AN INTRODUCTION TO ASSET ALLOCATION OF PROPERTY IN A MIXED ASSET PORTFOLIO

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Abstract

Although it is widely accepted that property is an important asset class in an investment portfolio, the role and significance of property is still debated (Lekander, 2015; Reddy, 2016b). There is also a gap between empirical evidence and the practices of portfolio managers, with a few studies finding that the asset allocation for property in mixed asset portfolios (comprising a few asset classes) are lower than optimal recommendations (Reddy, 2016a). Real estate is a unique asset, especially when compared to financial investment assets such as stocks or bonds. Hence, the inclusion of property in mixed asset portfolios requires some alteration to the asset allocation framework (Lekander, 2015; Lee and Stevenson, 2006; Reddy, 2016b). The objective of this paper is to further understand the role of property as an asset class in mixed asset portfolios. The first section discusses the strengths and weaknesses of property as an asset class. The following section looks at the framework used to determine optimal property allocation in mixed asset portfolios, i.e. the constrained Markowitz efficient frontier. Finally, empirical evidence regarding the performance of property and relevant asset classes in mixed asset portfolios is summarized. This serves to provide a brief overview of methodology used to investigate the performance of property in mixed asset portfolios as well as general findings and implications. Despite its disadvantages, property is still able to provide attractive returns and diversification benefits to a mixed asset portfolio. Property investments are also found to be more return enhancing than risk reducing (Olaleye, 2011; Oyedele et al., 2013; Oyedele, 2014) as well as resilient in periods of financial crisis due to its lower correlation with other asset classes. (Newell et al., 2013; Oyedele, 2014; Newell et al., 2015).

Keywords: Mixed-Asset Portfolio, Optimal Asset Allocation, Property Investment, Efficient Frontier, Markowitz mean-variance

1.0 INTRODUCTION

1.1 Background

Although it is widely accepted that property is an important asset class in an investment portfolio, the role and significance of property is still debated (Lekander, 2015). There is also a gap between empirical evidence and the practices of portfolio managers, with a few studies finding that the asset allocation for property in mixed asset portfolios (comprising a few asset classes) are lower than optimal recommendations (Reddy, 2016a). Existing literature points out that a fundamental reason for this is the nature of property itself. Real estate is a unique asset, especially when compared to financial investment assets such as stocks or bonds. Hence, in order to make better investment decisions in a mixed asset portfolio, it is important to understand the role of property in mixed asset portfolios.

1.2 Objective and Approach

The objective of this paper is to further understand the role of property as an asset class in mixed asset portfolios. There are several aspects that will be addressed in this paper, which are:

i. Characteristics and significance of property in the context of mixed asset portfolios
ii. Criteria for constructing a mixed asset portfolio with optimal property allocation
iii. Performance of specific property asset classes in mixed asset portfolios

The paper will be a literature review of past studies in this area. As certain aspects are theoretical and therefore remain relevant over time, literature is selected from a wide time range; i.e. from 1990 onwards. However, for the financial performance of investment portfolios, literature is limited to the past 5 years to ensure relevance.

2.0 CHARACTERISTICS OF PROPERTY AS AN ASSET CLASS

Although property is heterogeneous, it is 'sufficiently homogenous' to be invested in without requiring securitization (Lekander, 2015). The complexity and heterogeneity of property also enables it to perform various roles in a portfolio, as follows:

i. reducing portfolio variance/ risk;
ii. matching liabilities;
iii. hedging against inflation; and
iv. enhancing returns. (Lekander, 2015; Reddy, 2016b)

However, investment returns may vary considerably among different property classes. A recent study by Abdul Jalil et al. (2017) found that a larger portfolio allocation on certain types of property classes such as the hospitality industry do not generate sufficient returns within Malaysian Real Estate Investment Trusts (REITs).

Nevertheless, the property market lacks quality financial information to aid investment decisions (Hagar, 1990). Data are generally appraisal based instead of market based. This makes comparisons between property and other market based securities difficult (Lee and Stevenson, 2006). It could also lead to inaccurate estimation of returns and underestimation of volatility (Bryne and Lee, 1995; Lee and Stevenson, 2006).

Returns from property investments are low but steadily increasing with time, making it suitable to offset inflation. The sale of property can also be planned to coincide with liability outflows in future, effectively deferring the returns by many years (Hagar, 1990). However, this type of return pattern is vastly different from other asset classes since it can only be accurately measured upon transaction. Hence, including property in an asset allocation model will prove difficult (Ang, 2012).

The illiquidity of property can make it difficult to adjust the asset allocation from period to period, and it is seen as a long term investment. Hesitation regarding the illiquidity of property was addressed in a study by Lee and Stevenson (2006), which showed that the performance of property in mixed asset portfolios is generally consistent over time, although the benefits are more significant in long term holdings.

Hoesli et al. (2005) as cited in Lekander (2015), notes that the management of property investments (both operational as well as asset allocation) is more complicated than other asset classes, reducing its attractiveness to portfolio managers. Ang (2012) also identifies active property management as one of the disadvantages of including property in mixed asset portfolios. Hence, direct property investments are more suitable for larger funds with more resources as well as longer investment holding periods (Hagar, 1990; Lee and Stevenson, 2006).

A recent study by Lekander (2015) found that despite the disadvantages illiquidity, management requirements and quality of information, property is still able to contribute diversification to a mixed asset portfolio. Many studies on this subject matter have convincingly proven that investments in property provide attractive returns and diversification benefits due to its low correlation with other asset classes (Byrne and Lee, 1995; Stevenson, 2000; Steinert and Crowe, 2001; Olaleye, 2011; Lekander, 2015; Reddy, 2016a).

In conclusion, property is significantly different in nature than other asset classes. Hence, the inclusion of property in mixed asset portfolios requires some additional assumptions and constraints added to the asset allocation framework (Lekander, 2015; Lee and Stevenson,

2006).The framework for constructing an optimal mixed asset portfolio is discussed in Section 3.

3.0 CONSTRUCTING OPTIMAL MIXED ASSET PORTFOLIOS WITH PROPERTY

3.1 Efficient Frontiers and Asset Allocation

An efficient portfolio is defined as a portfolio that has the highest expected return for a given level of risk or the lowest level of risk for a given expected return (Lee and Stevenson, 2006). The efficient portfolio is determined by solving the equation (1) below (Markowitz, 1952, as cited in Lee and Stevenson, 2006):

Minimise $$\sigma_{Port}^2 = \sum_{i=1}^{N} {w_i}^2 {\sigma_i}^2 + 2 \sum_{i=1}^{N} \sum_{\substack{j=1 \\ j>i}}^{N} w_i w_j \sigma_{ij} \quad (1)$$

Subject to:

$$\sum_{i=1}^{N} w_i = 1 \quad (2)$$

$$0 \leq w_i \leq 1 \quad (3)$$

$$E(R_{Port}) = \sum_{i=1}^{N} w_i E(R_i) \quad (4)$$

where:

w_i	=	the weight associated with asset class *i*
${\sigma_i}^2$	=	the variance of asset *i*
σ_{ij}	=	the covariance between asset classes *i* and *j*
N	=	the number of asset classes
$E(R_i$	=	the expected return of asset class *i*
$E(R_t$	=	the expected return of the portfolio

The constraints (2), (3), and (4) ensure that:

i. The sum of all weights (asset proportion) must equal to one i.e. the weights corresponds to the fraction of portfolio allocated to that asset class.
ii. The weights allocated to each asset class must be must be positive. This means that no short selling is allowed. This constraint is especially relevant because short selling of real estate is impossible property and short selling by most institutions is controlled (Stevenson, 2000).
iii. The expected return of the portfolio is equal to the sum of total expected returns of each asset class (according to its corresponding weight in the portfolio).

As parameters such as expected return, standard deviation and correlation of each asset is fixed, the only variable is the weights or allocations of each asset class in the portfolio (Markowitz, 1952, as cited in Lee and Stevenson, 2006). This method for determining asset allocations is also known as the Modern Portfolio Theory (MPT) or Markowitz mean-variance framework, (Bryne and Lee, 1995; Reddy, 2016a). The efficient frontier is obtained by plotting all efficient portfolios on a graph, as the example in Figure 1 shown below:

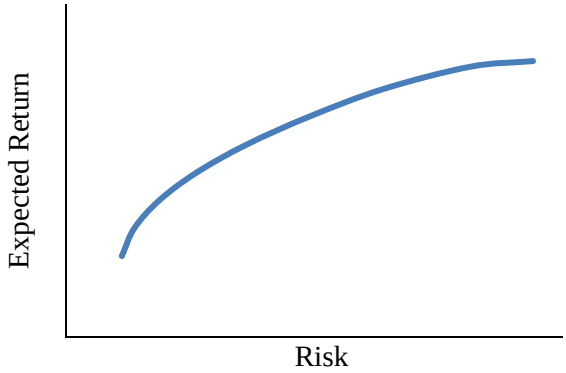

Figure 1: Example of Efficient Frontier

3.2 Criticisms of the Traditional Efficient Frontier

Some criticisms of this method are that it may result in unrealistic and extreme recommendations, such as some assets allocated zero weights and some allocated 100% (Bryne and Lee, 1995). The introduction of low risk asset classes into the portfolio may cause the weightage of the low risk asset to dominate all other assets (Bryne and Lee, 1995). For example, studies have shown that the introduction of cash tends to skew all results in favour of cash holdings (Bryne and Lee, 1995; Stevenson, 2000). This is unrealistic and also pushes

property out of the portfolio i.e. a weightage of zero.

Therefore, constraints on the allocation of certain asset classes are imposed in order to model the allocation of property in mixed asset portfolios. Additional constraints are sometimes added to comply with investment guidelines and objectives and to act as a risk management tool (Reddy, 2016a; Reddy, 2016b).

Putting aside statistical criticisms, an article by Edesess (2017) points out that the exercise of determining an 'optimal' asset allocation implies that asset allocation is a the most significant factor of investment returns. He argues that the fund manager's risk tolerances, liability streams, and funding policies largely affect the portfolio performance (Edesess, 2017). The 'perfect' mathematical shape of the frontier disregards these factors.

3.3 Impact of Constraints to Property Allocation

The impact of constraints can be effectively illustrated by the findings of Bryne and Lee (1995). The authors studied a four-asset MPT model consisting of property, equities, bonds and cash. In the unconstrained efficient frontier, property is included in 72.7% of efficient asset combinations, with allocations between 0 - 12.05%. However, when cash is constrained to a maximum of 6%, property is included in 90.9% of efficient asset combinations, with allocations between 0- 66.41%. Another possible constraint is fixed allocations for property. Stevenson (2000) suggests that instead of a range, a fixed allocation for property is more appropriate due to property characteristics (illiquid and high transaction costs). This is more realistic for portfolio managers. Past studies consistently show that with appropriate constraints, the allocation of property in efficient mixed asset portfolios will be increased (Bryne and Lee, 1995; Stevenson, 2000).

3.4 Optimal Allocation for Property in Mixed Asset Portfolios

Older studies (prior to 2010), have suggested that the optimal property allocation in mixed asset portfolios is between 10-30% (Craft, 2001; Hoesli et al., 2003; Bekkers et al., 2009; as cited in Reddy, 2016a). Lekander (2015) concluded that the optimal range of property allocations was 5%-20%. Reddy's (2016a) study of the Australian industry superannuation fund performance concluded that the optimal property allocation for industry funds is 19%. In contrast, a similar study by Reddy (2016b) indicated that optimal property allocations in Australian superannuation funds can be as high as 22%.

4.0 PERFORMANCE OF PROPERTY AND RELEVANT ASSET CLASSES IN MIXED ASSET PORTFOLIOS

In this section, empirical evidence regarding the performance of property and relevant asset classes in mixed asset portfolios is summarized. This serves to provide a brief overview of methodology used to investigate the performance of property in mixed asset portfolios as well as general findings and implications. The selected literature has been published within the past five years, i.e. 2011 to 2016.

The specific asset classes discussed in this section are:

i. property listed stock (Olaleye, 2011)
ii. real estate investment trusts (Newell et al., 2013; Newell et al., 2015; Nyachiro and Jagongo, 2017)
iii. regeneration property (Haran et al., 2011)
iv. listed infrastructure (Oyedele et al., 2013; Oyedele, 2014)

4.1 The performance of South African property listed stock in mixed-asset portfolios

Olaleye (2011) analyzed the performance of South African property listed stock in mixed asset portfolios. The data sets used consisted of quarterly returns on property listed stock, all share, all bond and 90 day Treasury bill (T-bill) over a ten year period (1999 - 2009). Among the characteristics evaluated were the mean return, standard deviation, mean standard deviation ratio, coefficient of variation and correlation coefficient. The author then constructed 5 control portfolios (without property), using initial weightings of 45% share and 55% fixed interests

(30% bond and 25% Treasury bill) to represent a typical institutional portfolio (Lee, 2005, as cited in Olaleye, 2011). These initial weightings were then adjusted by replacing a certain percentage of one of the assets with property stock, resulting in a further 17 portfolios of different allocation scenarios. Finally, the return and risk levels of the 22 naive portfolios (17 with property stock and 5 without) were determined using Markowitz's mean variance analysis. Findings show that property stock performed better than the other asset classes. The addition of property stock into the portfolios resulted in significantly enhanced returns. However the risk reduction benefits were minimal and statistically insignificant. Further analysis found that the risk reduction benefits could be better obtained when all share is entirely replaced with property stock rather than when both are combined in a portfolio. The author notes that this suggests a co-integration between property listed stock and common equity (all share). (Olaleye, 2011)

4.2 The performance of Real Estate Investment Trusts (REITs) in a mixed-asset portfolio

Newell et al. (2013) assessed the performance of French REITs over a nine year period (2003 – 2012). This was done by analyzing the monthly total returns for REITs, stocks, property companies and bonds. Direct property investments were not considered in this study. The annualized average monthly return and annualized monthly risk were calculated, and efficient frontiers were used to evaluate the role of REITs in a mixed-asset portfolio. It was found that the French REITS had better risk-adjusted returns compared to stocks, however had limited diversification benefits with stocks as compared to with bonds. REITs also played a significant role in the efficient frontier across all levels of risk in the mixed-asset portfolio. Analysis was also extended to gauge the post-global financial crisis (GFC) recovery of French REITs. REITs continued to provide high risk adjusted returns, but no observable recovery of the portfolio diversification benefits with stocks to the pre-GFC levels. (Newell et al., 2013)

The study was then repeated by Newell et al. (2015), with similar methodology to assess Singaporean REITs over a ten year period (2003 – 2013). The findings strongly echoed the previous study in terms of strong risk-adjusted returns and little diversification benefits with stocks as compared with bonds. Likewise, REITs played a significant role in the efficient frontier across all levels of risk in the mixed-asset portfolio, as well as in constrained allocation scenarios. In the post- GFC period analysis, REITs remained the best-performed asset class in Singapore. Singaporean REITs showed some post-GFC recovery in the diversification benefits with stocks; however these benefits were significantly less than the pre-GFC period. (Newell et al., 2015)

Overall, these studies confirmed the significant role of REITS in mixed asset portfolios and it's resilience in the post-GFC environment (Newell et al., 2013; Newell et al., 2015). Based on their review of developed property markets, Nyachiro and Jagongo (2017) also recommend including REITs in mixed asset portfolios as it has been proven to diversify returns as well as take advantage of other asset class inefficiencies.

However, Kizer and Grover (2017) offer a different view of REITs as an asset class. Their study of data over the period from January 1978 up to September 2016 argues that REITs may not be a distinct asset class as they have high correlation with equities and bonds. Nevertheless, they agree that REITs offer diversification benefits to investment portfolios (Kizer and Grover, 2017).

4.3 The performance of UK regeneration property within a mixed asset portfolio

Urban regeneration involves redevelopment of an area in order optimize its usage, economic capacity as well as community wellbeing. Common perceptions are that regeneration properties are less profitable than mainstream real estate. To investigate this claim, Haran et al. (2011) assessed the performance of UK regeneration property over a span of 28 years (1981–2008). The data set consisted of the risk-adjusted total returns for UK regeneration property, direct property, stocks and bond series. The study analyzed the diversification benefits of property portfolios as well as mixed asset

portfolios. Correlation analysis and efficient frontiers were also employed to investigate the role of regeneration property in a mixed-asset portfolio. (Haran et al., 2011)

Findings show that although there were some variations between the performance of various sub-sectors within regeneration properties (retail, office and industrial), generally the level of absolute risk for regeneration properties is not significantly more than mainstream properties. For this data set, optimal risk-return tradeoffs could be obtained with a portfolio consisting of either

i. 57% regeneration property and 43% bonds; or
ii. 7% property, 39% regeneration property, 7% stocks and 47% bonds. (Haran et al., 2011)

The latter portfolio is more diversified; however this statistically signifies that not only is regeneration property able to replace mainstream real estate in a multi-asset portfolio, but also an optimal portfolio can also be constructed with a majority allocation in regeneration property. The paper concluded that regeneration property did not weaken the multi-asset portfolio performance. In fact, for lower risk portfolio strategies, the inclusion of regeneration property as opposed to other forms of real estate reduced risk and enhanced returns. (Haran et al., 2011)

4.4 Performance of European and UK Listed Infrastructure in a mixed-asset portfolio

The role of property in mixed asset portfolios can be also extended to infrastructure assets, which are more closely related, compared to other assets such as bonds and equities. Oyedele et al. (2013) studied the performance of European listed infrastructure in a mixed asset portfolio over a ten year period (2001-2010). Using the monthly investment return indices from Thomson Reuters DataStream, they analyzed characteristics such as average annual return and risk, mean variance portfolio, maximum return portfolio and calculated the efficient portfolio frontiers. It is important to note that the study involved a period of GFC. The study found that European infrastructure investment had a significant role in the optimal mixed asset portfolios. It was also found the adding infrastructure in the portfolio had potential for diversification especially during the post GFC period. The diversification benefits of infrastructure were also described to be more return enhancing rather than risk reducing. (Oyedele et al., 2013)

The study was then repeated with UK-listed infrastructure by Oyedele (2014), employing the same methodology. Findings show that UK infrastructure performed better than UK property, private equity, hedge funds and UK stocks. This paper noted that the majority of asset classes showed negative annualized returns and relatively high volatilities during the GFC period. Nevertheless, the study found that infrastructure had positive annualized returns outperforming most other assets. Findings also echoed the previous study, whereby the diversification benefits of infrastructure were more return-enhancing than risk-reducing.

These studies proved that infrastructure was fairly resilient in times of financial crisis. In order to ensure justifiable allocations during periods of downturn, a deeper understanding of infrastructure performance as well as its correlation with other asset classes is necessary (Oyedele, 2014). The authors concluded that European listed infrastructure has developed into a unique asset class, providing alternative investment for investors to tap into (Oyedele et al., 2013; Oyedele, 2014).

5.0 CONCLUSION

The paper explored the role of property in mixed asset portfolios, the statistical criteria for optimal allocation of property, and the performance of property assets in mixed asset portfolios. Indisputably, property plays a significant role in mixed asset portfolios. Despite its disadvantages, property is still able to provide attractive returns and diversification benefits to a mixed asset portfolio. Property investments are also found to be more return enhancing than risk reducing (Olaleye, 2011; Oyedele et al., 2013; Oyedele, 2014) as well as resilient in periods of financial crisis due to its lower correlation with other asset classes. (Newell et al., 2013; Oyedele, 2014; Newell et al., 2015). Studies show that the potential of property as an asset class has not been

tapped into by institutions, despite the overwhelming empirical evidence. This gap could partially be due to the statistical framework of the Markowitz mean variance that seems to push out property in favor of other assets unless appropriate constraints are placed. This also raises questions regarding other preferences or criteria that fund managers may have besides the statistical allocation of assets. The wide variety of property asset classes also opens up areas for further research on their return and risk characteristics, especially in the Malaysian real estate research arena.

REFERENCES

Rohaya Abdul Jalil, Low Sheau-Ting, Izran Sarrazin Mohammad, Siti Zulfarina Fadzli and Tiong Chai Ping. (2017). The Relationship of Malaysian REITs' Portfolio and its Financial Performance, International Journal of Real Estate Studies, 11 (2), 159 -167.

Abel Olaleye. (2011). The effects of adding real estate into mixed-asset portfolios in South Africa. Journal of Financial Management of Property and Construction, 16 (3), 272–282.

Ang, A. (2012). Real Assets, Research Paper No. 12-60, Columbia Business School, New York, NY.

Daniel Nyachiro and Ambrose Jagongo. (2017). Role of Real Estate Investment Trusts (REITs) in a Mixed Asset Portfolio: A Review of Literature. Journal of Business and Management, 19(3), 102-108.

David P. Hagar. (1990). Property and asset allocation – 1 The consulting actuary′s view. Journal of Valuation, 8(3), 254–261.

Graeme Newell, Alastair Adair, and Thi Kim Nguyen. (2013). The significance and performance of French REITs (SIICs) in a mixed-asset portfolio. Journal of Property Investment & Finance,Vol. 31(6), 575–588.

Graeme Newell, Anh Khoi Pham, and Joseph Ooi. (2015). The significance and performance of Singapore REITs in a mixed-asset portfolio. Journal of Property Investment & Finance, 33(1), 45-65.

Hoesli, M. and Lekander, J. (2005). Suggested versus actual institutional allocations to real estate in Europe: a matter of size? Journal of Alternative Investments, 8(2), 62-70.

Jared Kizer and Sean Grover. (2017). Are REITs a Distinct Asset Class? Buckingham Strategic Wealth. Retrieved from http://buckinghamadvisor.com/reits-are-they-a-distinct-asset-class/

Jon R.G.M Lekander. (2015). Real estate portfolio construction for a multi-asset portfolio. Journal of Property Investment and Finance, 33(6), 548–573.

Joseph B. Oyedele, Stanley McGreal, Alastair Adair, and Peter Ogedengbe. (2013). Performance and role of European listed infrastructure in a mixed-asset portfolio. Journal of Financial Management of Property and Construction, 18(2), 160-183.

Joseph Bamidele Oyedele. (2014). Performance and significance of UK-listed infrastructure in a mixed asset portfolio. Journal of European Real Estate Research, 7(2), 199–215.

Larry Swedroe (2017, August 21). The Role of REITs in a Diversified Portfolio. Advisor Perspectives. Retrieved from https://www.advisorperspectives.com

Mark Steinert and Scott Crowe. (2001). Global Real Estate Investment: Characteristics, Optimal Portfolio Allocation and Future Trends. Pacific Rim Property Research Journal, 7(4), 223-239.

Markowitz, H.M. (1952). Portfolio selection. Journal of Finance, 7(1), 77-91.

Martin Haran, Graeme Newell, Alastair Adair, Stanley McGreal and Jim Berry. (2011). The performance of UK regeneration property within a mixed asset portfolio. Journal of Property Research, 28(1), 75-95.

Michael Edesess. (2017, August 14). The Absurdity of Asset Allocation Studies. Advisor Perspectives. Retrieved from https://www.advisorperspectives.com/articles/2017/08/14/the-absurdity-of-asset-allocation-studies

Peter Byrne and Stephen Lee. (1995). Is there a place for property in the multi-asset portfolio? Journal of Property Finance, 6(3), 60–83.

Simon Stevenson. (2000). Constraining optimal portfolios and the effect on real estate's allocation. Journal of Property Investment and Finance, 18(4), 488–506.

Stephen Lee and Simon Stevenson. (2006). Real estate in the mixed-asset portfolio: the question of consistency. Journal of Property Investment and Finance, 24(2), 123–135.

Wejendra Reddy. (2016a). Evaluation of Australian industry superannuation fund performance; asset allocation to property. Journal of Property Investment and Finance, 34(4).

Wejendra Reddy. (2016b, January 17-20). Real Asset Allocation: Evaluating the Diversification Benefits of Property and Alternative Asset Classes in Australian Superannuation Portfolios. Paper presented at 22nd Annual Pacific-Rim Real Estate Society Conference, Queensland, Australia.