

SUPERANNUATION FUNDS AND PROPERTY ALLOCATION STRATEGIES: WHAT IS THE MIX? DIRECT PROPERTY, LISTED PROPERTY OR BOTH?

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ABSTRACT

Property as an asset class plays an important role in Australian superannuation fund investment portfolios. This research examines the diversification benefits of direct and listed property in a mixed asset portfolio using nine different asset allocation models, including the industry superannuation fund conventional strategic investment approach. Over a 17-year sample period (1995 to 2011) direct property significantly outperforms all other asset classes in the industry fund balanced investment option. In addition, direct property figures more prominently than listed property across all investment strategies. Although statistically small, the contribution of listed property cannot be ignored as several strategies that included both property assets demonstrated improved performance. On looking at specific time periods, an average mixed allocation of direct property (16%) and listed property (5%) was beneficial across all strategies. Excluding unconstrained investment strategies, an increased 17% allocation to property (12% direct property and 5% listed property) is recommended for the industry fund balanced portfolio. This high allocation is backed by improved risk-adjusted return performance.

Keywords: property investment, asset allocation, diversification, portfolio construction.

INTRODUCTION

Property has traditionally been regarded as a key investment asset class for the A\$268 billion industry superannuation funds. Industry superannuation funds, designed for employees working in the same industry, are the largest not-for-profit (or institutional) superannuation investment option in Australia. Approximately 67% of their assets are held in the balanced or default investment option which consists of equities (Australian and International), fixed income (Australian and International), property, alternatives and cash (APRA 2013, p50). This research paper examines the performance and the asset allocation components of different property assets in the industry fund balanced investment option using nine different asset allocation techniques, including the industry fund conventional strategic approach.

Past asset allocation studies (Bajtelsmit and Worzala 1995; Brown and Schuck 1996; Hoesli, Lekander and Witkiewicz 2003) have invariably concluded that the optimal weight which should be allocated to property in mixed-asset portfolios is in the 10-30% range and the inclusion of property leads to a 15-25% reduction in the portfolio risk. In reality, Australian superannuation fund allocation to property has historically averaged 8% to 10%. Newell (2008) notes that institutional investors normally justified property's low allocation by small market size and illiquidity constraints. In addition, Reddy (2012) identified management fees, limits on listed/ unlisted split, declining market conditions, entry restrictions and time and staff limitations as other institutional constraints to optimal property allocation. Regardless of these constraints, fund managers have used their property allocations to improve portfolio performance by adding an uncorrelated asset class.

Combined with its comparatively good returns, real estate's low volatility (even after adjusting for the effects of valuation smoothing) emphasise its attractive risk and return characteristics to investors.

The recent poor performance of the equities markets has seen Australian fund managers place greater emphasis on stable investment sectors such as property to achieve improved risk-adjusted return performance. Leading industry superannuation fund managers Australian Super and Unisuper have recently announced increased appetite for property assets (Friemann 2012, p50; Hughes, p47). In addition, market reports by JP Morgan Asset Management (2012) and Jones Lang LaSalle (2012) anticipate superannuation real estate asset allocation to increase to 25% in the next decade as fund managers re-profile investment portfolios following the 2007 global financial crisis. The need to generate continued retirement income for Australia's growing and ageing population means that allocation to property assets will remain important for the Australian superannuation sector's growth in future.

Reddy (2012) in a recent survey of Australian fund managers and asset consultants identified that the current property allocation trend is to diversify away from REITs with higher allocation to direct/unlisted property funds due to the stability of income. The allocation of capital to different property assets provides several challenges for fund managers. Although both direct and listed property investments are backed by the same real estate physical assets, their return and risk profile are distinct. Direct property is the traditional form of property which is tangible and exposes investors to the physical real estate assets. Although direct property provides an attractive mix of attributes (inflation-hedging, relative stability, bond-like income, global exposure and improved risk-adjusted returns), there are numerous problems associated with investing directly (higher investment and management cost, appraisal-smoothing vs transaction-based pricing, illiquidity and lag reaction to market information). Therefore, institutional investors generally prefer to use indirect property such as real estate investment trusts (REITs) in conjunction with, or in lieu of, investments in direct property. Indirect property such as REITs were designed to provide a more liquid, easily tradable and cost effective way to gain exposure to commercial real estate for institutional and retail investors (De Francesco 2005; Higgins and Ng 2009).

	<i>Public Markets</i>	<i>Private Markets</i>
Equity Assets	Shares - A-REITs	Private Equities - Unlisted Property (wholesale property trusts and syndicates)
Debt Assets	Traded Debt Securities - Commercial mortgage backed securities - Property trust bonds	Bank Loans - Whole commercial property mortgages

Four Quadrant Property Investment Product Markets

Source: Higgins 2007, p.13

Table 1

Higgins (2007) used the four quadrant investment model to define the Australian property market. Table 1 provides details of the four quadrant Australian property investment model and illustrates that property investment products can offer different risk and return profiles and deliver different diversification benefits. For the purpose of this research paper, direct property is a representation of investments in direct commercial property assets and unlisted property funds. Listed property is a representation of the Australian REITs.

Newell (2006) found that while direct property is the underlying asset in all REITs, property was only a small contributor to A-REITs performance. The returns of direct property are underpinned on fundamental macroeconomic factors such as employment growth and retail trade. While A-REITs returns are mainly driven by financial and capital market variables and stock market sentiment. The general consensus is that REITs are not a surrogate for the ownership of direct property over the short to medium term, rather more like common stocks than property. Therefore, the co-integration of direct property and A-REITs is expected to be low in the short term but returns are expected to display convergence in the long-run.

Reddy (2012) and Worzala and Bajtelsmit (1997) using industry surveys found that a significant number of institutions classified REITs within the equities portfolio. In addition, Reddy (2012) identified that some fund managers allocated alternative assets in existing real estate portfolios.

This research will investigate the above issues by evaluating the diversification benefits and performance matrix for direct property and listed property assets within the setting of two asset and multi-asset portfolios.

The allocation of resources between different asset classes is based on set modelling parameters that follow modern portfolio theory (MPT) methodology. Industry funds start their asset allocation process by setting long-term investment objectives and guidelines, referred to as the strategic asset allocation (SAA) policy. Fund managers (mainly active managers) attempt to earn additional return above the SAA policy by altering the asset class exposures over time, a process termed as tactical asset allocation strategy or TAA (Fabozzi and Markowitz 2011; Sharpe et al 2007).

MacKinnon and Al Zaman (2009) identified that there is a need to examine the optimal holdings for direct and listed property assets within more dynamic portfolios when the asset weighting can be continuously rebalanced. Reddy (2012) in a survey of Australian fund managers and asset consultants identified that the SAA is the dominant asset allocation model used in the industry. The study also identified that, due to the continued uncertain investment markets, some Australian fund managers are increasingly changing to shorter term strategies such as the TAA. In addition to the industry fund conventional SAA model, Reddy et al (2013) identified a series of eight alternative investment strategies to determine the optimal allocation to property assets, detailed in Table 2.

Asset Allocation Strategies	Model Characteristics	Transaction Costs	Management Costs	Liquidity Benefits	Default Risk
Strategic	Industry fund conventional long term strategy.	Medium	Medium	Medium	Low
Buy and Hold	Asset weighting remains constant for the investment horizon.	Low	Low	High	Low
Traditional*	Allocation restricted to equities, bonds and cash.	Low	Low	High	Medium
Optimal – No constraints	Mean-variance optimization with no asset weight constraints.	High	Medium	Medium	High
Optimal – Weighted constraints	Mean-variance optimization with pre-defined weight parameters.	High	Medium	Medium	Medium
Turning Points	Allocation based on cyclical movement of GDP.	High	High	Low	High
Equal Weighted	Equal weighting to all assets.	Low	Low	Medium	Low
Tactical – No constraints	Short term asset rebalancing with no asset weight constraints.	High	High	Low	High
Tactical – Weighted constraints	Short term asset rebalancing with pre-defined weight parameters.	High	High	Medium	Medium

*Note for the purpose of this research, property assets are included in the Traditional portfolio.

Nine Asset Allocation Models: Key Characteristics and Operational Features
Source: Reddy et al (2013)

Table 2

The Buy and Hold and Equal Weights strategies are passive techniques. The Optimal strategies seek the highest risk adjusted returns, a technique known in the field of MPT as Markowitz mean-variance portfolio optimization. The Traditional strategy in this research also includes property assets. The Turning Points allocation is based on the cyclical movement of GDP. The Strategic allocation is a representation of an industry fund conventional asset allocation model. The Tactical strategies are based on a risk parity and momentum investment technique. The Traditional, Buy and Hold and Equal Weights strategies are less management intensive with low transaction and medium to high liquidity benefits. Most of the active asset allocation techniques encompass medium to high transaction and management costs and generally offer low to medium liquidity benefits. The default risk assesses if certain asset allocation models have high exposure to a specific asset class. The Optimal-No Constraints and Tactical-No Constraints models overweight assets with low variance

and thus involve high default risk. Although consideration of operational features are important, industry funds are primarily measured on performance.

In addition to the SAA policies, industry superannuation funds also formulate a range of permissible investable asset weights as a primary risk management tool. Table 3 illustrates the assumed pre-determined weight constraints.

<i>Asset Class</i>	<i>Minimum Weight</i>	<i>Maximum Weight</i>
Australian Equities	20%	40%
International Equities	10%	30%
Direct Property	0%	20%
Listed Property	0%	20%
Australian Fixed	0%	20%
International Fixed	0%	15%
Cash	0%	15%
Alternatives	0%	25%

Industry Superannuation Funds Asset Weight Parameters: December 2011

Source: Author

Table 3

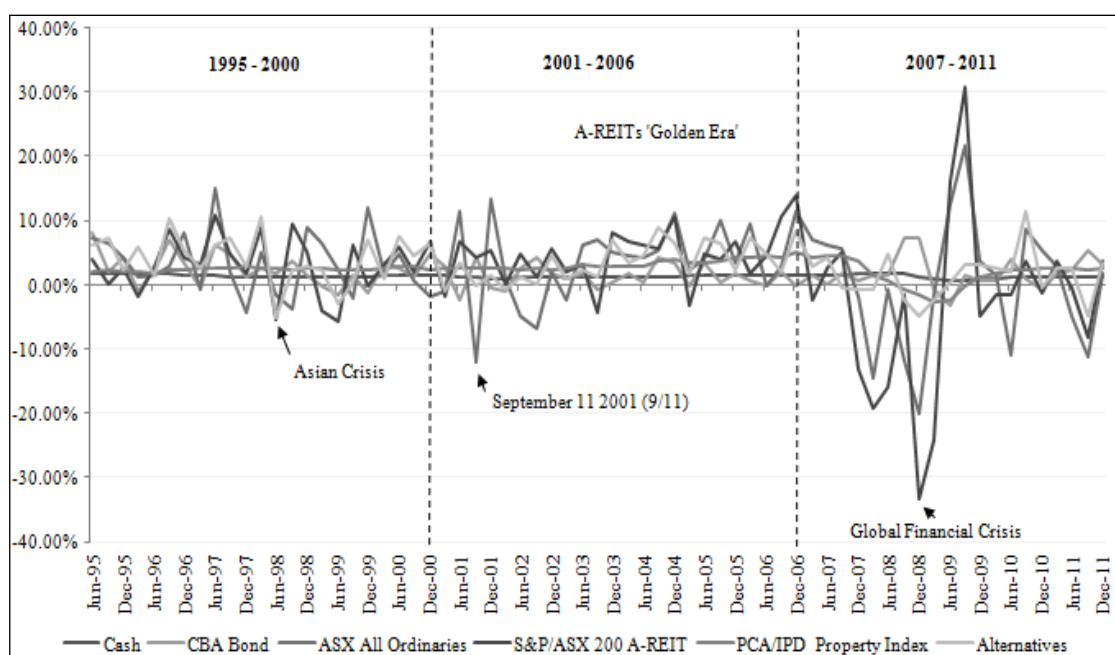
Table 3 illustrates that industry funds place high weighting on the equity markets. The property allocation range is set as 0% to 20%. This information is prepared based on consensus data from six leading Australian industry superannuation funds with A\$146 billion of funds under management. Except for the Optimal-No Constraints and Tactical-No Constraints investment techniques, all strategies are modelled within the above pre-defined asset weight parameters.

The following sections include: section two which provides a literature review; section three details the historical performance of industry superannuation fund balanced investment option asset classes and the associated research methodology; section four provides the empirical research findings; and the last section provides the research conclusions.

LITERATURE REVIEW

Overview of Australian Property Assets

Institutional investors in Australia generally gain allocation to property assets by investing in property funds and via mandates or partnership with other wholesale managed funds. Fund managers have access to more than 1,000 different property funds including listed property (A-REITs) and unlisted property such as wholesale property funds, property syndicates and retail property funds. The largest is the A-REITs sector, which represent 48% of the Australian A\$290 billion property market, followed by unlisted wholesale funds (33%). A-REITs are listed and traded on the Australian Stock Exchange (ASX). Unlisted property funds are traded through the manager on the private market and are designed as open or closed ended vehicles. Compared to A-REITs, unlisted property funds and property syndicates have a total return focus and offer lower investment risk profile (PCA 2011, p6; Higgins 2010; Parker 2012).



Australian Market Asset Performance: Quarterly Data (June 1995: December 2011)

Source: Author

Figure 1

Figure 1 shows the Australian assets historical performance from June 1995 to December 2011 and illustrates that the A-REITs and the Australian equities markets display significant variance compared to the more stable investment sectors such as direct property, cash and Australian fixed income. At the height of the recent global financial crisis (March 2009), A-REITs market capitalisation declined by 70% to approximately A\$47 billion from a peak of approximately A\$148 billion in August 2007. Unlisted wholesale property funds, a better representation of direct property, declined from A\$78 billion in 2008 to \$61 billion in 2009 (PCA 2011, p8; Parker 2013, p2).

The more severe collapse in the A-REITs sector has been attributed to structural alteration in recent years, including increased gearing levels, higher exposure to offshore property assets, diversification in other activities such funds management and property development which has given rise to stapled REITs (De Francesco and Hartigan 2009; Higgins and Ng 2009; Newell 2006).

Direct Versus Listed Property Asset Allocation

Markowitz (1952) and subsequent researchers, such as Jack Treynor, William Sharpe and Frank A. Sortino established the field of MPT, the analysis of rational portfolio choices based on efficient use of risk. MPT concepts, like Efficient Frontier, Mean-Variance Optimization and Sharpe Ratio (risk adjusted return performance) assist investors evaluate the trade-off between risk and return and achieve greater diversification benefits (Fabozzi et al 2012).

Geltner, Rodriguez and O’Conner (1995) found that although both listed and direct property are essentially similar neither form of property is a perfect substitute for the other in a portfolio. Other

studies have found that the inclusion of both direct and listed property within a multi-asset portfolio is regarded as beneficial and can lead to improved portfolio performance. In addition, timing may be an important factor in choosing between direct and securitised property, that is, there will be certain times when it is better to buy (or sell) one form of property over the other (Clayton and MacKinnon 2003; Lee and Stevenson 2005; Mueller and Mueller 2003; Yunus, Hansz and Kennedy 2012).

Numerous studies conclude that the Australian direct property and A-REITs markets move in counter-cyclical nature in the short term but show convergence in the long-run (CFS 2008; De Francesco and Hartigan 2009; Newell 2008; Radanovic 2010). Despite the lack of short-term co-integration there is evidence of a common 'real estate factor' driving both property markets. However, the consensus generally is that the relationship between listed property and direct property is considerably stronger when a lead in REIT returns is considered (Brounen and Eichholtz 2003; Giliberto 1990; Hoesli and Oikarinen 2012). These studies found that whilst direct and listed property markets are closely linked, 'real estate shocks' take place first in the REIT market after which the direct market adjusts to these shocks.

Chiang and Lee (2007), MacKinnon and Al Zaman (2009), Pagliari, Scherer and Monopoli (2005) and Seiler, Webb and Myer (2001) found that when both direct property and listed property are available as asset classes, REITs play little or no role in optimal portfolios. In addition, MacKinnon and Al Zaman (2009) examined the optimal allocation to property assets with different investment horizons and found that on all horizons REITs displayed greater risk and the optimal portfolios displayed large allocations to direct property. Waggle and Moon (2006) used mean-variance function to determine the optimal allocation to REITs. Their study found that using recent data rather than the full time-series data results in optimal allocations in REITs that are considerably higher. Lee and Stevenson (2006) investigated the role of direct property in mixed asset portfolios and found that real estate consistently had positive allocation over different time-periods ranging from five to 25 years. The research states that direct property should be considered as a strategic asset in the mixed-asset portfolio. Previous research on Australian market (CFS 2008; De Francesco and Hartigan 2009; Newell and Razali 2009) also anticipate higher allocation to direct property in the short to medium term as institutional investors seek greater portfolio stability and control after the global financial crisis. CFS (2008) found that increased A-REITs market volatility may warrant a direct property allocation in property asset portfolio to exceed 65%-70% in the short term.

The literature highlights that, although both direct and listed property are classed as property, they offer different portfolio diversification benefits. Therefore, it is important to cater for these differences when making asset allocation decisions. Direct property and listed property need to be analysed as separate asset classes and their inclusion in multi-asset portfolios based solely on respective asset return, risk and correlation matrix against other assets.

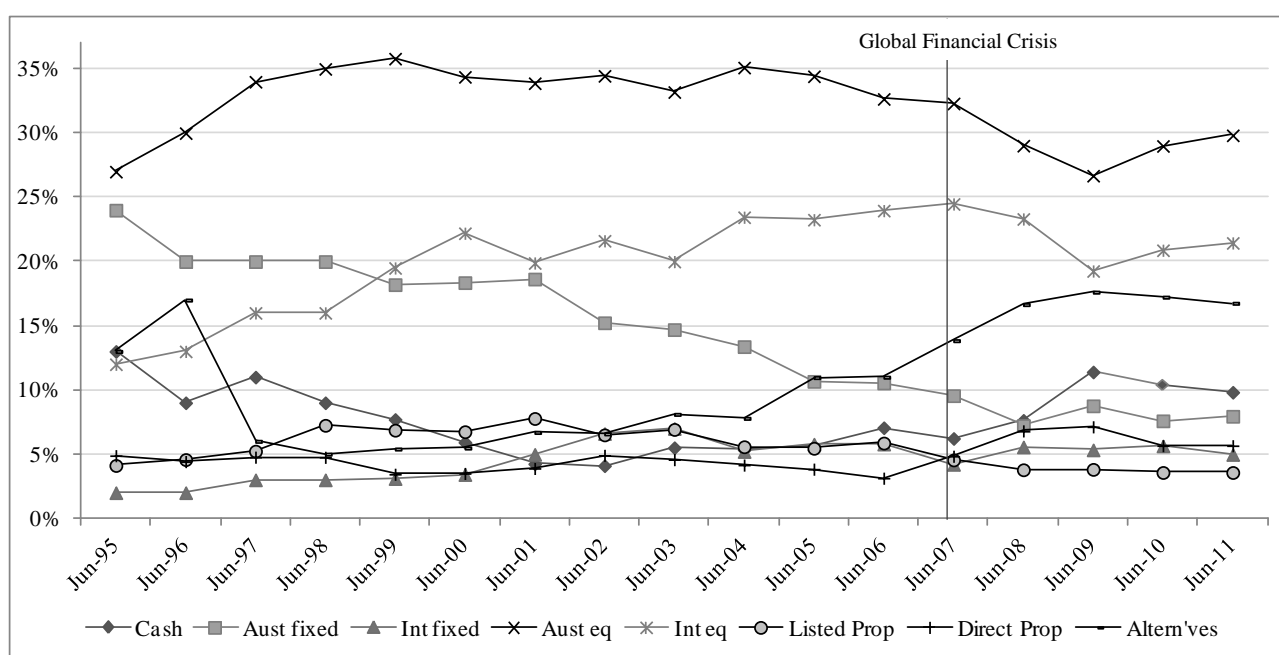
RESEARCH DATA AND METHODOLOGY

Data

The research data covers a sample period of 17 years (1995 to 2011), comprising 68 quarterly data points. The asset data and benchmark representations for the research include:

- Australian Equities (Aust eq) = S&P/ ASX 200 Accumulation Index or All Ordinaries Index;
- International Equities (Int eq) = MSCI WORLD Standard (Large+Mid Cap) Index (AU);
- Australian Fixed Income(Aust fixed) = CBA Bond (All Series, All Maturities);
- International Fixed Income(Int fixed) = Citigroup World Global Bond Index (AU);
- Cash = Reserve Bank of Australia (RBA) Interbank Rate;
- Direct Property (Direct Prop) = PCA/IPD Composite Property Index;
- Listed Property (Listed Prop) = S&P/ASX 200 A-REIT Index; and,
- Alternatives Assets index (Altern'ves) = infrastructure, hedge fund, private equity and commodity assets.

The Alternatives index is constructed based on the UK alternative asset class index structure (Bond et al 2007). The data was sourced from UBS Wealth Management, Dow Jones Credit Suisse, AVCAL and Cambridge Associates and RBA. All international index data was converted to Australian Dollars (AU).



Industry Superannuation Balanced Fund Asset Weights (1995 – 2011)

Source: Rainmaker Group 2012

Figure 2

Figure 2 provides details of the asset allocation weights for the industry superannuation balanced fund. The data was sourced from the Rainmaker Group, a leading superannuation service provider in Australia. Figure 2 demonstrates that over the 17-year sample period, equities (Australian and

International) were the most dominant asset class. The aggregated average (from highest to lowest) was Australian equities 32.2%, international equities 20.4%, Australian fixed 13.8%, alternatives 11.2%, cash 7.4%, listed property 5.4%, direct property 5.0% and international fixed 4.7%. Allocation to listed property has generally been higher than direct property in the pre-GFC period. Post 2007 allocation to listed property has declined from 6% to 3%. In contrast, the allocation level to direct property has improved significantly, from an average of 4% prior to 2007 to 7% at December 2011.

Methodology

The asset performance, portfolio risk, returns and correlation measures for this research are based on quarterly ex-post data. The portfolio return for all asset allocation models was calculated using Equation 1.

$$R_p = w_1R_1 + w_2R_2 + \dots + w_GR_G \text{ Equation 1: Portfolio Return}$$

Equation 1 states that the return on a portfolio (R_p) of G assets is equal to the sum of all individual assets' weights in the portfolio multiplied by their respective return (Fabozzi et al 2012). For all nine asset allocation models, the individual asset return is represented by the time-series benchmark return data (see Data sub-section). Detailed individual asset return performance data is provided in the 'Results and Discussion' section. The individual asset weighting data was sourced from the Rainmaker Group (see Figure 2). Except for the industry fund Strategic portfolio, the asset weight data in the eight alternative asset allocation models was modified to suit the different investment styles.

The Strategic portfolio is the industry fund original balanced investment option and includes investments in equities (Australian and International), fixed income (Australian and International), cash, property (direct and listed) and alternative assets. For the Buy and Hold strategy the asset weights were determined at the start of the investment period (June 1995) and remained constant throughout the investment period. The Traditional portfolio includes investments in equities (Australian and International), fixed income (Australian and International), property (direct and listed) and cash. Consequently, the industry fund balanced portfolio is re-weighted to the four traditional assets. For example, the weighting for traditional assets as at 30 June 1995 was equities (39%), fixed income (26%), cash (13%) and property (9%). The re-weighted traditional portfolio to 100% was equities (45%), fixed income securities (30%), cash (15%) and property (10%). The Equal Weighted model allocates equal weighting to all asset classes. For the eight asset industry fund balanced investment portfolio, individual asset weight was approximately 13% throughout the investment period. The Turning Points model is based on the Australian GDP moving average trend. Funds are allocated to growth focused assets (equity, alternatives and property) during improved economic conditions, while income focused assets (fixed income, cash and property) are selected in declining market conditions. The industry fund balanced portfolio is re-weighted to either growth or income focused assets on a quarterly basis similar to the Traditional model.

The Optimal – No Constraints and Optimal – Weighted Constraints models are based on the MPT mean-variance portfolio construction technique. For n number of assets involved in the portfolio,

the asset allocation is optimised by minimising portfolio risk for a given level of expected return following Markowitz (1952) quadratic programming problem:

$$\text{Minimise } \sigma_p^2 = \sum_{i=1}^n \sum_{j=1}^n x_i x_j \sigma_{ij} \quad \text{Equation 2: Quadratic Mean-Variance Function}$$

$$\text{subject to } \mu_p = \sum_{i=1}^n x_i \mu_i$$

$$\mu_p \geq \mu_0$$

where:

- x_i = proportion of portfolio allocated to asset i
- μ_p = expected portfolio return
- μ_i = expected return on asset i
- μ_0 = given level of expected return
- σ_{ij} = covariance between asset i and asset j returns.

The covariance and correlation coefficient matrix tests the portfolio diversification benefits for the industry fund balanced investment option asset classes. The Microsoft Excel spreadsheet ‘Solver’ function, a what-if analysis tool, is used to find the optimal weightings at a risk minimised and targeted expected portfolio return value. The use of Solver allows application of constraints to restrict the values the program can use in the model. The individual asset weights were constrained to being positive (greater than or equal to zero) and the total portfolio weight should sum to 100%. The model does not allow short selling. The construction of efficient frontiers involved calculating the possible portfolio weighting at 10% intervals for return and standard deviation. The Australian Government 10 year bonds are used as the risk free rate. For the Optimal – No Constraints strategy, there is no weight restriction on the level of investment for individual asset classes. This resulted in extreme allocation in specific assets. For more industry practical application of the mean-variance optimisation problem, the Optimal – No constraints equation is expanded by adding minimum and maximum asset weight constraints. Fabozzi et al (2011) explain that the minimal and maximal exposure for individual assets can be controlled by the constraint:

$$L_i \leq w_i \leq U_i \quad \text{Equation 3: Weight Constraints}$$

where:

L_i and U_i are vectors representing the minimum and maximum holding in asset i .

The Optimal – Weighted Constraints strategy is modelled using minimum and maximum holding constraints based on the industry fund strategic portfolio asset weight parameters (see Table 3).

The industry fund Tactical asset weight shifts were determined on a quarterly basis using the ‘Risk Parity and Momentum’ portfolio construction technique. Risk parity (a simple volatility-weighted

technique) over-weights less volatile assets and under-weights more volatile assets. Exposure to assets with negative quarterly returns is reduced to zero with the weight redistributed to cash. This allows increases in risk-adjusted return (higher Sharpe ratio) in the long run because of capital preservation. The Momentum portfolio construction technique ranks each asset class based on its respective quarterly momentum signal. This ranking is used to determine the tactical weights. For asset class i , the weight (W_m) is calculated using the formula:

$$W_m(i) = \text{Base}(i) + R \times [\text{rank}(i) - \text{average}(\text{rank})] \text{Equation 4: Momentum Ranking}$$

For the chosen 7 asset class portfolio, the average rank (by definition) is 4. The changes to asset classes are always within the $-3xR$, $-2xR$, $-R$, 0 , R , $2xR$ and $3xR$ based on rankings from 1 to 7. R is a parameter that can be changed depending on the investor's risk preference. A higher value of R means higher risk (Gray et al 2012; Wang and Kochard 2011). For the purpose of this exercise R is set as the risk free rate (Australian Government 10 year bonds). There are no pre-defined asset weight constraints for the Tactical – No Constraints strategy. For the Tactical – Weighted Constraints strategy, the portfolio is modelled on pre-defined weight parameters for all asset classes (see Table 3).

The individual asset and portfolio performances were compared using the Sharpe ratio. The Sharpe ratio, developed by William F. Sharpe (1966, 1994) is the most common measure of comparative performance in the financial markets. The Sharpe ratio is calculated using Equation 5

$$(rp - rf) / \sigma_p \quad \text{Equation 5: Sharpe Ratio}$$

where:

σ_p = portfolio standard deviation

rp = expected portfolio return

rf = is the risk-free rate (Australian 10 year bond rate)

Bernstein (2007) explains that a high Sharpe ratio performance is preferred by fund managers, with the target benchmark being 1.00. Whilst a portfolio may demonstrate high total returns, the associated risk for that return may also be high. The risk-adjusted return performance attempts to capture the trade-off between risk and return.

RESULTS AND DISCUSSION

The results are divided in two major parts. Firstly, the individual asset performance statistics and correlation matrix are discussed. Then the results from the nine asset allocation models are discussed using different property allocation scenarios.

Asset Return Performance

The industry fund balanced investment option historical performance trend was highlighted in Figure 1 earlier. Table 4 provides the quarterly total return data for all asset classes at different time intervals, demonstrating that there is significant variance in quarterly total returns for most asset classes at different time intervals. The data displays sharp fluctuations for the Australian equities, International equities and A-REITs markets. The returns for cash, direct property and fixed assets (Australian and International fixed) remained relatively stable. A-REITs recorded strong

performance in 1995-2000 and enjoyed a ‘golden era’ during 2001-2007, recording the highest total return (4.4%). However, during 2007-2011 (post GFC period) the sector declined to its lowest point, recording the only negative mean return (-3.1%). Although direct property performance lagged the A-REITS returns for most of the analysis period, it outperformed the listed property sector during 2007-2011.

Time Period	Cash	Aust Fixed	Int Fixed	Aust eq	Int eq	Direct Prop	Listd Prop	Alter'ves
1995 – 2000								
<i>Mean Return</i>	1.4%	2.4%	1.9%	3.7%	4.5%	2.4%	3.0%	4.0%
<i>Standard Deviation</i>	0.3%	2.7%	1.7%	5.0%	10.9%	0.3%	4.7%	4.0%
<i>Variance</i>	0.0%	0.1%	0.0%	0.2%	1.1%	0.0%	0.2%	0.2%
2001 – 2007								
<i>Mean Return</i>	1.3%	1.4%	1.1%	3.3%	1.5%	3.2%	4.4%	3.6%
<i>Standard Deviation</i>	0.1%	1.9%	1.6%	6.1%	13.9%	0.8%	4.2%	3.0%
<i>Variance</i>	0.0%	0.0%	0.0%	0.4%	1.9%	0.0%	0.2%	0.1%
2008 – 2011								
<i>Mean Return</i>	1.2%	1.9%	1.2%	0.5%	0.4%	1.6%	-3.1%	1.4%
<i>Standard Deviation</i>	0.3%	2.6%	4.5%	10.0%	18.7%	2.2%	13.9%	3.7%
<i>Variance</i>	0.0%	0.1%	0.2%	1.0%	3.3%	0.0%	1.8%	0.1%

Asset Total Return at Different Intervals: Quarterly Data (1995 – 2011)

Source: Author

Table 4

Asset Class	Mean Return	Std Dev'n	Sharpe Ratio	Kurt osis	Skew ness	Varia nce	Ann'ld Return	Ann'ld Std Devn
Cash	1.32%	0.26%	-0.45	-0.09	0.28	0.00%	5.37%	0.52%
Aust fixed	1.87%	2.35%	0.19	0.32	0.55	0.05%	7.70%	4.71%
Int fixed	1.38%	2.80%	-0.02	10.94	-0.62	0.08%	5.62%	5.60%
Aust eq	2.43%	7.28%	0.14	1.24	-0.56	0.52%	10.07%	14.56%
Int eq	2.10%	14.59%	0.05	0.70	0.19	2.10%	8.69%	29.17%
Direct Prop	2.46%	1.42%	0.72	4.16	-1.60	0.02%	10.22%	2.85%
Listed Prop	1.76%	8.91%	0.04	5.06	-1.04	0.78%	7.25%	17.82%
Altern'ves	3.06%	3.65%	0.44	-0.08	-0.01	0.13%	12.80%	7.30%

Descriptive Statistics for Asset Performance: Quarterly Data 1995 - 2011

Source: Author

Table 5

Table 5 details the individual asset performance descriptive statistics for the 17 year sample period and illustrates that direct property was the best performing asset class over the 17 year period. Direct property recorded the highest risk-adjusted return (0.72), followed by the alternatives sector (0.44). All listed assets displayed significant risk and variance. International equities recorded the highest standard deviation (14.59%), followed by listed property (8.91%) and Australian equities (7.28%). In contrast, cash and direct property displayed relatively low standard deviation, 0.26% and 1.42% respectively.

Table 6 details the covariance of direct property and listed property asset classes at different time intervals and demonstrates that the co-movement of returns between direct property and listed property is significantly low when compared to the A-REITs and Australian equities matrix. There is no evidence of a linear relationship between the direct property and listed assets during 1995-2007. Although, in the post GFC period, direct property and listed property return covariance has improved, it is still not as strong as the A-REITs and Australian equities co-movement.

<i>Covariance between:</i>	<i>1995 – 2000</i>	<i>2001 - 2007</i>	<i>2008 - 2011</i>	<i>1995 - 2011</i>
Direct Prop & Listed Prop	0.0000	0.0001	0.0005	0.0004
Listed Prop & Aust eq	0.0003	0.0008	0.0104	0.0040

Covariance Matrix: Direct and Listed Property at Different Intervals

Source: Author

Table 6

The diversification benefits of the industry fund balanced investment option asset classes can be attained by examining the correlation matrix. Tables 7 and 8 assess the correlation between direct and listed property and other assets over different time periods. This follows the Jones Lang LaSalle (2012) correlation reporting methodology for property assets. Each time period involves a different number of data points. For example, 1-Year represents 4 quarterly data points in 2011, 2-Year represents 8 quarterly data points from 2010 to 2011 and 17-year represents 68 quarterly data points from 1995 to 2011. The alternative index assets are separated as infrastructure (Infr), hedge funds, private equity and commodity to better evaluate the correlation of different property assets to the specific alternative asset classes.

Table 7 demonstrates that over the short term period (1 to 2 years), the correlation between direct property and listed property is high (0.59 and 0.45) which indicates lower diversification potential between the assets. In the medium term (3-7 years) the correlation between direct and listed property ranges from 0.19 to 0.32, being 0.31 over the 17-year sample period. Direct property displays strong diversification potential with most asset classes including alternative assets such as infrastructure and commodity in both the short and long term horizon.

	<i>Direct Property correlation to:</i>									
<i>Time Period</i>	<i>Cash</i>	<i>Aust fixed</i>	<i>Int fixed</i>	<i>Aust eq</i>	<i>Int eq</i>	<i>Listed Prop</i>	<i>Infr</i>	<i>Hedge Funds</i>	<i>Private Equity*</i>	<i>Commodity</i>
1-year	0.15	-0.94	-0.86	0.78	0.55	0.59	0.77	0.44	-0.16	0.12
2-year	0.91	0.20	-0.01	-0.09	0.14	0.45	-0.18	0.12	-0.60	-0.10
3-year	0.79	0.26	-0.08	-0.08	-0.16	0.19	0.27	-0.32	0.55	0.61
5-year	0.50	-0.09	-0.10	0.21	0.03	0.23	0.28	-0.03	0.60	0.21
7-year	0.52	-0.11	-0.12	0.28	0.07	0.32	0.31	-0.01	0.66	0.22
10-year	0.49	-0.10	-0.10	0.28	0.08	0.33	0.32	0.01	0.55	0.19
17-year	0.32	-0.08	-0.11	0.24	0.06	0.31	0.19	-0.01	0.52	0.19

*Private Equity data is available from June 2000.

Correlation Matrix: Direct Property and Other Asset Classes at Different Intervals

Source: Author

Table 7

	<i>Listed Property correlation to:</i>									
<i>Time Period</i>	<i>Cash</i>	<i>Aust fixed</i>	<i>Int fixed</i>	<i>Aust eq</i>	<i>Int eq</i>	<i>Direct Prop</i>	<i>Infrast.</i>	<i>Hedge Funds</i>	<i>Private Equity*</i>	<i>Commodity</i>
1-year	-0.49	-0.47	-0.63	0.78	0.89	0.59	0.88	0.86	0.23	-0.12
2-year	0.16	-0.30	-0.33	0.57	0.78	0.45	0.45	0.76	0.03	-0.16
3-year	-0.31	-0.46	-0.62	0.83	0.53	0.19	0.58	0.23	0.78	-0.14
5-year	-0.25	-0.36	-0.52	0.79	0.50	0.23	0.62	0.22	0.66	-0.22
7-year	-0.18	-0.30	-0.47	0.78	0.50	0.32	0.60	0.22	0.62	-0.21
10-year	-0.19	-0.25	-0.44	0.73	0.46	0.33	0.57	0.23	0.55	-0.21
17-year	-0.09	-0.04	-0.32	0.62	0.40	0.31	0.52	0.21	0.47	-0.19

*Private Equity data is available from June 2000.

Correlation Matrix: Listed Property and Other Asset Classes at Different Intervals

Source: Author

Table 8

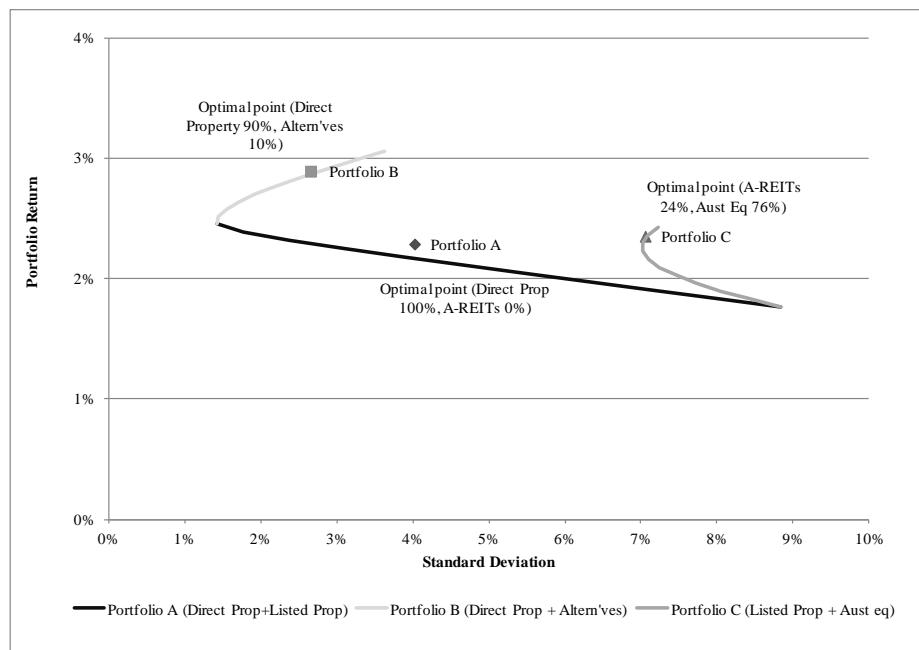
Listed property displayed strong diversification benefits with cash, fixed income (Australian and International) and to some extent with hedge funds in the short to long term horizon. The correlation between A-REITs and Australian equities was high (> 0.60) in both the short and long term, displaying potential lack of diversification benefit.

Property in Two Asset Portfolio Models

The research investigates the diversification benefits of property assets with Australian equities and alternative assets by constructing two asset portfolio models. The asset allocation is determined using the mean-variance portfolio optimisation technique. Figure 3 displays the efficient frontier and optimal allocation results and illustrates that the inclusion of listed property in direct property portfolio is insignificant, evident by the 100% allocation to direct property in Portfolio A. However, listed property does gain an allocation of 25% in the Australian equities portfolio (Portfolio C). The listed and direct property portfolio provides a much better risk-adjusted return performance (0.21) than the inclusion of A-REITs in the Australian equities portfolio (0.13). The inclusion of

alternative assets in the direct property portfolio (Portfolio B) provides the best risk-adjusted return performance (0.55), although portfolio weighting is dominated by direct property.

Overall, the results provide evidence that including listed property in the equities portfolio is not a viable investment option. However, the inclusion of alternatives assets in the real estate portfolio seems beneficial. The performance of different property assets needs to be further tested within the parameters of multi-asset allocation models.



Efficient Frontier: Property in Two Asset Portfolios

Source: Author

Figure 3

Property in Multi-Asset Portfolios

Industry superannuation fund balanced investment option average property allocation is 10.3% for the 17-year sample period, comprising direct property (5.0%) and listed property (5.3%). The research investigates the diversification benefits of different property assets in the industry fund balanced portfolio within the setting of nine different investment strategies. The analysis is undertaken using three scenarios, including either direct property, listed property or both property asset classes. For the 'direct property inclusive portfolios', industry fund balanced investment option property asset allocation is represented by the direct property component only. Similarly, the industry fund 'listed property inclusive portfolios' have property represented by the listed property component. The 'direct and listed property inclusive portfolios' includes both property asset classes added separately to the balanced portfolio.

Table 9 details the performance statistics for the asset allocation strategies using different property investment scenarios and highlights that, except for the Tactical - No Constraints strategy, all direct property led portfolios outperformed the listed property inclusive portfolios. Buy and Hold, Traditional, Turnings Points and Tactical-Weight Constrained strategies perform better when

property is represented by direct property assets. In contrast the Tactical-No Constraints was the only strategy that displayed improved performance when property was represented as listed property assets.

However, the inclusion of both property asset classes in a multi-asset portfolio does provide improved risk-adjusted return performance for several strategies including the Strategic (lower risk mainly), Optimal strategies and Tactical-No Constraints strategy. The Tactical-No Constraints strategy which included both direct and listed property assets produced the highest risk-adjusted return performance (1.10). The results also illustrate that, except for the Traditional strategy, all direct and listed property inclusive investment strategies have outperformed the industry fund Strategic investment portfolio.

Investment Strategies	Direct Prop Inclusive Portfolios			Listed Prop Inclusive Portfolios			Direct and Listed Prop Inclusive Portfolios		
	<i>Mean Return</i>	<i>Standard Deviation</i>	<i>Sharpe Ratio</i>	<i>Mean Return</i>	<i>Standard Deviation</i>	<i>Sharpe Ratio</i>	<i>Mean Return</i>	<i>Standard Deviation</i>	<i>Sharpe Ratio</i>
Strategic	2.19%	5.29%	0.14	2.17%	5.54%	0.13	2.19%	5.25%	0.14
Buy and Hold	2.16%	3.69%	0.20	2.13%	3.95%	0.18	2.15%	3.77%	0.19
Traditional*	2.08%	5.74%	0.11	2.04%	6.06%	0.10	2.05%	6.15%	0.10
Optimal – No constraints	2.18%	2.69%	0.28	2.16%	3.03%	0.24	2.19%	1.01%	0.75
Optimal – constrained	2.16%	3.89%	0.19	2.15%	4.09%	0.17	2.17%	2.78%	0.26
Turning Points	3.08%	5.30%	0.31	2.96%	5.64%	0.27	2.96%	5.21%	0.29
Equal Weighted	2.36%	3.50%	0.27	2.36%	3.50%	0.27	2.04%	3.42%	0.18
Tactical – No constraints	2.09%	0.83%	0.79	2.32%	0.95%	0.94	2.45%	0.93%	1.10
Tactical – constrained	4.08%	4.75%	0.56	4.25%	5.58%	0.50	4.13%	5.16%	0.52

*Property included with Equities, Cash and Fixed Income assets.

Performance Statistics: Direct Property, Listed Property and Both Property Inclusive Asset Allocation Strategies

Source: Author

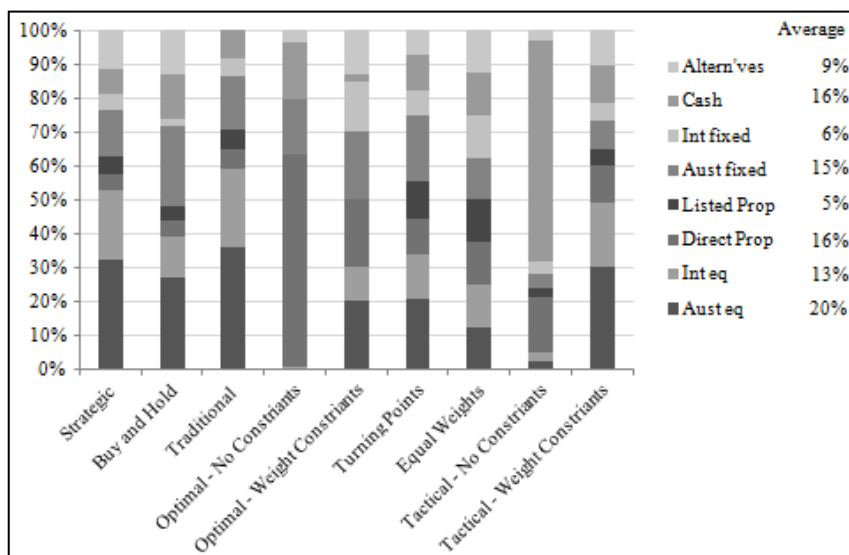
Table 9

The asset allocation model returns and asset weighting is susceptible to variations in economic and financial market conditions. For example, in periods of financial market collapse such as the 2007 global financial crisis and 9/11 (September 2001), Strategic portfolio is rebalanced with greater attention to stable investment sectors such as property and alternatives. In contrast, the early 1990s and mid 2000s period were characterised by high investment returns, with the Strategic portfolio overweighted in assets such equities and listed property (see Figure 2).

The performance variations for the different asset allocation models are also largely explained by their asset weighting. Changes in market conditions had no material impact on the Buy and Hold and Equal Weighted portfolio weights. In contrast, the Turning Points model asset weighting was constantly shifted based on the movements in GDP. The movement in investment markets had significant material impact on the optimal and tactical portfolio performance. The Optimal – No Constraints models are predominantly overweighted in assets that demonstrated the lowest volatility each quarter. The Tactical models are overweighted quarterly to the best performing assets (see Figure 1 for asset performance trend).

The performance of listed property led Tactical asset allocation strategies must be read with some caution. Tactical strategies work on the premise of overweighting assets with least volatility and reduce allocation for assets with negative performance to zero. Listed property recorded negative total return in 13 out of 20 quarters leading up to December 2011 and 21 out of 68 quarters for the entire sample period. Although, in theory, listed property offers better tactical allocation options due to direct property’s illiquidity issues, the A-REITs performance during the 2007-2011 period would have made it impracticable for active fund managers to earn extra returns using listed property. Recent data however shows that the A-REITs sector has recovered strongly which may lead to improved portfolio allocation in future.

Figure 5 details the average asset weights for the industry fund balanced investment option when both property assets are included in the multi-asset portfolio and demonstrates that, when both direct and listed property investments are available, the allocation to direct property mostly outweighs listed property in all investment strategies.



Average Asset Weights: Both Direct and Listed Property Inclusive Strategies

Source: Author

Figure 5

Australian equities was the dominant asset class with an average 20% allocation, followed by direct property and cash both at 16%. Listed property recorded the lowest average asset allocation at 5%. Except for the Strategic, Traditional and Turning Points strategies, direct property had a higher representation than listed property across all investment strategies.

Despite the higher asset allocation range assigned to alternative assets (0% - 25%) than to property assets (0% - 20%), the average allocation to alternatives was 9%, lower than the direct property allocation (16%). Recent studies (Finkenzeller, Dechant and Schäfers2010; Newell and Lee2011; Newell, Peng and De Francesco2011) have concluded that direct property may play a less significant role in the multi-asset portfolio when alternative assets are included. However, the consensus was that both are distinct assets and offer different diversification benefits. The strong allocation to direct property in both the two asset and multi-asset portfolios in this research further highlights that direct property will command significant allocation in institutional portfolios despite the availability of similar real assets such as infrastructure.

Table 10 further details the direct and listed property allocation level in three year rolling intervals. Note that passive investment strategies (Buy and Hold, Equal Weights) are excluded from the analysis.

<i>Asset Allocation Strategy</i>	<i>Jun-98</i>		<i>Jun-01</i>		<i>Jun-04</i>		<i>Jun-07</i>		<i>Jun-10</i>		<i>Dec-11</i>		<i>17-year Average</i>	
	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>	<i>Direct Prop</i>	<i>Listed Prop</i>
Strategic	5%	5%	4%	7%	5%	7%	4%	5%	6%	4%	7%	3%	5%	5%
Traditional	5%	6%	4%	8%	5%	7%	4%	6%	8%	5%	8%	4%	6%	6%
Optimal - No Constraints	44%	0%	54%	2%	31%	0%	69%	4%	37%	2%	41%	1%	47%	2%
Optimal - Weight Constraints	20%	5%	16%	9%	8%	0%	18%	8%	14%	7%	19%	3%	16%	6%
Turning Points	9%	10%	8%	14%	10%	14%	10%	13%	15%	10%	14%	7%	10%	11%
Tactical - No Constraints	20%	3%	25%	3%	28%	4%	6%	3%	6%	1%	8%	2%	16%	3%
Tactical - Weight Constraints	11%	4%	16%	5%	13%	6%	7%	6%	7%	2%	7%	3%	11%	5%
Average	16%	5%	18%	7%	14%	5%	17%	6%	13%	4%	15%	3%	16%	5%

3-Year Rolling Direct Property and Listed Property Asset Allocation Level

Source: Author

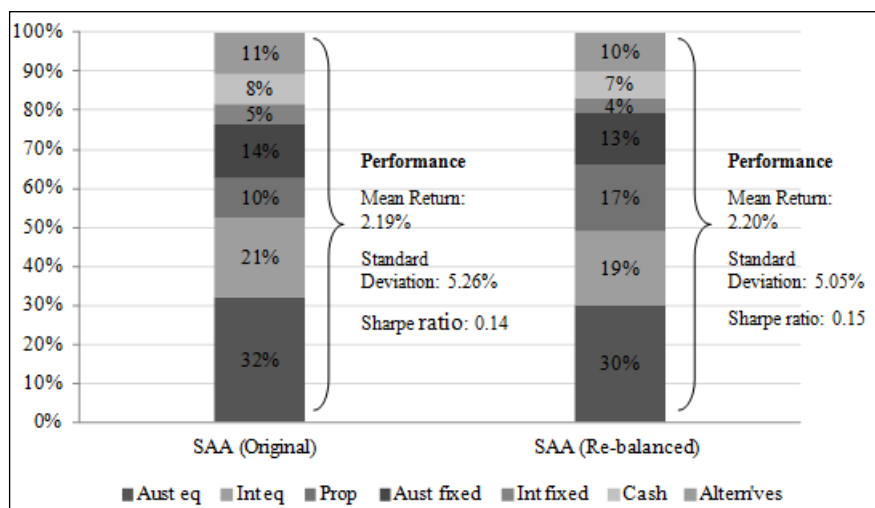
Table 10

Table 10 analysis confirms that the allocation to direct and listed property assets is time-varying. Direct property allocation was prominent for the Optimal and Tactical investment strategies, while listed property received higher allocation in the Strategic, Traditional and Turning Points strategies. Both direct and listed property peaked in the 3-year period leading to 2001, with an average allocation across all strategies at 18% and 7% respectively. Since then direct property allocation has declined to as low as 13% (June 2010). Listed property allocation was prominent across most investment strategies in the 3-year period to June 2007. However, the post GFC period trend highly

favours direct property allocation across all investment strategies. The average allocation to direct property and listed property during the 3-year period leading to December 2011 was 15% and 3% respectively. Overall, the results demonstrate that, even at different time intervals, the average allocation to direct property is significantly higher than listed property across most investment strategies.

Over the 17 year sample period, the industry fund strategic balanced investment option average property allocation was 10%, invested in direct property (5%) and listed property (5%). In comparison, the allocation to property in the alternative active asset allocation models ranged from 12% to 49%. The approximate 50% allocation in the Optimal – No Constraints strategy is expected given that the model works on the premise of overweighting assets with least volatility. The average allocation to property across the alternative investment strategies was 21%, comprising direct (16%) and listed property (5%). Excluding unconstrained investment strategies, the average allocation to property was 17%, invested in direct property (12%) and listed property (5%).

Overall the results demonstrate that there is scope to increase the industry fund property exposure from its current 10% position. For industry application, whilst an allocation of 50% to property assets may not be practically justifiable, Australian fund managers can benefit from the increased 17% average property allocation recommended within the constrained investment strategies. The increased 17% allocation to property can be implemented by rebalancing the industry superannuation fund strategic portfolio. Figure 6 compares the performances of the industry fund original strategic portfolio (which includes 10% property allocation) against a rebalanced industry fund strategic portfolio with 17% allocation to property.



**Industry Fund Strategic Balanced Investment Option:
Original and Re-balanced Portfolio (Jun 95 – Dec 11)**

Source: Author

Figure 6

Figure 6 shows the rebalanced industry fund strategic investment portfolio, with property allocation increased to 17%. The results show that allocation to equities (Australian and International), although slightly lower, still dominates the industry fund balanced investment portfolio. Cash and fixed income (Australian and International) also recorded slight declines in the rebalanced SAA model. Allocation to property is higher (17%), while the proportion invested in alternative assets remains steady at 10%. The combined real asset (property and alternatives) allocation accounts for 27% of the rebalanced portfolio. This high allocation is in line with JP Morgan Asset Management (2012) and Jones Lang LaSalle (2012) prediction of real assets occupying 25% of institutional portfolios in the next decade. The increased allocation to property is backed by the improved risk-adjusted return performance. The Sharpe ratio for the rebalanced portfolio is 0.15, higher than 0.14 recorded for the original portfolio.

This finding will be beneficial for funds currently re-profiling investment portfolios to achieve stable risk-adjusted return. The rebalanced industry fund strategic portfolio property allocation has 12% invested in direct property and 5% listed property. The results substantiate the findings from recent studies (CFS 2008; De Francesco and Hartigan 2009; Newell and Razali 2009; Reddy 2012) that anticipate higher allocation to direct property in the short to medium term in Australia.

CONCLUSIONS

This research used nine different asset allocation strategies to determine which property allocation scenario, that is including either direct property, listed property or both, provides the best diversification benefits in the industry superannuation fund balanced investment portfolio.

The results demonstrate that over the 17-year sample period direct property significantly outperforms the listed property sector with higher returns, low risk and variance statistics. Despite A-REITs performance being tightly linked to the Australian equities market, the research provides evidence that including listed property in the equities portfolio is not a viable strategy. However, the inclusion of alternative assets in direct property does provide better results.

The findings also provide evidence that substituting direct property with listed property is not likely to benefit the industry fund's balanced portfolio performance. Whilst the asset allocation models predominately favour higher allocation to direct property than listed property, the results are time-varying. Listed property allocation remained steady prior to 2007. However, the post GFC (2008-2011) trend highly favours direct property allocation. The inclusion of both property assets in a multi-asset portfolio does however demonstrate improved risk-adjusted return for several strategies, including the Tactical-No Constraints strategy which produced the highest risk-adjusted return (1.10). Except for the Traditional strategy, all direct and listed property inclusive investment strategies have outperformed the industry superannuation fund conventional strategic investment portfolio.

In conclusion, the results demonstrate that there is scope to increase the industry superannuation fund direct property exposure to 12% from the current average of 5%. However, listed property allocation is expected to remain at 5%. The recommended 17% allocation to property in the industry fund strategic portfolio is backed by high risk-adjusted return profile. The overall push towards direct property is reflective of the need for fund managers to achieve greater portfolio

stability and deliver sound risk-adjusted return and for institutions to have more control in how they invest in property. Whilst lack of liquidity could act as a deterrent for higher allocation to direct property, the continued evolution of unlisted property fund vehicles such as wholesale property funds and property syndicates could provide the medium through which fund managers can attain higher direct property allocation to meet specific member investment and liquidity requirements alongside retaining some input into property allocation decisions.

Interestingly, the allocation to direct property was higher than alternative assets in most investment strategies, indicative of direct property's importance in institutional portfolios despite the presence of similar real asset investments such as infrastructure. However, this needs to be examined in more detail in future research.

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