THE CASE OF DIRECT PROPERTY SUB-SECTOR ASSET ALLOCATIONS IN INSTITUTIONAL PORTFOLIO

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ABSTRACT

Australian fund managers mainly comprising A$3 trillion superannuation industry in recent decade has shown increased appetite for direct/ unlisted property assets compared to listed property (A-REITs). Recent research attributes this asset allocation shift to fund managers search for stable, risk-adjusted returns in the post-GFC era. At sub-sector level, Australian fund managers have a range of traditional direct property products to choose: retail, office and industrial (also classified as 'core'), with 'non-core' or 'specialised' property sector (healthcare, data centres, retirement living, residential etc) also providing another option. This research uses 21 years quarterly data series (1995 – 2016) to examine the performance and asset allocation efficiency of these direct property sub-sectors within Australian industry superannuation portfolio. All direct property sub-sectors lead other assets with higher risk adjusted returns. Retail, followed by industrial property recorded best performance (+1 Sharpe ratios). The results when split in different time periods demonstrate that there is value of higher allocation to 'non-core' property sub-sector evident by highest Sharpe ratio (0.96) in the recent decade. Overall, the portfolio modelling recommended allocation to property is 17%, heavily weighted towards all direct property sub-sectors then A-REITs.

Keywords: Property Investments, Asset Allocation, REITs, Superannuation, Funds Management.

INTRODUCTION

Asset allocation has long been recognised as the greatest single determinant of an investment fund's performance (Brinson, Hood & Beebower 1986; Sharpe 1992). Therefore, fund managers dedicate a significant amount of capital and resources to developing appropriate asset allocation policies. Fund managers are responsible for allocating investors' subscribed funds across different investment sectors to best meet fund members' investment objectives. The Australian superannuation fund managers' conventional strategic default balanced investment portfolio generally consists of five major components, namely: equities (Australian and international), fixed income (Australian and international), property, alternatives, and cash. Australian superannuation fund manager's exposure to property is via both listed property (A-REITs) and direct (unlisted) property streams. Each superannuation fund investment option has different mandates and risk profiles (for example, conservative, balanced, growth funds), and the level of property can vary slightly across the investment options. However, property as an asset class features prominently in most superannuation funds mandates. This research uses 21 years quarterly data series (1995 – 2016) to examine the performance and asset allocation efficiency of different direct property sub-sectors within Australian industry superannuation portfolio.

Typically, institutional investors 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) emphasises its attractive risk and return characteristics to investors (Bond et al. 2007a). In Australia, although institutional allocation to property assets has historically averaged 10%, recent data suggests that sub-sector allocation approach has changed significantly. Figure 1 illustrates the aggregated balanced industry superannuation fund default option asset allocation, as at June 2016. Industry funds and private sector funds represent 82% of Australian institutional superannuation property assets under management (APRA 2019).

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Figure 1: Industry Superannuation Balanced Fund Option Portfolio: June 1995-2016
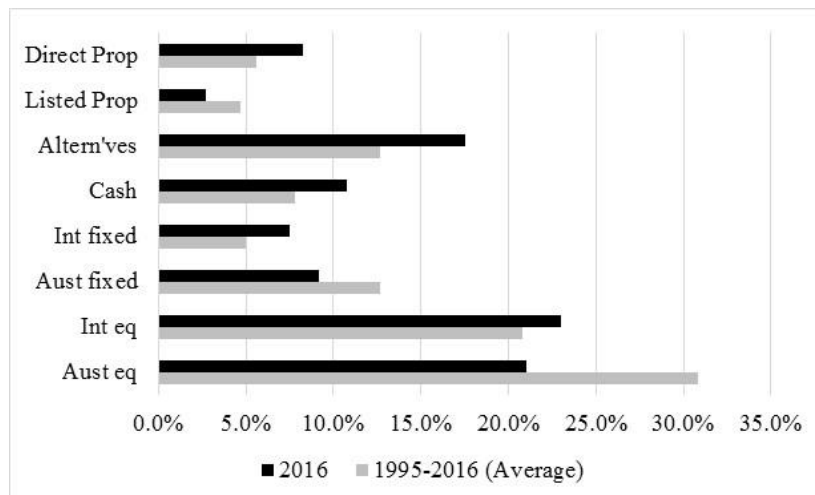
Figure 1 shows that over the study period (21 years), equities (Australian and international) was the dominant asset class, representing 52% of the industry superannuation balanced fund portfolio, followed by fixed income securities (Australian and international) 18%, alternatives (12%), property (10%) and cash (8%). Property component includes both allocation direct/unlisted property (5%) and listed REITs (5%). These asset allocation components do change over time as fund managers regularly rebalance investment portfolios to reflect prevailing market conditions. For example, allocation to property ranged from 9%-14% in the 20 year period to June 2015. In 2006, institutional superannuation fund investment in listed property was A$11.9 billion, and unlisted property A$12.5 billion. In the ten years to June 2016, the sub-sector allocation component has moved from a more even split in 2006 to a weighting of over 70% for unlisted property (APRA 2019). There is increased role of club deals and separate accounts/ mandates via unlisted funds in post-GFC context for larger pension funds; this shows a change in strategy and more focus on control and alignment of interest. It appears that some superannuation funds have switched their entire property allocation to unlisted property.

Geltner et al. (1995) found that although both listed and direct property are essentially similar, in a multi-asset portfolio neither form of property is a perfect substitute for the other. Although both property investments are backed by the same physical real estate physical assets, their return and risk profiles are distinct. A-REITs are listed and traded on the Australian Stock Exchange (ASX). Similar to common stock, the A-REITs returns are driven mainly by financial and capital market variables and market sentiment. While A-REITs do offer greater liquidity, there is disparity in the return profile for REITs and their underlying portfolio assets. In contrast, direct property returns are underpinned by fundamental macroeconomic factors (such as employment growth) and retail trade and financial market influences such as the bond rate (De Francesco 2005; Higgins & Ng 2009; Newell 2006).

Direct property investment is the underlying physical asset (that is, bricks and mortar) that forms the nucleus of property fund portfolios. At sub-sector level, Australian fund managers have a range of traditional direct/ unlisted property products to choose and generally have divided their property portfolio into core and non-core sectors. Higgins (2007) explains that in the institutional investor context, core property includes office, retail and industrial property markets. The non-core (or specialised) property sector includes assets such as residential apartments, hotels, entertainment and recreational facilities, health and aged care facilities, entertainment and recreational, data centres and educational properties.

Newell (2007) identified that direct property exposure for large and medium sized superannuation funds is generally in the core property sector, typically via unlisted wholesale property funds. However, non-core sectors have recently gained greater representation in institutional property portfolios. Newell and Peng (2008) found that the growth of the emerging property sector is driven by an increased appetite for property investment by superannuation funds, acceptance of higher risk levels by many investors (for example, value-added and opportunistic funds), demographic changes favouring the retirement and healthcare property sectors, and increased experience in including emerging property sector assets in their property fund portfolios. The key motivating factor for fund managers investing in the emerging property sector has been the need for new

product diversity. In addition, there is the mismatch between available funds and available core property assets in Australia.

Overall, the literature highlights that the allocation of resources to property presents an interesting case for institutional investors. Choices about investment vehicles have expanded over the past two decades with the rise of REITs, and other unlisted property funds and syndicates. In addition, the emergence of non-core sectors also provide various portfolio diversification and asset allocation opportunities for Australian fund managers. Although studies (such as Benefield et al. 2009; Lin et al. 2019) have recently investigated listed property diversification benefits, there is limited similar research on Australian direct property sub-sector assets. This research paper thus aims to examine the performance and the asset allocation components of different direct property sub-sector (retail, industrial, office and specialised) assets within the Australian industry superannuation fund balanced investment option using constrained and unconstrained asset allocation techniques. The next section details the historical performance of selected asset classes and associated methodology, then the empirical findings and industry implications are provided followed by concluding comments.

DATA AND METHODOLOGY

This research will evaluate the diversification benefits and asset allocation components of different direct sub-sectors (retail, office, industrial and specialised) within the setting of multi-asset portfolios, including the industry funds' conventional strategic investment approach. Asset data for this study covers a 21 year period, 1995-2016, and comprises 84 quarterly data points. The asset data and benchmark representations for the research are detailed below:

- Cash – RBA Interbank Rate
- Australian Fixed Income (Aust fixed) - CBA Bond: All Series, All Maturities
- International Fixed Income (Int fixed) - Citigroup World Government Bond Index (AU$)
- Australian Equities (Aust eq) - ASX All Ordinaries Accumulation
- International Equities (Int eq) - MSCI WORLD ex AUSTRALIA Standard (Large+Mid Cap) (AU$)
- Direct Property (Direct Prop) - PCA/IPD Composite Property Index
- Listed Property (Listed Prop) - S&P/ASX 200 A-REIT Index
- Alternatives Assets (Altern'ves) - UBS Wealth Management; Dow Jones Credit Suisse; AVCAL & Cambridge Associates; Reserve Bank of Australia.

The property data used to construct the different asset allocation models are raw and not de-smoothed property, which is in line with industry practice. Recent studies such as Newell and Lee (2011) in Australia, show that substituting the raw property index data with the de-smoothed property returns did little to change the weighting of property in the optimal portfolio. The normal industry practice is to use property index data in the original format.

The sourced overseas data was converted to Australian dollars, based on the prevailing exchange rate. In Australia there is no recognised alternatives index available to industry. The Alternatives index in this research is constructed from the commencement of selected Australian data series for Infrastructure and Utilities, Hedge Funds (AU), Private Equity, and Commodity Prices (AU) based on an equal weighted formula, which follows the UK alternative asset class index structure (Bond et al. 2007). The benchmark allocation series data for the seven asset classes in industry superannuation balanced funds was displayed in Figure 1. The range of asset allocation is exhibited in Table 1.

Table 1: Industry Superannuation Balanced Fund Range of Asset Allocations, 1995-2016

	Aust eq	Int eq	Prop	Aust fixed	Int fixed	Cash	Altern'ves
Average	31.3%	20.7%	10.3%	12.8%	4.9%	7.7%	12.4%
Minimum	22.0%	12.0%	8.7%	5.3%	2.0%	3.3%	3.6%
Maximum	37.0%	27.6%	14.0%	24.0%	7.9%	13.0%	21.0%
Range	15.0%	15.6%	5.3%	18.7%	5.9%	9.7%	17.4%

Source: APRA 2019; Rainmaker Group 2012

Table 1 shows the varying benchmark asset allocation weighting for the industry superannuation balanced funds. The aggregated average over the study period (21 years) was: Australian equities 31.3%, international equities 20.7%, Australian fixed income 12.8%, international fixed income 4.9%, alternatives 12.4%, property 10.3%, and cash 7.7%. Property allocation includes both direct/unlisted property, and listed securitised property (REITs). Allocation to property ranged between 9-11%, having peaked at 14% in September 1998, which corresponded with the push by REITs to offshore property investment. The lowest allocation to property was recorded at 9% in March 2010. This was during the recent Global Financial Crisis (GFC) that led to major falls in REIT prices and property valuations.

The Markowitz (1952) classical mean-variance portfolio selection model serves as the starting point for constructing optimal asset allocation models in this research. In theory, the portfolio optimisation (or mean-variance setting) generates a maximum Sharpe ratio portfolio based on the expected return, volatility and pairwise correlation parameters for all assets to be included in the portfolio. For n number of assets in the portfolio, the asset allocation is optimised by minimising portfolio risk for a given level of expected return using Markowitz's (1952) quadratic programming problem (see Equation 1).

$$\text{Minimise } \sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i \, x_j \, \sigma_{ij}$$

Equation 1: Quadratic Mean-Variance Function

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

$$\mu_p \geq \mu_o$$

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 key inputs include the historical total return and standard deviation data. 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 optimal asset allocation model is reviewed annually. The construction of the efficient frontier involved calculating the possible portfolio weighting at a 10% interval for return and standard deviation. The Australian government 10 year bonds are used as the risk-free rate.

In practice, the Markowitz mean-variance framework is altered with various types of constraints that follow the institution's investment guidelines and investment objectives. This is because the classical mean-variance portfolio optimisation can often result in extreme allocation in specific assets. Therefore, in addition to the Strategic asset allocation policies, industry superannuation funds also formulate a range of permissible investable asset weights as a primary risk management tool. Including holding constraints leads to a more industry practical application of the mean-variance optimisation problems.

Table 2 illustrates the assumed predetermined weight constraints for industry superannuation fund balanced portfolios.

Table 2: Industry Superannuation Funds Asset Weight Parameters

| Asset Class	Minimum Weight	Maximum Weight
Australian Equities	20%	40%
International Equities	10%	40%
Property	0%	20%
Australian Fixed	0%	20%
International Fixed	0%	15%
Cash	0%	15%
Infrastructure	0%	20%
Hedge Funds	0%	15%
Private Equity	0%	15%
Commodities	0%	15%

Source: Author

Industry superannuation fund asset allocation parameters appear to place high weighting on the equity markets. The property allocation range is set as 0-20%. At sub-sector level, allocation to property was re-tested with varying maximum weight parameters (5%, 10%, 15%, and 20%) for direct property (retail, industrial, office, specialised) and listed property (A-REITs). This research evaluates the optimal allocation to different direct property sub-sector asset classes within multi-asset unconstrained (*Optimal – No Constraints model*) and weight constrained (*Optimal – Weight Constrained*) mean-variance models.

RESULTS AND DISCUSSION

Figure 2 illustrates the industry superannuation fund balanced investment option property asset allocation trend, with direct property (DP) split into retail, office, industrial and specialised sectors. In addition, the listed property (A-REITs) allocation is also displayed.

Figure 2: Industry Superannuation Balanced Fund Option Portfolio: June 1995-2016
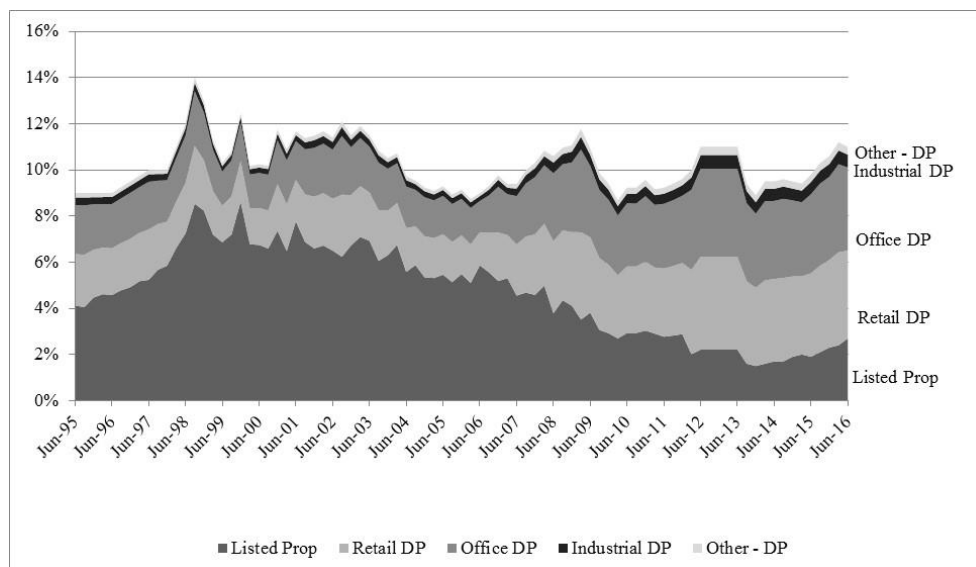
Source: Author adopted from APRA 2019; Rainmaker 2012

Consistent with previous research (Higgins 2007; Newell (2007), the Australian industry superannuation fund direct property exposure is predominantly in the core property sector allocated mainly in retail and office markets. The combined direct core property sector allocation has increased from 3% in 2006 to 8% in 2016. In contrast, allocation to listed property has declined from 6% to 2% during the same period. All direct property sub-sectors recorded maximum allocations (office and retail around 4%; industrial and specialised around 1%) in the post-GFC period. Listed property recorded the highest allocation (9%) in early 2000s which coincided with the lowest allocations to all direct property sub-sectors.

Table 3 details the industry superannuation fund balanced investment option asset allocation performance, with property allocation split into different direct property sub-sectors and listed property components.

Table 3: Industry Superannuation Funds Asset Performance – Quarterly Data, 1995 – 2016

Asset Class	Mean Return	Standard Deviation	Sharpe Ratio	Variance	Minimum	Maximum
Cash	1.17%	0.37%	-0.43	0.00%	0.43%	1.83%
Aust fixed	1.87%	2.23%	0.24	0.05%	-3.33%	8.06%
Int fixed	1.03%	2.91%	-0.10	0.08%	-12.09%	12.87%
Aust eq	2.25%	6.93%	0.13	0.47%	-20.20%	21.55%
Int eq	2.10%	13.78%	0.06	1.88%	-33.19%	42.47%
Altern'ves	2.87%	3.62%	0.42	0.13%	-5.18%	12.36%
Listed Prop	2.14%	8.12%	0.10	0.65%	-33.23%	30.79%
Retail DP	2.58%	1.13%	1.10	0.01%	-1.76%	4.70%
Office DP	2.33%	1.42%	0.70	0.02%	-4.1%	5.5%
Industrial DP	2.76%	1.37%	1.04	0.02%	-3.2%	4.3%
Specialised DP	2.37%	1.69%	0.61	0.03%	-5.4%	4.9%
All Property	2.41%	3.64%	0.30	0.13%	-13.3%	9.8%

The mean quarterly total return for the asset classes ranged from 1.03% (International Fixed) to 2.87% (Alternatives). Table 4 results show that retail, followed by industrial direct property sectors recorded the best risk-adjusted return performance (+1 Sharpe Ratio). Office property (0.70), specialised property (0.61) and Alternatives (0.42) were other assets to record strong performances. Notably all direct property sectors performed better than the diversified (All Property) portfolio and A-REITs. All listed assets (Australian equities, international equities and A-REITs) displayed significantly high volatility over the 21-year study period. The property sub-sector data when evaluated in more recent period (2007-2016) show that the specialised or non-core sector as the best performer evident by highest Sharpe ratio (0.96). The diverse movements in the asset classes can be further examined by correlation analysis, as shown in Table 4.

Table 1: Correlation Matrix – Asset Benchmark Returns – Quarterly Data, 1995-2016

	Cash	Aust fixed	Int fixed	Aust eq	Int eq	Altern'ves	Listed Prop	Retail DP	Office DP	Industrial DP	Specialised DP
Cash	1.00										
Aust fixed	0.16	1.00									
Int fixed	0.24	0.53	1.00								
Aust eq	0.00	-0.35	-0.31	1.00							
Int eq	-0.09	-0.37	-0.34	0.69	1.00						
Altern'ves	0.23	-0.05	-0.11	0.51	0.54	1.00					
Listed Prop	-0.12	0.02	-0.28	0.58	0.35	0.38	1.00				
Retail DP	0.11	-0.18	-0.14	0.28	0.11	0.33	0.36	1.00			
Office DP	0.14	-0.02	-0.06	0.14	-0.03	0.24	0.25	0.75	1.00		
Industrial DP	0.10	0.03	-0.10	0.21	0.04	0.34	0.40	0.81	0.83	1.00	
Specialised - DP	-0.08	0.11	-0.12	0.01	0.00	0.16	0.19	0.43	0.58	0.44	1.00

Table 4 illustrates the diversification benefits of the selected asset classes. Asset classes with a strong correlation (>0.50) were linked to the same local and overseas asset class (for example, Australian & international Equities). In addition, the alternative asset class showed a relatively strong relationship with Australian and international Equities (>0.50). In part, this may relate to the underlying asset classes behind the performance of Private Equity and Hedge Funds. For listed property, the strong correlation (>0.50) with Australian Equities would relate to trading on the same equities platform. Traditionally, REITs short-term performance is linked to the equity market. All direct sub-sectors display strong diversification benefits with low and negative correlation to other assets.

Table 5 illustrates the quarterly performance of the multi-asset allocation strategies. For the 'Optimal – Weight Constrained' model, allocations at sub-sector level to property was constrained at 0-4% for direct property (retail, industrial, office, specialised) and listed property (A-REITs). Mean total returns for all asset allocation

strategies were similar (around the low 2% mark). Both Optimal – No Constraints and Optimal – Weight Constrained models recorded high risk-adjusted return profiles of 0.20 and 0.23 respectively. The alternative asset allocation strategies have outperformed the industry superannuation fund Strategic investment option, which recorded a Sharpe ratio of 0.17.

Table 5: Industry Fund Asset Allocation Strategies – Descriptive Statistics, Quarterly Performance Data, 1995-2015

Model	Mean Return	Standard Deviation	Risk-Adjusted Return	Annualised Return	Annualised Standard Deviation
Strategic (original portfolio)	2.15%	4.97%	0.17	8.90%	9.93%
Optimal – No Constraints	1.94%	2.98%	0.20	7.98%	5.96%
Optimal – Weight Constrained*	2.15%	3.60%	0.23	8.88%	7.21%

Table 6 details the weightings for the selected asset classes within the different asset allocation models.

Table 6: Asset Allocation Components for Different Investment Strategies

Model	Cash	Aust fixed	Int fixed	Aust eq	Int eq	Altern' ves	Listed Prop	Retail DP	Office DP	Industri al DP	Speciali sed - DP
Strategic (Original Portfolio)	8%	13%	5%	31%	21%	13%	5%	3%	2%	0%	0%
Optimal – No Constraints	3%	23%	9%	15%	16%	4%	0%	10%	0%	8%	12%
Optimal – Weight Constrained	2%	15%	15%	20%	12%	14%	2%	5%	5%	5%	5%
Average	**4%**	**17%**	**10%**	**22%**	**16%**	**10%**	**2%**	**6%**	**2%**	**5%**	**6%**

The average asset weightings range were: cash 4%, Australian fixed 17%, international fixed 10%, Australian equities 22%, international equities 16%, alternatives 10%, and property 21%. The minimum and maximum allocation for different property asset classes varies within each asset allocation strategy. The highest level of allocation was to direct property sub-sectors were Specialised (12%), Retail (10%) and Industrial (8%) within the Optimal – No Constraints asset allocation strategy. The Office direct property sub-sector and listed property recorded 0 allocation within the unconstrained model. The other assets to attain high allocation within the unconstrained strategy was Cash (23%). The allocation to direct property and listed property in the unconstrained alternative models was direct property 30%, and listed property 0% respectively. The Optimal – No Constraints strategy works on the premise of allocating most weighting to assets that display the lowest volatility in performance. However, re-testing the model with changing maximum weight constraints for property (5%, 10%, 15% or 20%) provides varying recommended allocation for the different property sub-sectors. Table 7 details the weightings for the different property sub-sectors within these scenarios.

Table 7: Property Asset Allocation within Changing Weight Parameters

Weight Constraints - Property	0-5%	0-10%	0-15%	0-20%
Listed Prop	2%	0%	0%	0%
Retail DP	5%	9%	5%	5%
Office DP	5%	0%	0%	0%
Industrial DP	5%	10%	13%	13%
Specialised - DP	5%	10%	12%	12%

Interestingly, both Office direct property and listed property fail to gain allocation within the multi-asset portfolio with increasing weight parameters, that is, beyond 0-5%. The retail direct property sub-sector recommended allocations generally remain around 4-5%, except when the allocation band is within 0-10%.

However, recommended weighting for both the Industrial DP and Specialised DP sub-sectors do increase to 10-13% when property allocation band moves 0-20% for each sector. Overall, excluding Optimal – No Constraints investment strategy, the average recommended allocation to property was 17% (direct property was 14%, and listed property 3%). This can be compared to the industry fund Strategic portfolio average property allocation of 10% (5% direct property, and 5% listed property) for the 21-year study period (June 1995 – June 2016). The model recommended allocation for individual direct property subsectors is Office (4%), Retail (4%), Industrial (3%), Specialised (3%) and listed property (3%). The strong allocation to direct property in multi-asset portfolios in this research further highlights property's significance in institutional portfolios.

CONCLUSION

This research examined the role of different direct property sub-sectors in the Australian industry superannuation fund balanced investment option by constructing and critically evaluating both different constrained and unconstrained multi-asset investment strategies. The analysis was undertaken for a 21 year timeframe (1995-2016) using ex-post quarterly total return asset benchmark data, and the industry superannuation fund asset allocation data. Consistent with previous research, the Australian industry superannuation fund direct property exposure is predominantly in the core property sector allocated mainly in retail and office markets. The combined direct core property sector allocation was 8%, non-core sector 0.4% and listed property 3% at June 2016. Retail, followed by Industrial direct property sectors recorded the best risk-adjusted return performance (+1 Sharpe), whilst Office (0.70) and Specialised (0.61) also outperformed all other asset classes. Notably all direct property sub-sectors performed better than the diversified (All Property) portfolio and listed property. The specialised (non-core) property sector recorded the best Sharpe Ratio (0.96) in most recent decade.

The key parameters from past market data (risk/return performance and correlation measures) provided the platform for the analysis of the historical benchmark data for industry superannuation funds' conventional Strategic balanced portfolio. The alternative multi-asset investment strategies evaluated included Optimal – No Constraints and Optimal – Weight Constrained models. The Optimal strategies seek the highest risk-adjusted returns: a technique known in the field of MPT as Markowitz mean-variance portfolio optimisation. The alternative asset allocation models outperformed the industry superannuation funds' conventional Strategic portfolio. The Optimal – No Constraints strategy recorded the highest Sharpe ratio (0.20), followed by Optimal– Weight Constrained (0.23). Strategic portfolio had a high standard deviation (4.97%), reflected in the relatively low risk-adjusted return profile rating (0.17).

The optimal allocation to property ranged from 10% (Strategic) to 30% (Optimal – No Constraints), with an average allocation of 21% across the different strategies. Upon excluding Optimal – No Constraints strategy, the recommended allocation to property for industry funds is 17% (14% direct, and 3% listed). This compares to the industry fund average property allocation of 10% for the 21-year study period. For the 'Optimal – Weight Constrained' strategies, the models were re-tested with increasing weight parameters (5%, 10%, 15% or 20%) for each property sub-sector: direct property (retail, industrial, office, specialised) and listed property (A-REITs). The results show that both Office DP and listed property fail to gain allocation within the multi-asset portfolio with increasing weight parameters, that is, beyond 0-5%. The Retail DP sub-sector recommended allocations is generally around 4-5%. However, recommended weighting for both the Industrial DP and Specialised DP sub-sectors are within 10-13% with increasing asset allocation bands (0-20%) for each sector. Overall, the model recommends a maximum 5% allocation to each of the Office DP, Retail DP and Listed Property sub-sectors. Based on the analysis, there is scope for higher (+5%) allocation for the Industrial DP and Specialised DP (non-core) sub-sectors. However, the mismatch or unavailability of quality non-core assets and industrial stock would provide Australian fund managers significant challenges to achieve such higher allocation with these direct property sub-sectors.

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