Property research note

Allocating capital between Australian direct property, Australian REITs & global listed property

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Executive summary

- A simple allocation model is proposed for allocating investor capital across Australian direct property, Australian REITs and global listed property investments. This is motivated by their distinctly different risk-return profiles.
- The analysis highlights the potential for diversification benefits when jointly investing in global listed property, Australian REITs and direct Australian property rather than in each property segment individually.
- This model is considered a valuable tool in formulating strategies for hybrid property investment structures which jointly invest in listed and direct property asset markets.
- Estimated target allocation ranges, based on historical ten year returns, for direct property, Australian REITs and global listed property are 60-70%, 20-30%, and 5-20% respectively. The range depends on the inclusion or exclusion of property development companies in the global listed property return series.
- Estimated target allocations for portfolios with only direct property and global listed property (with development exposure excluded) are 70% and 30% respectively.
- Tactical allocations which differ to these can be determined based on forecast return profiles for each property asset class. For example, the current heightened volatility in the listed space might suggest a greater allocation (>70%) of capital towards Australian direct property.

Colonial First State

1. Introduction

One of the main tools used by the wealth management industry is asset allocation models. These models provide guidance on how capital can be effectively allocated across various asset classes so that investors reap diversification benefits.

Such models can also be constructed at a sector level for a given asset class. With reference to property investment, distinctive characteristics are exhibited between listed and direct property. The following note outlines a simple asset allocation model for allocating investor capital across three property investment segments: direct property in Australia, listed property in Australia and listed property globally.

2. Features of direct and listed property investments

A central feature of an asset allocation model involves the construction of an efficient portfolio frontier via an application of an optimisation procedure. To undertake the optimisation procedure, three pieces of information are required for each property class. These include an estimate of: i) the expected return; ii) expected covariance between returns and, iii) the correlations between returns. In this exercise, estimates for these three information sets are based on historical values; using monthly returns over a ten-year sample period. In using this estimation approach, we are effectively assuming that future returns and risk characteristics will, on average, be represented by the historical sample period.

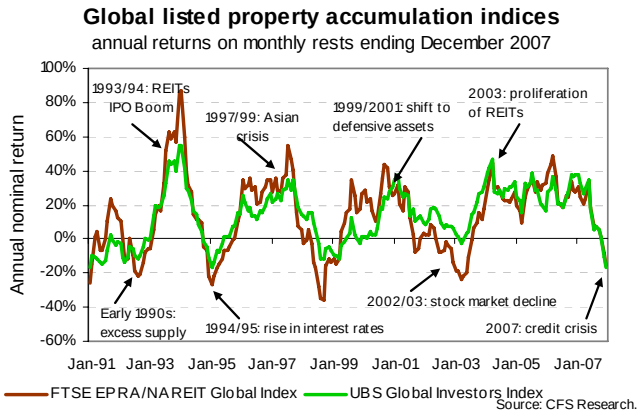
A brief discussion of each of these three information sets is given below.

Global listed property returns

Two commonly used performance benchmarks for the global listed property market include the FTSE EPRA/NAREIT Global Real Estate (FTSE) Index and the UBS Global Real Estate (UBS) Index. Both indices track the performance of listed real estate companies and REITs globally. The FTSE series covers around 307 securities in 28 countries, divided into three regions (Europe, Asia Pacific and North America). The UBS series can be considered to be a subset of the FTSE series, comprising of 250 REITs and real estate management companies outside Australia – it excludes real estate development companies which tend to be more volatile.

Figure 1 shows historical annualised total returns for both the FTSE and UBS series. In terms of average compound annual returns, the UBS series has outperformed the FTSE series. Over the last 5 and 10 years ending December 2007, UBS series reported average annual returns of 17.8% and 12.1% respectively. This compares favourable to returns reported by the FTSE series of 16.5% and 9.3% for the corresponding periods. While both series tend to track closely, exhibiting in similar cycle patterns, the UBS series is less pronounced in terms of troughs and peaks. This is not surprising with the omission of the more volatile development companies.

Figure: 1



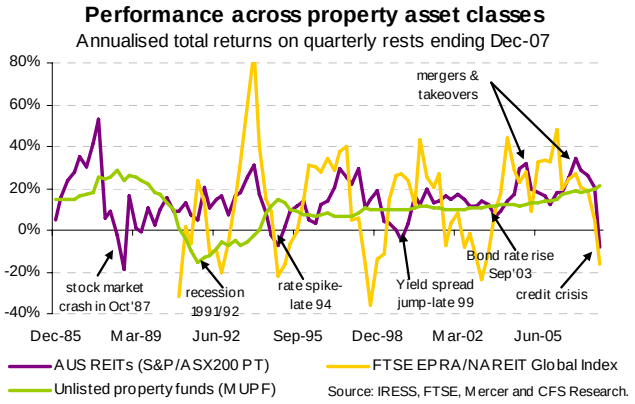
Returns: listed versus direct property

Investment in direct property delivers investors two main return attributes. Firstly, it provides investors with a consistent income stream, generally secured by rental leases. Secondly, it provides investors with capital growth, via asset value appreciation, underpinned by economic growth and associated macro-economic drivers, such as employment growth and retail turnover. In contrast to direct property, listed property - also referred to as indirect property - relates to property held in listed Real Estate Investment Trusts (REITs) which are traded on stock exchanges.

Figure 2 shows rolling annual returns for direct property, Australian REITs (denoted as A-REITs) and global listed property companies and REITs (based on the FTSE series, denoted as G-REITs).

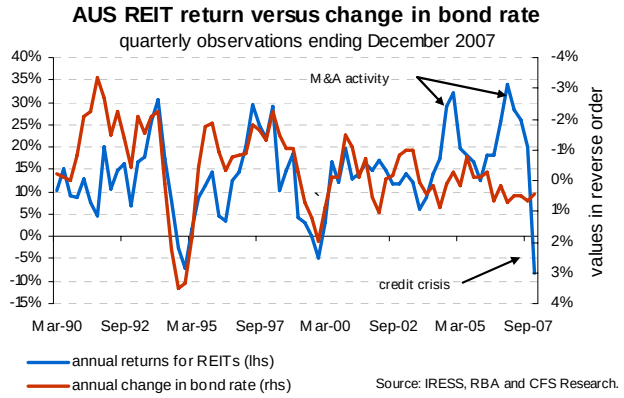
Direct property returns exhibit a clear structural break around 1993/94. Prior to this period, returns experienced a pronounced downturn in line with sluggish economic activity at the time. Whilst the retail sector displayed relative resilience in its performance during the downturn, both the office and industrial sectors experienced negative returns. Since 1993/94, the direct property return series has been relatively stable, delivering average annual returns of around 10%. This reflects a combination of generally favourable space market fundamentals and strong investor demand. It is also worth noting that the past fifteen years can be characterised as having benefited from a relatively low and stable inflation/interest rate environment compared to that of the late 1970s and 1980s. While it is true the cash rate has increased 12 successive times following the last rise on March 5th 2008; at 7.25%, it is still below the historical average of 11.72% for the period from 1978 to 1995.

Figure: 2



The return profile for A-REITs, based on the S&P/ASX200 Property Trust accumulation index, is distinctly different to that for direct property as shown in Figure 2. While direct property returns are fundamentally underpinned by macroeconomic factors, A-REIT returns are underpinned by financial and capital markets. This is highlighted in Figure 3 which shows that A-REIT returns are highly correlated with changes in the ten-year bond rate. However, the disparity between these two series is explained by the increased level of takeover and merger activity in the A-REIT sector during recent times. This resulted in the sector recording very strong returns of around 30% per annum over that period. More recently, the sector has experienced a dramatic fall, triggered by the global credit crisis.

Figure: 3



Volatility: the covariance matrix

The second information set refers to variance information for the two property asset classes. When this variance information is orderly grouped together, it is often referred to as the covariance matrix. The covariance matrix denotes the joint risk across property returns. For instance, high values imply high risk while low values imply lower risk.

The estimated joint risk across the three property investment segments is reported in the covariance matrices presented in Tables 1A and 1B. Table 1A makes us of the FTSE series to denote G-REITs while Table 1B makes use of the UBS series. [Note DS refers to 'de-smoothed' returns. Unlisted property tends to exhibit relatively smooth returns as a result of the appraisal based valuation system used. The return series is de-smoothed in an attempt to characterise the structure of the data in a similar manner as that of listed property returns].

Table: 1A

COVARIANCE MATRIX

Last 10 years ending Dec-2007

	DP(DS)	A-REITs	G-REITs (FTSE)
DP(DS)	**0.00444**	**0.00006**	**-0.00022**
A-REITs	0.00006	**0.01056**	**0.00462**
G-REITs (FTSE)	-0.00022	0.00462	**0.02267**

Table: 1B

COVARIANCE MATRIX Last 10 years ending Dec-2007			
	DP(DS)	A-REITs	G-REITs (UBS)
DP(DS)	**0.00444**	**0.00006**	**0.00000**
A-REITs	0.00006	**0.01056**	**0.00652**
G-REITs (UBS)	0.00000	0.00652	**0.01509**

Tables 1A and 1B highlight that direct property investing delivers lower return volatility than A-REITs as the variance of listed property is about two and half times as large as that of direct property. The greater volatility exhibited by REITs is attributable to share market volatility and is the 'price' of liquidity.

A further point on risk relates to the structure of REITs. Over recent years the structure of A-REITs has changed markedly: gearing levels have increased substantially - currently around 35% plus; exposure to offshore real estate assets has also grown, now representing around 40% of total REITs in terms of market capitalisation; as well as rising exposure to development/construction risk in conjunction with the rise of stapled trusts. These elements have reshaped the REIT market and exposed investors to non-traditional types of property investments and their associated risks.

Return correlations

The third piece of information is the correlation matrix. The correlation value between two series is commonly given by the correlation coefficient which is a number between -1 and 1. It measures the strength of the linear relationship between the two variables. A value of 1 implies perfect positive correlation, -1 implies perfect negative correlation, while 0 implies no correlation.

The correlation matrix is important as it gives rise to diversification benefits. Diversification benefits arise when the portfolio risk can be reduced beyond that of any individual portfolio assets. Hence, efforts to achieve such benefits commonly involve mixing asset classes with different risk and return characteristics such that they exhibit negative or low correlation values. [Refer to the Technical appendix for more detail].

A review of Figure 2 shows that returns for direct property and REITs tend to move counter-cyclical to one another. In other words, they are negatively correlated. This divergence in the two property cycles can be attributable to different underlying drivers as previously discussed.

Tables 2A and 2B report estimated correlation values for the three property investment segments over the past ten years, ending December 2007. The correlation value between direct property and A-REITs is not negative but very small, close to zero. The correlation between A-REITs and G-REITs is positive although low (when either of the FTSE or UBS series is used). However, for correlations between direct property and G-REITs, this value is slightly negative (essentially zero) when the FTSE series is used but positive when the UBS series is used. In all, the low and (just slightly) negative correlation values suggest that diversification benefits are obtainable by having exposure across these three property segments.

Table: 2A

CORRELATION MATRIX Last 10 years ending Dec-2007			
	DP(DS)	A-REITs	G-REITs (FTSE)
DP(DS)	**1.000**	**0.009**	**-0.022**
A-REITs	0.009	**1.000**	**0.299**
G-REITs (FTSE)	-0.022	0.299	**1.000**

Table: 2B

CORRELATION MATRIX Last 10 years ending Dec-2007			
	DP(DS)	A-REITs	G-REITs (UBS)
DP(DS)	**1.000**	**0.009**	**0.001**
A-REITs	0.009	**1.000**	**0.517**
G-REITs (UBS)	0.001	0.517	**1.000**

3. Portfolio construction

Based on the three information sets, one can now engage in the estimation of the portfolio frontier using an optimisation procedure. Note, the objective of the optimisation procedure is to produce a set of weights when the portfolio variance is minimised subject to a set of allocation constraints for a given portfolio return.

Portfolio frontiers

The estimated portfolio frontiers using global listed property data based on the FTSE and UBS indices are shown in Figures 4A and 4B respectively.

In both cases the efficient frontier is represented by the purple curved line. As expected, the frontier bulges in towards the vertical axis, reflecting the lower return correlation between the two property classes. The frontier is augmented with the risk-free rate (RFR) which extends the frontier to the vertical line.

Figure: 4A

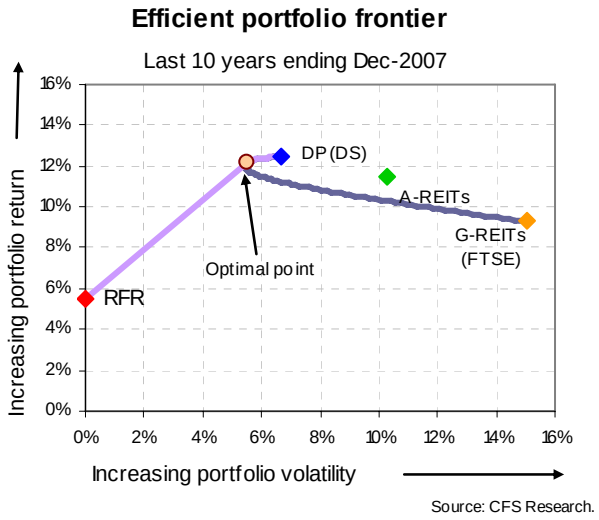
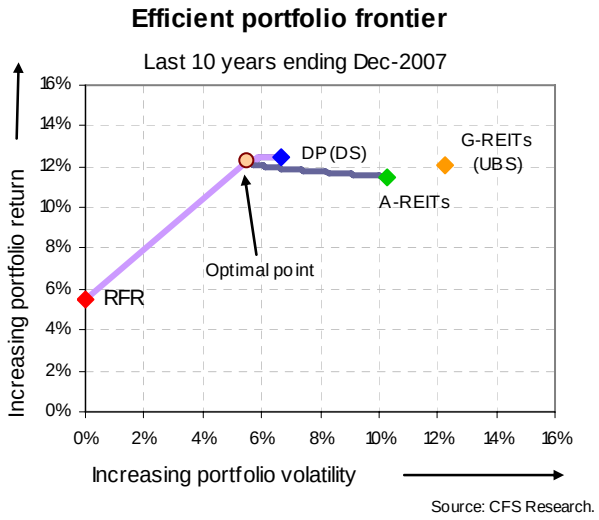


Figure: 4B



Strategic allocations

The estimated portfolio frontier is now used to determine appropriate strategic allocations between the three property investment segments.

Strategic asset allocation refers to the process of selecting a target asset allocation. The strategic allocation is related to the choice of benchmark as well as the performance measure.

In this study use is made of a risk-adjusted performance measure. The appealing feature of a risk-adjusted performance measure is that it attempts to encapsulate the trade-off between risk and return. Risk-adjusted return quantifies a given unit of return per unit of risk. Whilst a portfolio may have a very high total return, the associated risk with that return is also of importance when considering an investor's risk tolerance. One such measure is the Sharpe Ratio (SR). The SR is calculated by taking the quotient of the excess portfolio return to the portfolio standard deviation. The SR is calculated as

$$SR = (r_p - r_f) / \sigma_p \qquad \text{... (1)}$$

where σ_p is the portfolio standard deviation, where r_f is the risk-free rate (i.e., average bond rate over the respective period) and r_p is the expected portfolio return.

With reference to the efficient frontier, the strategic allocation can be determined by finding the maximum value of the SR ratio along the frontier. This is shown in Figures 4A and 4B and often referred to as the 'optimal' allocation.

Estimated optimal weight allocations across these property segments for various ten-year sample periods are reported in Tables 3A and 3B. For instance, for the period ending December 2007, optimal allocations between direct property, A-REITs and G-REITs (based on FTSE series) are approximately 70%, 25% and 5%respectively. If developers are stripped out (i.e., use if made of the UBS series), then optimal allocations between direct property, A-REITs and G-REITs are 65%, 20% and 15% respectively. The higher allocation to G-REITs using the UBS series is not surprising due to its higher SR (i.e., 0.61 for UBS versus 0.24 for FTSE series); essentially reflecting a combination of higher average return and lower return volatility.

It is also worth mentioning that Tables 3A and 3B also highlight the potential for diversification benefit. Looking at the SR statistics, one notes that this measure is higher when the three property segments are combined.

To gauge the robustness of these optimal weights, the exercise was repeated for sub-sample periods ending December 2006, 2005 and 2004. Estimated target weights for direct property, A-REITs and G-REITs (using the FTSE series) are 65%, 30% and 5% respectively. In contrast, if the UBS series is used, estimated target weights for direct property, A-REITs and G-REITs are 60%, 20% and 20% respectively.

The increased allocation to direct property over the sample period ending December 2007 reflects the recent marked downturn in the REIT markets and general listed equity markets associated with the credit crisis. With the credit crisis considered to present a short-term deviation from the longer term performance of REIT markets, then one may consider the estimated optimal allocations for the earlier periods as target weights. Subsequently, short-term tactical allocations can be made based on any material changes across the three property segments. The recent heightened volatility seen in the listed investment space might warrant an increased allocation above the optimal 65%-70% range to direct property over the short-term.

Table: 3A

Portfolio performance for selected sample periods

estimates based on historical ten year sample periods

Portfolio	Period ending			
statistics	Dec-07	Dec-06	Dec-05	Dec-04
Return				
DP(DS)	12.5%	11.2%	10.4%	9.8%
A-REITs	11.5%	14.0%	13.2%	12.6%
G-REITs (FTSE)	9.3%	11.2%	12.4%	11.0%
Optimal weight				
DP(DS)	72%	65%	63%	64%
A-REITs	24%	31%	31%	31%
G-REITs (FTSE)	4%	3%	6%	5%
Sharpe ratio				
DP(DS)	1.05	0.99	0.89	0.81
A-REITs	0.59	0.87	0.81	0.75
G-REITs (FTSE)	0.25	0.37	0.44	0.35
Combined	1.21	1.22	1.17	1.10

Source: CFS Research.

Table: 3B

Portfolio performance for selected time periods

estimates based on historical ten year sample periods

Portfolio	Period ending			
statistics	Dec-07	Dec-06	Dec-05	Dec-04
Return				
DP(DS)	12.5%	11.2%	10.4%	9.8%
A-REITs	11.5%	14.0%	13.2%	12.6%
G-REITs (UBS	12.1%	15.1%	14.9%	13.7%
Optimal weight				
DP(DS)	71%	60%	58%	59%
A-REITs	18%	21%	23%	25%
G-REITs (UBS	12%	19%	19%	16%
Sharpe ratio				
DP(DS)	1.05	0.99	0.89	0.81
A-REITs	0.59	0.87	0.81	0.75
G-REITs (UBS	0.54	0.85	0.84	0.76
Combined	1.23	1.30	1.24	1.14

Source: CFS Research.

Variations to portfolio construction

The model structure also allows one to consider portfolios comprising solely of Australian direct property and global listed property. Such portfolios are motivated by investors desiring a purely global listed exposure. Estimated optimal weight allocations across these two property segments for various ten-year sample periods are reported in Tables 4A and 4B.

Table: 4A

Portfolio performance for selected sample periods

estimates based on historical ten year sample periods

Portfolio	Period ending			
statistics	Dec-07	Dec-06	Dec-05	Dec-04
Return				
DP(DS)	12.5%	11.2%	10.4%	9.8%
G-REITs (FTSE)	9.3%	11.2%	12.4%	11.0%
Optimal weight				
DP(DS)	90%	90%	86%	87%
G-REITs (FTSE)	10%	10%	14%	13%
Sharpe ratio				
DP(DS)	1.05	0.99	0.89	0.81
G-REITs (FTSE)	0.25	0.37	0.44	0.35
Combined	1.09	1.03	0.97	0.88

Source: CFS Research.

Similar to results reported in Tables 3A and 3B, there is an improvement in the risk-adjusted return when individual property segments are combined.

Furthermore, estimated target weights for direct property and G-REITs are 90% and 10% respectively (using the FTSE series), and 70% and 30% respectively (using the UBS series). Notably, these target allocations give greater weight to direct property due to its superior risk-adjusted return profile.

Table: 4B

Portfolio performance for selected sample periods

estimates based on historical ten year sample periods

Portfolio	Period ending			
statistics	Dec-07	Dec-06	Dec-05	Dec-04
Return				
DP(DS)	12.5%	11.2%	10.4%	9.8%
G-REITs (UBS)	12.1%	15.1%	14.9%	13.7%
Optimal weight				
DP(DS)	79%	71%	68%	70%
G-REITs (UBS)	21%	29%	32%	30%
Sharpe ratio				
DP(DS)	1.05	0.99	0.89	0.81
G-REITs (UBS)	0.54	0.85	0.84	0.76
Combined	1.18	1.22	1.14	1.03

Source: CFS Research.

4. Summary remarks

A simple allocation model was proposed for allocating investor capital across Australian direct property, A-REITs and global listed property investment markets. This model is considered a valuable tool, providing a basis for formulating allocation strategies across property investment segments to reap out-performance based on diversification benefits.

Estimated target allocations, based on historical returns, for direct property, A-REITs and global listed property are 65%, 30% and 5% respectively. If global development property companies are omitted, then the estimated target weights for direct property, A-REITs and G-REITs become 60%, 20% and 20% respectively. The choice of target weights depends on market segmentation rules.

Estimated target allocations for portfolios with only direct property and global listed property (with development exposure excluded) are 70% and 30% respectively.

Short-term tactical allocations can be made which differ to these target weights as dictated by the prevailing market conditions for each property investment segment.

5. Technical appendix

This section reports the mathematical expression for the portfolio variance for two and three asset classes.

Two asset classes

The portfolio variance, $\sigma^2_{p(2)}$, based on two assets, which can be expressed as

$$\sigma^2_{p(2)} = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho_{12}\sigma_1\sigma_2 \text{ ... (A1)}$$

where w_1 and w_2 are the weights of assets 1 and 2 respectively, and σ_1 and σ_2 denote standard deviations for assets 1 and 2 respectively, and ρ_{12} is the correlation coefficient between asset 1 and 2.

An inspection of equation (1) highlights that diversification is driven by the covariance term $2w_1w_2\rho_{12}\sigma_1\sigma_2$. More importantly, the portfolio variance is minimised when the covariance term is minimised. This occurs when the correlation coefficient is at its maximum negative value of -1.

Three asset classes

The portfolio variance, $\sigma^2_{p(3)}$, based on two assets, which can be expressed as

$$\sigma^2_{p(3)} = w'\Omega w \quad \text{... (A2)}$$

$$= w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + w_3^2\sigma_3^2$$

$$+ 2[w_1w_2\rho_{12}\sigma_1\sigma_2 + w_1w_3\rho_{13}\sigma_1\sigma_3 + w_2w_3\rho_{23}\sigma_2\sigma_3]$$

where w is a vector of asset weights, Ω is a 3x3 co-variance matrix, w_3 and is the weight of asset 3, σ_3 is denotes the standard deviation for asset 3, and ρ_{13} and ρ_{23} are the correlation coefficients between assets 1 and 3 and assets 2 and 3 respectively.

6. Research team

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