THE IMPACT OF ALTERNATIVE ASSETS ON THE ROLE OF DIRECT PROPERTY IN AUSTRALIAN MIXED-ASSET PORTFOLIOS

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ABSTRACT

Australian superannuation funds have increased their allocations to the alternative assets in recent years; this includes private equity, infrastructure, hedge funds and commodities. This raises the issue of whether this increased allocation to these alternative assets impacts on the strategic role and allocation of direct property in the Australian mixed-asset portfolio, due to the potential increased competition between these assets. This paper assesses the risk-adjusted performance and portfolio diversification benefits of direct property and various alternative assets over 1995-2009 and their role in optimal mixed-asset portfolios. While direct property is still seen to play a key role in the portfolio, direct property plays a less significant role in the portfolio when the alternative assets are included. In particular, Australian unlisted infrastructure and listed infrastructure are seen as key alternative assets across a significant portion of the portfolio risk spectrum. This is seen as validating the investment strategy of Australian superannuation funds who have significant exposure to the infrastructure sector.

Keywords: Direct property, alternative assets, risk-adjusted returns, portfolio diversification, portfolio impact, superannuation funds

INTRODUCTION

The case for commercial property as an important asset class in an institutional portfolio has been well established. This includes both domestic and international property in a mixed-asset portfolio (Bond et al, 2003; Hoesli et al, 2004; Hudson-Wilson et al, 2003; Ling and Naranjo, 2002; Mueller and Mueller, 2003; Peyton and Lotito, 2007; Sirmans and Worzala, 2003; Worzala and Sirmans, 2003). These strategic benefits of commercial property in a mixed-asset portfolio include portfolio diversification, inflation-hedging, low risk and strong risk-adjusted returns (Newell, 2005).

With Australian superannuation funds having over $1.3 trillion in assets in 2010 (APRA, 2011b), the average Australian superannuation balanced fund comprised 10% property in 2010; consisting of 7% unlisted property and 3% listed property (APRA, 2011a). Amongst the major Australian superannuation funds, these levels of property include State Super ($2.7 billion; 9% of total portfolio), AustralianSuper ($3.3 billion; 10%), UniSuper ($2.5 billion, 10%), HESTA ($1.5 billion; 9%), ARIA ($2.2 billion; 14%) and Cbus ($1.8 billion; 13%). Equivalent levels of property in some of the major North American and European pension funds include CalPERS (7%), CALSTRS (10%), Canada Pension Plan (6%), Ontario Teachers Pension Plan (18%), British Telecom (11%) and ABP (8%). This has seen Australian superannuation funds as major property investors; particularly using unlisted wholesale property funds with AMP, QIC, ISPT, Lend Lease, GPT, Colonial First State and Goodman to achieve this property exposure (Newell, 2007a, 2007b, 2008).

Recent years have seen most pension funds consider property as a traditional asset class, not as an alternative asset class. As well as the core asset classes of shares, bonds and property, pension funds also invest in the alternative asset classes of private equity, infrastructure, hedge funds and commodities. These alternative asset classes have taken on increased significance in recent years, as pension funds seek portfolio diversification and enhanced risk-adjusted returns. Amongst the major pension funds and endowments globally, the level of these alternative assets in their portfolios is expected to increase from 10% to 13% over 2009-2012, comprising private equity (5%), hedge funds (6%), infrastructure (1%) and commodities (1%) (Russell Investments, 2010). Levels of these alternative assets in the major Australian superannuation funds include StateSuper ($3.4 billion; 11%), AustralianSuper ($5.0 billion; 16%), UniSuper ($2.3 billion; 9%), HESTA ($2.7 billion; 17%), ARIA ($1.9 billion; 12%) and Cbus ($3.2 billion; 23%). Similarly, in the Future Fund (Australia's sovereign wealth fund), these alternative assets account for $14.7 billion or 22% of total assets.

This raises the issue of whether this increased allocation to these alternative assets by pension funds impacts on the strategic role and allocation of direct property in an institutional portfolio, due to the potential increased competition between these assets. In particular, the issues of whether the typical allocations by pension funds to direct property will be reduced and whether these alternative assets replicate the role of direct property in a mixed-asset portfolio need to be assessed. The impact of these alternative assets on the contribution of direct property in a mixed-asset portfolio has recently been assessed for US portfolios (Ankrim and Hensel, 1993; Georgiev et al, 2003; Hung et al, 2008; Peyton and Lotito, 2007; Sa-Aadu et al, 2010; Terhaar et al, 2003) and UK portfolios (Bond et al, 2007). Given the significant levels of both commercial property and these alternative assets in Australian superannuation fund portfolios, it is also important to consider this strategic issue in the context of Australian superannuation funds. As such, this paper assesses the impact of these

alternative assets on the role and contribution of direct property in Australian mixed-asset portfolios over Q4:1995- Q2:2009. Sub-period analyses are also conducted to assess the dynamics of this relationship between direct property and these alternative assets, as well as the strategic implications for Australian superannuation funds are highlighted.

SIGNIFICANCE OF THE ALTERNATIVE ASSETS

This section highlights some of the key features, benefits and attributes of the various alternative assets, including private equity, infrastructure, hedge funds and commodities.

Private equity

Pension funds are major private equity investors, with the top 20 pension funds globally having committed over $220 billion in private equity investments (Preqin, 2011b); eg: CalPERS (13% of portfolio), CALSTRS (15% of portfolio). Private equity is expected to comprise 5% of pension fund portfolios by 2012 (Russell Investments, 2010). Private equity provides diversification benefits and the potential for high returns; offset by a high degree of illiquidity. Private equity fund raisings globally have been $2.9 trillion over 2004-2010, with the $225 billion in private equity raised in 2010 being the lowest since 2004; reflecting investor reluctance to commit to this illiquid asset class in the post-GFC uncertain environment (Preqin, 2011b). Major private equity players include Carlyle, Cerebus, Blackstone, Brookfield, Morgan Stanley and Oaktree (Preqin, 2011d). Improvements in the private equity sector are expected in 2011, with 37% of private equity investors expecting to increase their allocation to private equity in the longer term (Preqin, 2011b). Amongst the Australian private equity investors, 43% invested in private equity in 2010, but remained cautious; with concerns over the level of fees. 75% of Australian private equity investors expect to increase or maintain their allocations to private equity investment in the longer term (Preqin, 2011a). Examples of leading Australian superannuation fund allocations to private equity include AustralianSuper ($1.2 billion; 4% of portfolio) and UniSuper ($1.0 billion; 4%); covering both Australian and international private equity investments.

The benchmark private equity performance series is the US Private Equity Funds Pooled index; produced quarterly since 1970 by Thomson Venture Economics. This US private equity series is the largest private equity database available with over 200,000 transactions and is based on actual cashflows and fund residual values for venture, buy-out and mezzanine private equity funds. It covers private equity from funds representing approximately 75% of capital under management in the private equity industry, and is a pooled IRR series net of fees.

Infrastructure

Infrastructure investment has taken on increased importance with Australian superannuation funds; eg: AustralianSuper ($3.8 billion; 12% of portfolio) and UniSuper ($1.2 billion; 5%), as well as for pension funds in the US and Europe. Infrastructure is expected to comprise 1% of pension fund portfolios by 2012 (Russell Investments, 2010). Infrastructure is seen as an attractive investment for superannuation funds, offering portfolio diversification, strong risk-adjusted returns, inflation hedging and cashflows effectively matching long-term liabilities, as well as being seen as a separate asset class to property (Newell et al, 2011; Russell Investments, 2010). Major infrastructure players include Global Infrastructure Partners, RREEF, Blackstone Infrastructure and Macquarie Infrastructure (Preqin, 2011d). Over $148 billion has been raised globally for unlisted infrastructure investment over 2004-2010, with 2010 seeing a more positive environment for infrastructure investment; seeing $27 billion raised in 2010 (Preqin, 2011c). 2011 is expected to see continued improvement in the infrastructure investment sector, with 70% of infrastructure investors expecting to invest in infrastructure in 2011. Infrastructure investors' major concerns are the level of fees, lack of liquidity and the infrastructure fund carry structure (Preqin, 2011c; Russell Investments, 2010). Both unlisted infrastructure and listed infrastructure are available to pension funds, with listed infrastructure comprising both local infrastructure projects and global infrastructure projects.

Previous research has assessed the positive added-value role of both listed and unlisted infrastructure in an Australian mixed-asset portfolio, and the clear differences between infrastructure and property as assets in a portfolio (Finkenzeller et al, 2010; Newell and Peng, 2008a; Newell et al, 2011; Peng and Newell, 2007). The benefits of infrastructure in a mixed-asset portfolio have also been shown for the US (Newell and Peng, 2008b), China (Newell et al, 2009) and India (Singhal et al, 2011). Benchmark infrastructure performance series are produced for Australian listed infrastructure and global listed infrastructure by UBS, with an Australian unlisted infrastructure series produced by Mercer; see Newell et al (2011) and Peng and Newell (2007) for specific details of these infrastructure performance series.

Hedge funds

Hedge funds have taken on more importance as an alternative asset class with pension funds globally. Hedge funds are expected to comprise 6% of pension fund portfolios by 2012 (Russell Investments, 2010). Hedge funds are lightly-regulated managers of private capital that use active investment approaches to play arbitrage opportunities that arise from the mispricing of financial interests. Hedge funds make extensive use of leverage and derivatives and provide liquidity to the market; typically with a short investment horizon (Blundell-Wignall, 2007). Major hedge fund players include Bridgewater, K2 and Grosvenor Capital (Preqin, 2011d).

The benchmark hedge fund performance series is the Dow Jones Credit Suisse Hedge Fund Index (previously Credit Suisse/Tremont Hedge Fund Index); produced monthly since 1994. This asset-weighted hedge fund index uses the Credit Suisse database of over 8,000 hedge funds; comprising open and closed funds in the US and overseas. Included hedge funds need to exceed US$50 million, have a 12-month track record and have audited financial statements. The index reports over 85% of the total hedge fund assets in ten hedge fund sub-sectors, including convertible arbitrage, emerging markets, long/short equity, fixed income arbitrage, global macro, event driven and managed futures. The index is calculated and rebalanced monthly; net of all fees and expenses.

Commodities

Commodities have been a more recent alternative asset sector supported by pension funds globally. Commodities include the energy, agriculture, industrial metals, livestock and precious metals sectors, and are expected to comprise 1% of pension fund portfolios by 2012 (Russell Investments, 2010). Drivers of the commodities asset class include liquidity, inflation protection and a track record of successful managers, while concerns in the sector include excessive valuations of commodities contracts and speculative trading (Russell Investments, 2010).

The S&P Goldman Sachs Commodities Index is the benchmark for commodity market performance, being calculated daily since 1970 on a world production-weighted basis. It comprises the principal physical commodities that are subject to active, liquid futures markets, with the weights reflecting the relative significance of each of the constituent commodities in the world economy. This sees 24 constituents in the five commodities sub-sectors of energy (67% of index), agriculture (17%), industrial metals (8%), livestock (4%) and precious metals (3%).

Previous research regarding direct property versus alternative assets

The impact of these alternative assets on the contribution of direct property in a mixed-asset portfolio has been assessed for various combinations of these alternative assets for US portfolios (Ankrim and Hensel,1993; Georgiev et al, 2003; Hung et al, 2008; Peyton and Lotito, 2007; Sa-Aadu et al, 2010; Terhaar et al, 2003) and UK portfolios (Bond et al, 2007). Whilst the alternative assets provide diversification benefits in a portfolio, most studies have shown that direct property still provides added-value in a portfolio, with the diversification benefits not replaced by these alternative assets. In particular, direct property was seen to be important and playing a major role in a mixed-asset portfolio, with no alternative assets delivering the same level of risk-reduction and portfolio diversification benefit as direct property (Bond et al, 2007; Hung et al, 2008).

This major role by direct property was evident, even if the alternative assets were included; with the inclusion of direct property seeing the subsequent role of the alternative assets as small (Bond et al, 2007). This saw direct property playing a distinct and separate role in the portfolio, compared to the alternative assets. Importantly, the role of direct property in the portfolio was evident over time, whereas the benefits of some alternative assets were more evident in different markets; eg: hedge funds in a bear market, commodities in a bull market (Bond et al, 2007). Direct property was also seen to have a far more dominant role compared to REITs when included with the alternative assets (Hung et al, 2008).

In an Australian context, the only alternative asset to have been assessed has been infrastructure (Finkenzeller et al, 2010; Newell et al, 2011; Peng and Newell, 2007). These studies highlighted the strategic contribution of infrastructure and direct property in an Australian portfolio, without specifically addressing the issue of infrastructure offsetting the added-value and portfolio diversification benefits of direct property. Studies concerning the other alternative assets of private equity, hedge funds and commodities and their competitive impact on the levels of direct property in an Australian portfolio have not been carried out. Subsequent sections of this paper will assess this key issue in an Australian portfolio context; particularly for Australian superannuation funds.

Similarly, previous studies (eg: Bond et al, 2007; Hung et al, 2008) have focused on a smaller set of alternative assets and their impact on the direct property allocation. In particular, Hung et al (2008) did not include infrastructure, while Bond et al (2007) considered global listed infrastructure but not unlisted infrastructure. Given the significant role of unlisted infrastructure in superannuation funds/pension funds, not including unlisted infrastructure as one of the alternative assets in the analysis is likely to see an incomplete picture regarding the fuller impact of including alternative assets on the level of direct property in the portfolio. A key feature of this present study is the inclusion of both listed and unlisted infrastructure in addition to private equity, hedge funds and commodities to see the fuller set of alternative assets assessed and their impact on direct property in the portfolio. This is the first time that the full set of alternative assets has been assessed regarding the impact on the direct property allocation in the portfolio.

METHODOLOGY

Data

The Australian commercial property performance series used in this study is the quarterly IPD/PCA property index (IPD/PCA, 2009); this being the benchmark Australian commercial property series. At June 2009, the IPD/PCA series comprised 1,115 properties valued at $86 billion from the portfolios of 21 property fund managers. To account for valuation-smoothing in this property series, de-smoothing of

the direct property returns was done using the standard Geltner (1993) procedure, with a one year lag structure and smoothing parameter of 0.2. The other core assets considered were shares, bonds and A-REITs. The alternative assets considered were private equity, infrastructure (listed and unlisted), hedge funds and commodities. As per direct property, unlisted infrastructure performance is also valuation-based; hence the unlisted infrastructure returns were also de-smoothed using the Geltner (1993) procedure as done in previous analyses of unlisted infrastructure (e.g. Finkenzeller et al, 2010). 90-day bills were used as the risk-free rate. Table 1 provides full details of the respective data series used for these four core assets and six alternative assets in this study. Where an Australian alternative asset series was not provided, the equivalent global benchmark series was used, as discussed in the previous section. This also reflects the fact that Australian superannuation funds have global mandates in these alternative assets; for example, UniSuper has $1.1 billion in private equity investments, comprising 32% in Australian private equity and 68% in international private equity.

Table 1: Asset data series*

Direct property: IPD/PCA Total Property
A-REITs: ASX A-REIT300
Shares: ASX All Ordinaries
Bonds: CBA All Maturities
Hedge funds: Dow Jones Credit Suisse Hedge Fund Index (US$)
Private equity: US Private Equity Funds Pooled Index (US$)
Commodities: S&P Goldman Sachs Commodity Index (US$)
Global listed infrastructure: UBS Global Listed Infrastructure Index (US$)
Australian unlisted infrastructure: Mercer Unlisted Australian Infrastructure Index
Australian listed infrastructure: UBS Listed Australian Infrastructure Index
Cash: 90-day bills
Inflation: CPI

*: all series are in Australian dollars unless indicated in US$

Statistical analysis

Risk-adjusted total returns and the portfolio diversification benefits for the various core assets and alternative assets were assessed over Q4:1995-Q2:2009; this saw 55 quarterly data points used in this study. Sub-period analyses were also assessed over Q4:1995-Q4:2002 and Q1:2003-Q2:2009 to examine the dynamics of these asset class relationships, with Australian superannuation funds being more active in the area of alternative assets in this second sub-period. These two sub-periods were selected, as the second sub-period has seen increased use of the alternative asset classes by pension funds, as well as seeing sufficient data in each sub-period to ensure rigorous results for the assets' performance analysis. Efficient frontiers and asset allocation diagrams were also used to fully assess the asset allocation competition between direct property and the alternative assets in the portfolio.

RESULTS AND DISCUSSION

Risk-adjusted performance

Table 2 presents the asset performance analysis for the core and alternative assets, with average annual returns presented on a 1, 3, 5 and 10-year basis. The variable performance of all of these assets over time is clearly evident; particularly during the Global Financial Crisis (GFC). Direct property was less impacted during the GFC compared to several core assets (eg: shares, A-REITs) and several alternative assets (eg: listed infrastructure, commodities). Importantly, over these various timeframes, direct property was consistently amongst the better performing assets; as was unlisted infrastructure. In comparison, some of the alternative assets were amongst the lesser performing assets; eg: private equity and commodities.

The risk-adjusted performance analysis for the various assets over Q4:1995-Q2:2009 is given in Table 3. Direct property (8.94% p.a.) was the 5th best performing of the ten assets considered in this study. Direct property was out-performed by four of the alternative assets, including listed infrastructure (16.72%) and unlisted infrastructure (12.56%), which were the two best performed asset classes. Amongst the alternative assets, only private equity and commodities under-performed direct property. Direct property also out-performed the three core assets of shares, bonds and A-REITs over this period.

Direct property was seen to be low risk (6.24%), only out-performed with lower risk by bonds (4.68%) and private equity (5.00%). Amongst the alternative assets, only private equity had a lower risk than direct property, with some of the alternative assets having much higher levels of risk. This includes commodities (25.08%), listed infrastructure (24.87%), unlisted infrastructure (19.09%) and global listed infrastructure (17.70%). Commodities and the three infrastructure assets also had higher risk levels than shares (13.94%), with A-REITs (17.63%) having the highest risk level amongst the core asset classes.

Table 2: Asset performance analysis: Q2:2009

Asset	Average annual return (%)			
	1Y	3Y	5Y	10Y
Direct property	-18.83	-2.86	5.82	8.66
A-REITs	-42.11	-23.07	-8.64	2.41
Shares	-22.15	-3.76	6.67	7.33
Bonds	10.46	6.43	6.66	6.13
Hedge funds	-13.71	1.51	4.97	7.03
Private equity	-11.03	-4.97	-3.01	-3.57
Commodities	-60.08	-20.15	-7.01	4.43
Global listed infrastructure	-29.16	-0.52	11.03	9.04
Unlisted infrastructure	-5.90	3.90	8.15	8.31
Listed infrastructure	-32.04	-8.85	2.60	8.47

Source: Authors' calculation

On a risk-adjusted returns basis (via the Sharpe ratio), direct property (0.53) was the best performed of all of the core and alternative assets. Several alternative assets also figured prominently in this risk-adjusted performance; namely listed infrastructure (0.44; #2), hedge funds (0.42; #3) and unlisted infrastructure (0.36; #4). Alternative assets to deliver lesser risk-adjusted returns were global listed infrastructure (#7), commodities (#9) and private equity (#10). As well as direct property (#1), the alternative assets of listed infrastructure (#2), hedge funds (#3) and unlisted infrastructure (#4) also out-performed the core assets of shares (#6) and A-REITs (#8) on a risk-adjusted returns basis.

Table 3: Asset risk-adjusted performance analysis: Q4:1995 - Q2:2009

Asset	Average annual returns (%)	Annual risk (%)	Risk/return ratio *	Sharpe ratio*
Direct property	8.94	6.24	0.70 (2)	0.53 (1)
A-REITs	4.93	17.63	3.57 (8)	-0.04 (8)
Shares	8.79	13.94	1.59 (6)	0.22 (6)
Bonds	7.02	4.68	0.67 (1)	0.29 (5)
Hedge funds	9.39	8.79	0.94 (3)	0.42 (3)
Private equity	-1.74	5.00	-2.88 (10)	-1.48 (10)
Commodities	3.35	25.08	7.49 (9)	-0.09 (9)
Global listed infrastructure	9.19	17.70	1.93 (7)	0.20 (7)
Unlisted infrastructure	12.56	19.09	1.52 (5)	0.36 (4)
Listed infrastructure	16.72	24.87	1.49 (4)	0.44 (2)

*: value in brackets is rank of risk-adjusted performance

Given the strong risk-adjusted performance by several of the alternative assets relative to direct property, this will potentially see pressure on the level of direct property in the portfolio when these alternative assets are considered in the fuller mixed-asset portfolio efficient frontiers and asset allocations.

Table 4: Inter-asset correlation matrix: Q4:1995 – Q2:2009

	Direct prop.	A-REITs	Shares	Bonds	Hedge funds	Private equity	Commodities	Global infra.	Unlisted infra.	Listed infra.
Direct prop.	1.00									
A-REITs	0.64*	1.00								
Shares	0.52*	0.58*	1.00							
Bonds	-0.12	-0.02	-0.41*	1.00						
Hedge funds	0.37*	0.30*	0.64*	-0.39*	1.00					
Private equity	0.28*	0.24	0.56*	-0.27	0.71*	1.00				
Commodities	0.20	0.28*	0.12	-0.09	0.29*	0.29*	1.00			
Global infra.	0.45*	0.52*	0.62*	-0.17	0.34*	0.24	0.12	1.00		
Unlisted infra.	0.19	0.18	0.16	0.02	0.10	0.24	0.20	0.28*	1.00	
Listed infra.	0.40*	0.57*	0.48*	0.09	0.14	0.11	-0.01	0.54*	0.28*	1.00
Inflation	-0.03	-0.02	-0.10	-0.19	-0.09	-0.04	0.43*	-0.09	-0.16	-0.21

*: significant correlation (P<5%)

Portfolio diversification

Table 4 presents the inter-asset correlation matrix for the various core and alternative assets over Q4:1995-Q2:2009. Direct property shows some degree of diversification benefit with most of the alternative assets, including unlisted infrastructure (r=0.19), commodities (r=0.20) and private equity (r=0.28). These diversification benefits were more significant than that seen for direct property and shares (r=0.52), and direct property and A-REITs (r=0.64).

While direct property showed some diversification benefits with shares (r=0.52), several of the alternative assets showed more diversification benefits with shares; namely commodities (r=0.12), unlisted infrastructure (r=0.16) and listed infrastructure (r=0.48). Only private equity, global listed infrastructure and hedge funds showed less diversification benefit with shares than the diversification benefits of direct property with shares. Similarly, with direct property and bonds seeing significant diversification benefit (r=-0.12), several alternative assets delivered more significant portfolio diversification benefits with bonds; namely hedge funds (r=-0.39), private equity (r= -0.27) and global listed infrastructure (r= -0.17). Within the six alternative assets, there was considerable variation in their diversification benefits, ranging from r=-0.01 (commodities and listed infrastructure) to r=0.71 (hedge funds and private equity), with an average correlation of r=0.26, reflecting overall diversification benefits.

As with the risk-adjusted performance of several of these alternative assets, these superior portfolio diversification benefits by several of the alternative assets relative to the diversification benefits by direct property will see a potential impact on the level of direct property in the mixed-asset portfolio when these alternative assets are included. The general extent of the impact of including these alternative assets in the portfolio on the level of direct property is summarised in Table 5. This sees most of the alternative assets out-performing direct property on the basis of two of the five performance criteria. The potential impact on the level of direct property in the portfolio will be seen in the following sections concerning efficient frontiers and mixed-asset portfolio asset allocations. It is also seen that direct property is not a good hedge against inflation (r=-0.03; see Table 4), but lack of inflation hedging ability is also seen for all of the alternative assets except for commodities (r=0.43).

Table 5: Performance of alternative assets versus direct property*

Alternative asset	Superior returns	Superior risk	Superior risk-adjusted returns	Superior diversification benefit (versus shares)	Superior diversification benefit (versus bonds)	Number of factors seem as superior to property
Hedge funds	YES	NO	NO	NO	YES	2/5
Private equity	NO	YES	NO	NO	YES	2/5
Commodities	NO	NO	NO	YES	NO	1/5
Global listed infrastructure	YES	NO	NO	NO	YES	2/5
Unlisted infrastructure	YES	NO	NO	YES	NO	2/5
Listed infrastructure	YES	NO	NO	YES	NO	2/5

*YES = superior performance versus direct property
NO = lesser performance versus direct property

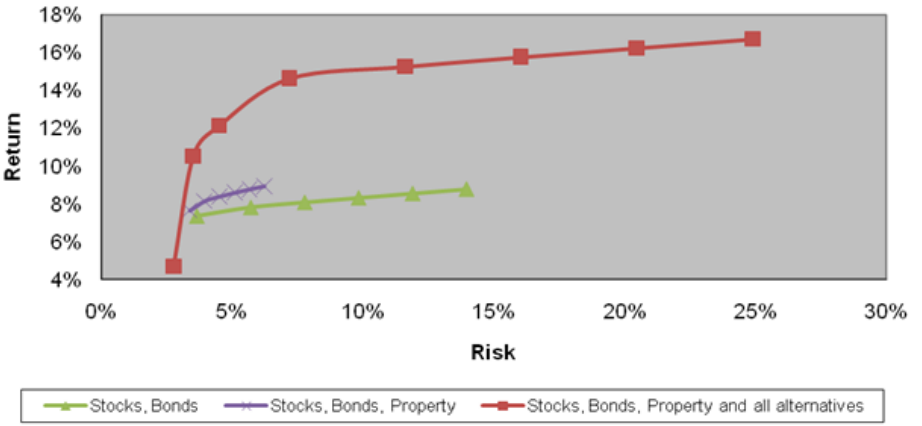
Optimal mixed-asset portfolios

To assess the relationship between direct property, the core assets (3) and the alternative assets (6), mixed-asset portfolios were constructed for:

- #1: shares and bonds
- #2: shares, bonds and direct property
- #3: shares, bonds, A-REITs, direct property and the alternative assets.

Figure 1 shows the efficient frontier for these three mixed-asset portfolio scenarios and Figure 2 shows the respective asset allocation diagrams. For the portfolio only including shares and bonds (scenario #1), the portfolio is dominated by bonds at low risk levels, with shares progressively increased in the portfolio at higher risk levels. When direct property is included in the portfolio with shares and bonds (scenario #2), this sees direct property present in the portfolio across the full risk spectrum at a level of at least 24%; largely replacing shares in the shares/bonds scenario. This shares/bonds/direct property scenario is over a much reduced risk spectrum of 3.37% to 6.24%, due to the stronger performance at low risk by direct property.

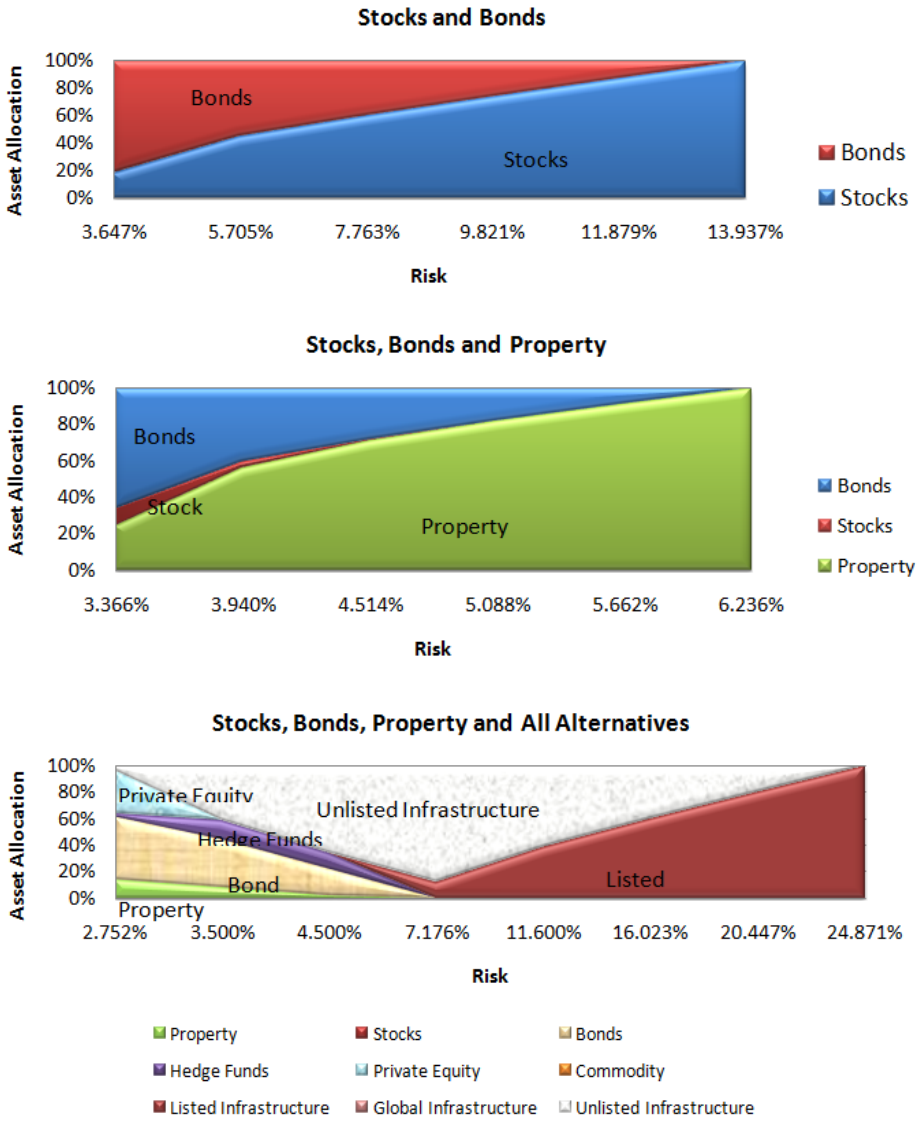
Figure 1: Efficient frontiers for property and alternative assets



Given the strong performance of several of the alternative assets, the key issue is whether these high levels of direct property in the portfolio in scenario #2 are maintained when the various alternative assets are also included in the mixed-asset portfolio (scenario #3). As seen in Figure 2, the inclusion of these alternative assets in the mixed-asset portfolio sees significantly reduced levels of direct property in the portfolio. In particular, direct property now only appears in the portfolio at low/medium portfolio risk levels and at a maximum allocation of 24% at a portfolio risk level of 7.2%. For portfolio risk levels above 11.6%, direct property does not get included in the portfolio, being replaced by a combination of various alternative assets. Shares and A-REITs do not figure in the portfolio at any portfolio risk level.

In particular, the alternative assets are now seen to figure in the mixed-asset portfolio across the full risk spectrum. This sees the alternative assets at levels of at least 36.7% in total allocation across the risk spectrum. At low portfolio risk levels, private equity and unlisted infrastructure are present in the portfolio, with hedge funds, unlisted infrastructure and listed infrastructure included at medium-level risk. At higher risk levels, listed infrastructure dominates along with unlisted infrastructure. Importantly, several of these alternative assets are seen to play a key role across a significant section of the portfolio risk spectrum; particularly unlisted infrastructure, listed infrastructure and hedge funds. The added value of including these alternative assets in the portfolio is clearly evident in the efficient frontiers for these three scenarios shown in Figure 1.

Figure 2: Asset allocation diagrams for role of property and alternative assets in portfolio



Overall, the inclusion of these alternatives assets in the portfolio has had a major impact on the role of direct property across the full risk spectrum. Direct property still has a key role in the portfolio, but is now only seen at low/medium risk levels at a maximum asset allocation of 24%, with direct property not being present in the portfolio at higher risk levels. An interplay between the various alternative assets is included across the full portfolio risk spectrum, involving hedge funds, private equity, listed infrastructure and unlisted infrastructure at various asset allocations at various portfolio risk levels. Amongst the alternative assets, only commodities and global listed infrastructure do not figure in the portfolio at any stage. The key roles of Australian listed infrastructure and Australian unlisted infrastructure are clearly evident at medium/high risk levels.

This result for including the alternative assets also sees reduced levels of direct property in the portfolio and differs significantly from the robust results for direct property in the portfolio seen in previous equivalent US and UK studies (eg: Bond et al, 2007; Hung et al, 2008). The main reason for the difference is the fuller inclusion of local infrastructure in this current study; particularly Australian unlisted infrastructure and Australian listed infrastructure which were not included at an equivalent local US and UK level in these previous studies. Only global listed infrastructure was considered by Bond et al (2007) and infrastructure was not considered by Hung et al (2008). The strong performance and diversification benefits of these two Australian infrastructure asset classes, and their subsequent significant asset allocation in the mixed-asset portfolio has clearly seen their importance and added-value to be included in the mixed-asset portfolio. This key role of infrastructure as an important alternative asset class is also an important empirical and practical justification for leading Australian superannuation funds who have included significant levels of infrastructure in their asset allocations in recent years to potentially achieve further portfolio diversification and enhanced returns. This includes AustralianSuper ($3.8 billion; 12% of portfolio) and UniSuper ($1.2 billion; 5% of portfolio), with multi-billion dollar infrastructure portfolios.

SUB-PERIOD ANALYSIS

Risk-adjusted returns

To further capture the dynamics of this investment performance, two sub-periods were considered that coincide with increased interest by superannuation funds in these alternative assets. This saw the two sub-periods of Q4:1995-Q4:2002 and Q1:2003-Q2:2009.

Table 6: Sub-period risk-adjusted performance analysis

Asset	Average annual return (%)	Annual risk (%)	Risk/return ratio	Sharpe ratio
Panel A: Q4:1995 – Q4:2002				
Direct property	10.11	1.94	0.19 (1)	2.33 (1)
A-REITs	13.29	8.56	0.64 (3)	0.90 (2)
Shares	8.61	12.33	1.43 (7)	0.24 (7)
Bonds	8.14	4.81	0.59 (2)	0.53 (5)
Hedge funds	11.95	9.20	0.77 (4)	0.69 (4)
Private equity	-1.11	6.27	-5.63 (10)	-1.07 (10)
Commodities	5.95	21.47	3.61 (8)	0.02 (8)
Global listed infrastructure	3.21	16.18	5.04 (9)	-0.15 (9)
Unlisted infrastructure	15.45	18.88	1.22 (6)	0.52 (6)
Listed infrastructure	27.52	26.43	0.96 (5)	0.83 (3)
Panel B: Q1:2003 – Q2:2009				
Direct property	7.65	8.90	1.16 (2)	0.21 (2)
A-REITs	-3.67	23.74	-6.48 (10)	-0.40 (9)
Shares	8.99	15.78	1.76 (5)	0.21 (2)
Bonds	5.78	4.55	0.79 (1)	0.01 (6)
Hedge funds	6.59	8.27	1.26 (4)	0.10 (5)
Private equity	-2.43	3.12	-1.28 (9)	-2.62 (10)
Commodities	0.52	29.02	55.55 (8)	-0.18 (8)
Global listed infrastructure	16.27	19.01	1.17 (3)	0.55 (1)
Unlisted infrastructure	9.43	19.60	2.08 (6)	0.19 (4)
Listed infrastructure	5.75	22.33	3.88 (7)	0.00 (7)

Table 6 presents the risk-adjusted performance analysis over these two sub-periods. Direct property showed consistent performance over the two sub-periods (10.11% p.a. and 7.65% p.a. respectively), being ranked #5 and #4 best-performed asset respectively. Assessed against the alternative assets, direct property was out-performed by listed infrastructure (27.52%; #1), unlisted infrastructure (15.45%; #2) and hedge funds (11.95%; #4) in the first sub-period and out-performed by global listed infrastructure (16.27%; #1) and unlisted infrastructure (9.43%; #2) in the second sub-period. Amongst the alternative assets, only unlisted infrastructure was able to out-perform direct property in each of the two sub-periods. Direct property out-performed shares in the first sub-period and A-REITs in the second sub-period. With the second sub-period including the global financial crisis (GFC), this saw lower returns in the second sub-period (eg: direct property, A-REITs). This was also the case for all of the alternative assets, except for global listed infrastructure (3.21% to 16.27%); reflecting the global growth in the infrastructure sector in recent years.

In terms of risk, most assets recorded an increased risk in the second sub-period, further reflecting the GFC impact on volatility. This includes direct property (1.94% to 8.90%), shares (12.33% to 15.78%), A-REITs (8.56% to 23.74%), and the alternative assets of commodities (21.47% to 29.02%), global listed infrastructure (16.18% to 19.01%) and unlisted infrastructure (18.88% to 19.10%). Often these increases in risk were significant (eg: direct property, A-REITs, commodities). Importantly, several alternatives assets only saw a marginal increase in risk (eg: global listed infrastructure, unlisted infrastructure), while several alternative assets reduced their level of risk in the second sub-period (eg: hedge funds, private equity and listed infrastructure). This reflects a degree of robustness by most of the alternative assets compared to the traditional core assets.

On a risk-adjusted returns basis (via the Sharpe ratio), direct property was a consistent top-performer amongst all of the core and alternative assets; being #1 and #2 respectively over these two sub-periods. Risk-adjusted performance rankings for the other assets were more variable across the sub-periods (eg: shares: #7 to #2; A-REITs: #2 to #9; global listed infrastructure: #9 to #1). Several alternative assets were able to improve their asset rankings, including global listed infrastructure (#9 to #1) and unlisted infrastructure (#6 to #4), while some saw reduced asset rankings; eg: hedge funds (#4 to #5) and listed infrastructure (#3 to #7). The alternative assets of private equity (#10 to #10) and commodities (#8 to #8) showed consistent poor rankings regarding risk-adjusted performance over the sub-periods. Compared to the six alternative assets, direct property ranked #1 in the first sub-period and #2 in the second sub-period, with alternative asset top rankings being variable; eg: listed infrastructure (#2 in first sub-period) and global listed infrastructure (#1 in second sub-period).

Overall, the sub-period analysis has clearly shown the robust risk-adjusted performance of direct property compared to both the core and alternative assets. Amongst the alternative assets, several have also performed strongly and could potentially impact the level of direct property at higher risk levels in the mixed-asset portfolios in these sub-periods. This includes unlisted infrastructure, listed infrastructure, global listed infrastructure and hedge funds.

Portfolio diversification

The inter-asset correlation matrix for the various core and alternative assets is given in Table 7 for Q4:1995-Q4:2002 and Table 8 for Q1:2003-Q2:2009. Direct property is seen to lose diversification benefits with each of the alternative assets over these two sub-periods; often this loss of diversification benefit was substantial. This includes the diversification of direct property with hedge funds (-0.13 to 0.61), private equity (0.04 to 0.65), commodities (-0.15 to 0.29), global listed infrastructure (-0.22 to 0.71), unlisted infrastructure (-0.23 to 0.32) and listed infrastructure (-0.02 to 0.66).

While direct property lost diversification benefits over these sub-periods with shares (-0.02 to 0.70), this was also the case for each of the alternative assets with shares; namely hedge funds (0.44 to 0.87), private equity (0.51 to 0.83), commodities (-0.16 to 0.30), global listed infrastructure (0.42 to 0.78), unlisted infrastructure (0.12 to 0.19) and listed infrastructure (0.25 to 0.77). In a mixed-asset portfolio context, this was offset to some degree by enhanced diversification benefits for direct property with bonds (0.09 to -0.22), as well as for each of the alternative assets with bonds; namely hedge funds (-0.17 to -0.73), private equity (-0.22 to -0.47), commodities (-0.03 to -0.14), global listed infrastructure (0.10 to -0.41), unlisted infrastructure (0.08 to -0.06) and listed infrastructure (0.34 to -0.33).

Within the six alternative assets, loss of diversification benefits over the two sub-periods was seen for each pair of alternative assets. This saw the average alternative asset correlation increase from 0.13 to 0.48 over the two sub-periods. Hedge funds and private equity were seen to be the most highly correlated alternative assets in both sub-periods (0.71 to 0.80 respectively).

Table 7: Inter-asset correlation matrix: Q4:1995 – Q4:2002

	Direct prop.	A-REITs	Shares	Bonds	Hedge funds	Private equity	Commodities	Global infra.	Unlisted infra.	Listed infra.
Direct prop.	1.00									
A-REITs	0.05	1.00								
Shares	-0.02	0.18	1.00							
Bonds	0.09	0.52*	-0.24	1.00						
Hedge funds	-0.13	-0.21	0.44*	-0.17	1.00					
Private equity	0.04	-0.22	0.51*	-0.22	0.71*	1.00				
Commodities	-0.15	-0.18	-0.16	-0.03	0.28	0.27	1.00			
Global infra.	-0.22	0.42*	0.42*	0.10	-0.01	0.01	-0.11	1.00		
Unlisted infra.	-0.23	0.14	0.12	0.08	-0.02	0.19	0.28	0.23	1.00	
Listed infra.	-0.02	0.46*	0.25	0.34	-0.25	-0.12	-0.18	0.45*	0.23	1.00
Inflation	0.04	-0.14	-0.09	-0.23	-0.12	-0.05	0.25	-0.15	-0.27	-0.16

*: significant correlation (P<5%)

Table 8: Inter-asset correlation matrix: Q1:2003 – Q2:2009

	Direct prop.	A-REITs	Shares	Bonds	Hedge funds	Private equity	Commodities	Global infra.	Unlisted infra.	Listed infra.
Direct prop.	1.00									
A-REITs	0.70*	1.00								
Shares	0.70*	0.77*	1.00							
Bonds	-0.22	-0.30	-0.58*	1.00						
Hedge funds	0.61*	0.56*	0.87*	-0.73*	1.00					
Private equity	0.65*	0.75*	0.83*	-0.47*	0.80*	1.00				
Commodities	0.29	0.43*	0.30	-0.14	0.31	0.42*	1.00			
Global infra.	0.71*	0.69*	0.78*	-0.41*	0.79*	0.80*	0.30	1.00		
Unlisted infra.	0.32	0.21	0.19	-0.06	0.23	0.39	0.13	0.36	1.00	
Listed infra.	0.66*	0.73*	0.77*	-0.33	0.65*	0.71*	0.14	0.79*	0.33	1.00
Inflation	-0.05	0.07	-0.13	-0.09	0.01	0.01	0.70*	-0.07	0.03	-0.27

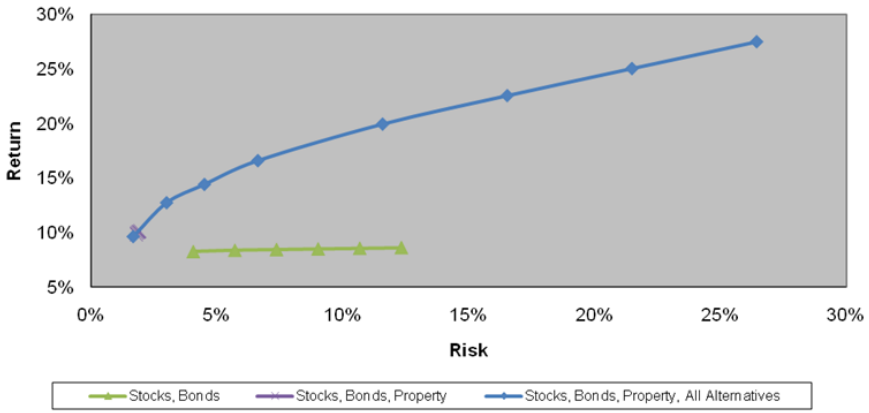
*: significant correlation (P<5%)

Optimal mixed-asset portfolios

To assess the asset allocation implications of these sub-period performance analyses for direct property, core assets and the alternative assets, Figure 3 and Figure 4 present the efficient frontiers and asset allocation diagrams in the first sub-period of Q4:1995-Q4:2002 and Figures 5 and 6 present the equivalent efficient frontiers and asset allocation diagrams in the second sub-period of Q1:2003-Q2:2009.

In the first sub-period of Q4:1995-Q4:2002, when direct property, the core assets and the alternative assets are considered, this sees direct property dominating the portfolio at low/medium risk levels (see Figure 4). As direct property reduces in the portfolio, it is progressively replaced by the three alternative assets of hedge funds, listed infrastructure and unlisted infrastructure. Hedge funds play a major role at the medium risk levels, with higher risk levels seeing listed infrastructure as the dominant asset. Unlisted infrastructure is seen to play a role over the full risk spectrum, with levels of up to 9% in the portfolio. Again, private equity, commodities and global listed infrastructure do not play a role in the portfolio; nor do the core assets of shares and A-REITs, with bonds only included at low risk levels up to 9% in the portfolio. Figure 3 shows efficient frontiers and the added value of the direct property and the alternative assets in the portfolio.

Figure 3: Efficient frontiers for property and alternative assets: 1995:Q4-2002:Q4



Overall, in the first sub-period, direct property continues to play a critical role in the portfolio when the alternative assets are included. However, the role of direct property diminishes at medium risk levels, with the dominant role at higher risk levels taken by hedge funds, listed infrastructure and unlisted infrastructure.

In the second sub-period of Q1:2003 to Q2:2009, the mixed-asset portfolio of shares/bonds/direct property sees direct property playing a significant role across the full risk spectrum (see Figure 6), with the portfolio increasingly dominated by shares at the highest risk levels. However, when the alternative assets are included in the portfolio, the asset allocations change significantly. In particular, direct property is not seen in the portfolio at any risk level. Amongst the core assets, only bonds are seen to play a role, with alternative assets in the portfolio at significant levels across the entire portfolio risk spectrum. This sees private equity in the portfolio at low risk levels, progressively replaced by hedge funds and global listed infrastructure at medium risk levels, with global listed infrastructure playing an increasingly dominant role at the higher portfolio risk levels. Commodities, listed infrastructure and unlisted infrastructure do not enter the optimal portfolios at any risk levels; nor do shares or A-REITs. The efficient frontiers in Figure 5 show the added value of the alternative assets in the portfolio.

Overall, in the second sub-period, direct property is not included in the portfolio when the alternative assets are included, with the dominant role played by global listed infrastructure over this period. This reflects the strong returns and high risk seen for global listed infrastructure over the second sub-period.

PROPERTY IMPLICATIONS

Direct property has attractive investment features that see direct property as typically making an important strategic contribution in the asset allocation process with the core assets (eg: shares, bonds) in a mixed-asset portfolio (Newell, 2005). However, with superannuation funds expanding into the alternative assets (eg: private equity, hedge funds, infrastructure and commodities) to achieve further portfolio diversification and enhanced returns, this raises the key issue of the strategic impact of including these alternative assets in the portfolio on the level of direct property in the portfolio.

This study saw strong performance and portfolio diversification benefits by direct property. However, these attributes were also enjoyed by several of the alternative assets; in some cases, at even stronger impacts. While previous US and UK research have shown the robustness of direct property to the inclusion of these alternative assets in the portfolio, this study has highlighted the significant but lesser role of direct property in the portfolio when these alternative assets are included in the portfolio. This difference in the levels of direct property in the optimal portfolio came about from the more effective selection of the alternative assets typically held by superannuation funds in Australia; namely the inclusion of Australian listed and unlisted infrastructure in this study.

Figure 4: Asset allocation diagrams for role of property and alternative assets in portfolio: 1995:Q4- 2002:Q4

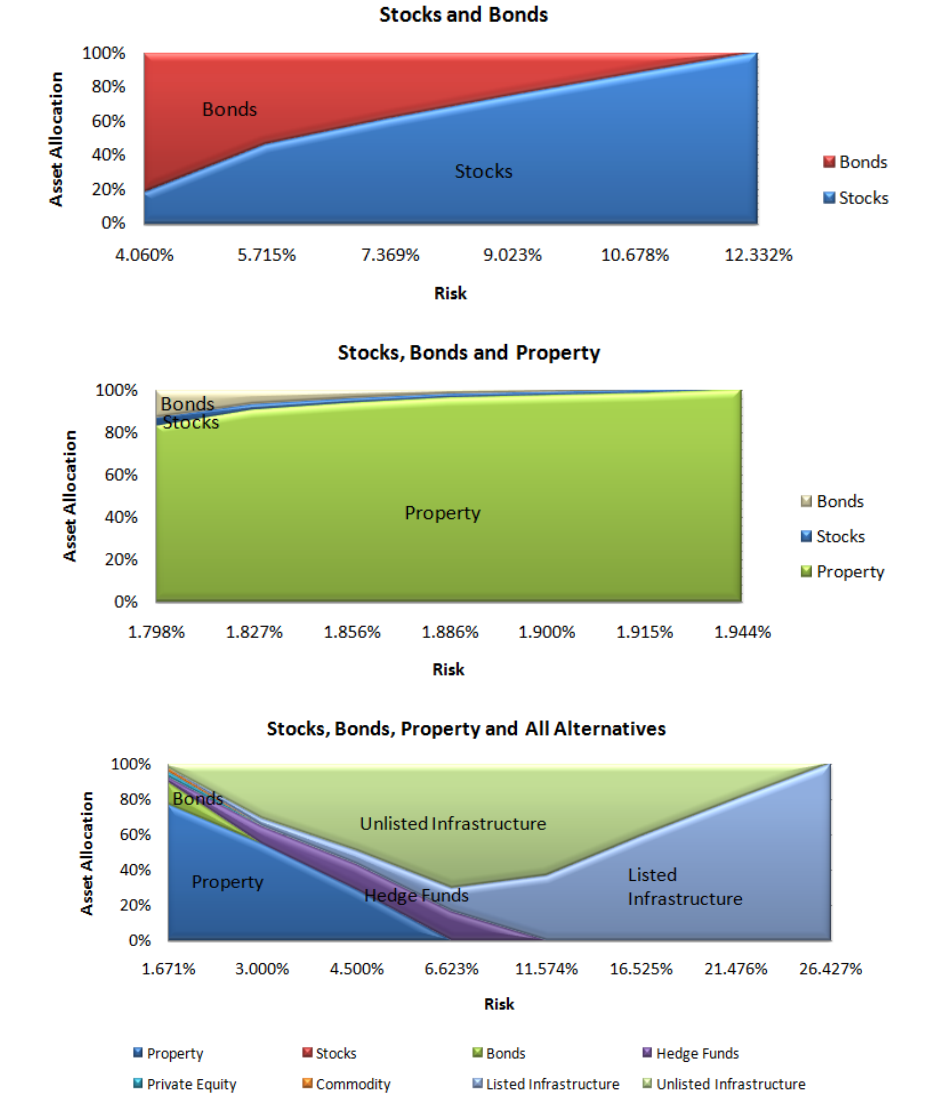
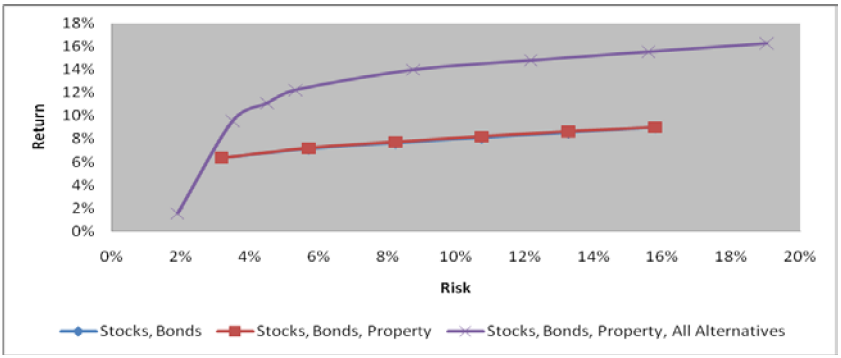
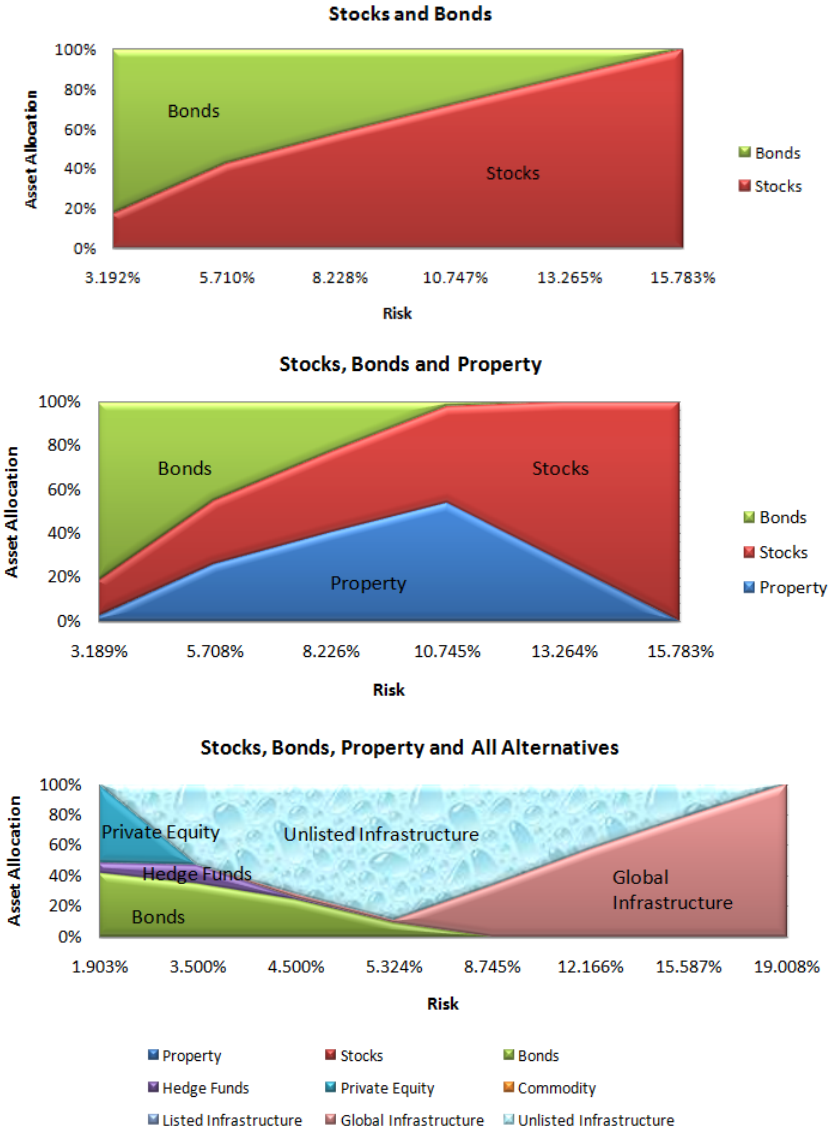


Figure 5: Efficient frontiers for property and alternative assets: 2003:Q1-2009:Q2



As such, direct property is included at reduced allocations at low/medium risk levels in the portfolio. The alternative assets are seen to play an increasing role across the portfolio risk spectrum; particularly listed infrastructure, unlisted infrastructure and hedge funds. This saw Australian infrastructure as a key alternative asset in the optimal portfolio. Differences were seen across the two sub-periods, but with the consistent trend of reduced levels of direct property in the portfolio and increased levels of the alternative assets at medium/high risk levels. Hedge funds and infrastructure were seen as the key alternative assets, with listed infrastructure and unlisted infrastructure being dominant in the first sub-period and global listed infrastructure being dominant in the second sub-period. This reflects the significance of listed and unlisted infrastructure as investment options and the more international investment nature of infrastructure in recent years; particularly via listed infrastructure. Despite this strong performance by infrastructure, Russell Investments (2010) only expect infrastructure to comprise 1% of pension fund portfolios by 2012; this largely reflects the lack of experience by many pension funds with infrastructure as a valid asset class in their portfolios.

Figure 6: Asset allocation diagrams for role of property and alternative assets in portfolio: 2003:Q1- 2009:Q2



The study has clearly shown the added-value role of several alternative assets in the portfolio and the consequences of still significant but reduced levels of direct property in the portfolio, particularly at medium/high portfolio risk levels. This key role of direct property in the optimal portfolio, whilst reduced, is still significant and is an important validation of direct property as an important asset class for Australian superannuation funds; with direct property typically accounting for 7% of an average balanced superannuation funds' portfolio. Importantly, the key role of both listed and unlisted infrastructure in the optimal portfolio has also been clearly highlighted. This empirical result concerning infrastructure has been an important practical justification of the asset allocation decision-making by leading superannuation funds in Australia who have significant infrastructure portfolios, both in dollar terms and percentage terms. The results of this study are further reinforced with the expected future increased allocations to these alternative assets by both Australian superannuation funds and pension funds globally (Russell Investments, 2010), as they seek further portfolio diversification and enhanced returns.

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