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PERFORMANCE ANALYSIS OF PROPERTY SECURITIES FUNDS

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ABSTRACT

Property securities funds (PSF) have become an increasingly popular form of indirect property investment in Australia in recent years. This is evident in that the total fund size has increased more than two folds over the last five years to over $3.1 billion as at June 2002. Over 26 major investment fund managers are actively involved in these property securities funds. 23 property securities funds are included in this study for a period of 5 years, from June 1997 to June 2002. The risk-adjusted performance of PSFs is assessed using three popular measures; namely Jensen alpha, Treynor ratio and Sharpe ratio. PSFs will be ranked according to their risk-adjusted performance. Further analysis will also be carried out to explain the performance of these PSFs. Style analysis will be applied to investigate the implied property type allocations of PSFs in 5 property types, i.e. diversified, retail, commercial, industrial and hotel. Excess returns of active fund managers will be explained and attributed to their property type allocation.

Keywords: Property securities funds, performance analysis, risk-adjusted returns, style analysis, implied property type allocation.

INTRODUCTION

Property securities funds (PSFs) have become an increasingly popular form of indirect property investment in Australia in recent years. This is evident in that the total fund size has expanded 240% over the last five years to over $3.1 billion as at June 2002. Over 26 major investment fund managers are actively involved in these property securities funds. This phenomenon can be rationalised by the 5-year (to 31 September 2002) property securities sector return of 10.3%p.a. as compared to Australian shares' return of 5.1%p.a. (Mercer Investment Consulting, 2002).

Investors are always interested in evaluating the performance of their portfolio and their fund managers. The two most common questions of interest in performance studies are which manager is doing best and why? The objective of this study is to evaluate and analyse PSF performance. This will be accomplished by computing risk-adjusted performance of PSFs employing three popular measures; namely Jensen alpha, Treynor ratio and Sharpe ratio. PSFs will be ranked corresponding to their risk-adjusted performance and relationship between performance and fund size will also be examined. Further analysis will be carried out to explain the performance of these PSFs. Style analysis will be applied to investigate the implied allocations of PSFs in 5 property types, i.e. diversified, retail, commercial, industrial and hotel.

LITERATURE REVIEW

At August 2002, the Listed Property Trust (LPT) sector accounted for over $44 billion in market capitalisation, representing over 6.6% of total Australian stock market capitalisation (UBS Warburg, 2002). With uncertainty in the broader equity markets and low interest rate environment, the appeal of LPTs will continued to be enhanced over the coming months (Property Investment Research, 2001a). The defensive features of LPTs and increased volatility in global investment markets were largely responsible for the outperformance of LPTs over the broader equities market. The LPT Price Index was up 1.3%, whilst the All Ords dropped 4.7%, as at September 2002 (Property Investment Research, 2002).

Investors can tap into this successful Australian Listed Property Sector via direct investment in individual property trusts, or alternatively, through property securities funds. Property securities funds offer the opportunity to invest in a portfolio of LPTs managed by professional fund managers, which allows the investor to achieve diversification across the spectrum of LPTs with reduced portfolio risk. To study the effectiveness of portfolio risk minimisation in property securities funds, portfolio risk simulation analysis was performed by Newell and Acheampong (2001). The authors found that to achieve minimum portfolio risk levels, at least 8 property trusts are needed. To reduce the tracking error against ASX200/ASX300 property index benchmarks, more than 13 property trusts are required. With property securities funds typically having 15-25 property trusts in their fund portfolio, this indicates that property securities funds are operating at levels at which portfolio risk is at a minimum.

Pearce and Newell (1998) studied the performance of PSFs in Australia. They found that over the period of 1991-96, PSFs generally underperformed the property trust sector benchmark. However, over shorter time periods, some PSFs have outperformed the benchmark. Similar studies on property/real estate funds performance have been carried out in UK (Lee, 1999; Lee and Stevenson, 2002) and USA (Webb and Myer, 1996; Liang and McIntosh, 1998; Myer and Webb, 2000; O'Neal and Page, 2000; Gallo, Lockwood and Rutherford, 2000) but the findings are mixed.

A few studies have examined the ability of property fund managers in market timing and selectivity. Stevenson, Kinsella and Healai (1997) found Irish property fund managers' selection ability is not encouraging. However, there is evidence of good

market timing but the number of significant individual timing coefficients is small. Using UK property funds data, Lee (1997) found the contrary. Lee shows most of UK property funds demonstrated negative market timing but these fund managers do have positive asset selectivity ability. In both studies, selectivity and timing tend to be offsetting and negative correlation between market timing and selectivity is consistent

In a subsequent study, Lee and Stevenson (2002) provide strong evidence that UK property fund managers, over the period of 1991 to 2001, showed superior risk-adjusted performance over and above the benchmark. This outstanding performance can be attributed to managers' superior selection ability. However, evidence of superior market timing is weak. In a similar study carried out in the USA, Gallo et al (2000) found that on average, property mutual funds outperformed the Wilshire Real Estate Securities Index and this superior performance is attributed to asset allocation decisions made by the fund managers. The authors also propose fund managers should place more emphasis on macro-level decisions i.e. property sector allocation, rather than spending too much resources on individual security selection.

To examine how well the fund manager is performing, a comprehensive performance measurement system is important, so as the proper benchmark. Brown and Matysiak (1995) cautious investors to be aware that property indices record market trends not market movements, therefore benchmarking fund performance against these indices could be seriously flawed. Furthermore, unless the returns from both the benchmark index and the subject portfolio are serially uncorrelated, any evidence of out- or under-performance is likely to be seriously biased. Therefore, we need to evaluate each fund manager's investment style to identify the proper benchmark for comparison.

Comparing one fund manager with another who has a different style of investing may lead to the charge of not comparing like-with-like and could result to erroneous conclusions (Lee, 1999). Even in situations where the fund managers can be classified into different investment groups, such as property securities group, managers in the "same" group might have special interests in and therefore focus on particular sub-sectors of the market, leading to different "return from style" through time.

Sharpe (1988, 1992) developed an approach to attend this issue based on the view that fund manager's performance is like "tracks" which can be traced and compared to a set of indices constructed to maximise the explanatory power of the manager's returns. Using this idea, Sharpe developed style analysis that optimised dynamic benchmarks from a combination of asset classes, by maximising the percentage of explained variation in the manager's returns over time. The mix can be taken to be the fund's implied asset allocation or style. This method does not require detailed information on actual investment mix or actual asset allocation of the fund; it is only necessary to find a set of indices that will provide reasonably good explanatory power to the fund's performance. Due to these flexibilities, this model is widely used in fund performance studies and applied to USA property by Myer and Webb (1996, 2000), Liang and McIntosh (1998), Gallo et al (2000), and to UK property funds by Lee (1999).

In first applying style analysis to property, Webb and Myer (1996) show that for most of the private property funds studied, the use of property-type indices to explain returns and as a basis for determining implied property-type allocations for use in formulating benchmark returns seems justified. However, when the implied allocations were compared to the actual allocations, there are large differences in most of the funds. The lower than expected R-squared values were attributed to the unique factors of property such as property size, geographical location, property quality, use of leverage, and unique skills of the property manager. Myer and Webb (2000) apply stye analysis to property investment trusts funds and find evidence for the ability of the implied allocations to explain performance, but the tests for a statistically significant relationship are mixed.

On the other hand, Lee (1999) applying a sample of 37 UK property funds, the results show that style analysis is effective in analysing property portfolio performance when given appropriate indices to best portray a particular fund's performance.

DATA AND METHODOLOGY

23 property securities funds are included in this study for a period of 5 years, from June 1997 to June 2002. The sample of 23 property securities funds represents 87.3% in terms of total property securities funds size in Australia. Monthly returns for the PSFs were provided by ASSIRT while property and share indices were taken from UBS Warburg database. UBS Warburg divides property-type into retail, commercial, industrial, diversified and hotel. Of 36 PSFs covered by ASSIRT at the end of June 2002 (see Exhibit 1), 13 funds were excluded from this study as they all started later than the sample period and, thus, did not have an adequate 5-year time series to be included in the study.

Treynor and Sharpe ratios will be utilised to generate a risk-adjusted performance ranking table while Jensen alpha is used to measure the excess return relative to the benchmark. Relationship between risk-adjusted performance and fund size will be evaluated as well. Implied/effective property type allocations of PSFs will be depicted by style analysis and the findings will be used to illustrate and explain superior performance of PSF managers to their above average ability in sector allocation.

Treynor and Sharpe Ratios

Treynor and Sharpe ratios are two popular risk-adjusted performance measures. Sharpe ratio uses the standard deviation of returns as the measure of risk, whereas Treynor ratio uses beta (the measure of systematic risk).

Treynor ratio is as follow:

$$T_i = \frac{R_i - R_F}{\beta_i}$$

where R_i is the average rate of return for fund *i*, R_F is the average risk–free rate and β_i is the beta of the fund's characteristic line.

Exhibit 1: Property Securities Funds (Retail) – Ranked by Fund Size

Property Securities Fund	**Fund Size** ($m) (as at 30 June 2002)
Deutsche Palidan Prop Sec*	550.5
MLC MKey Unit Tr Prop Sec*	370.7
Col First State Prop Sect*	263.3
APN Property for Income	202.8
W'pac Inv Chce Aus Prop Sec Fund*	199.9
UBS Property Securities*	164.0
Questor Multi Strat Trade Prop Fund*	150.3
AMP Property Securities*	143.7
ANZ Property Securities*	100.0
Westpac PPSI Australian Prop Securities*	94.8
BT Property Securities*	89.4
C'Wealth Property Securities*	88.9
HSBC Aust Prop Securities*	86.5
Aust Unity Prop Sect Income*	73.8
NAFM Inv Tr Prop*	64.7
HSBC Strategic Property*	61.5
United SMF SLF Property*	59.7
STL Premium Property Fund*	45.1
Aust Unity Prop Sect Ordinary*	43.0
Vanguard Index Property Securities	38.4
Aust Unity Prop Sect Growth*	33.7
Advance Prop Sec*	31.4
ANZ Gateway Prop Securities	31.4
Westpac PPSI Macq Property Securities	25.9
EQT Property Index	22.0
Rothschild FA Property Investment	20.7
ING Property Securities	17.1
Westpac PPSI MLC Property Securities	13.1
Perpetual Inv Ch Prop Sec*	11.6
Macquarie Prop Securities NEF	7.6
Credit Suisse Priv Invesment Property	6.4
Macquarie Prop Securities	6.0
Westpac PPSI Macquarie Master Prop Sec*	5.8
ING Property Securities	3.0
Zurich Mgd Investment Property Securities	2.6
IOOF Flex Tr Property*	0.2
Total Fund Size:	**$3,129.6 million**

*Funds included in this study

Source: ASSIRT

Sharpe ratio is as follow:

$$S_i = \frac{R_i - R_F}{\sigma_i}$$

where R_i is the average rate of return for fund *i*, R_F is the average risk–free rate. σ_i is the standard deviation (total risk) of the rate of return for fund *i* during the specific time period.

As denoted by the denominator, the Sharpe ratio evaluates the fund manager on the basis of total risk, which encompass both rate of return performance and diversification. For a completely diversified portfolio, the two measures (Sharpe and Treynor ratios) will give identical rankings because the total risk of the completely diversified portfolio is its systematic risk. However, a poorly diversified portfolio could have a high ranking on the basis of Treynor ratio, but a much lower ranking on the basis of the Sharpe ratio. Any difference in rank would come directly from a difference in diversification. Therefore, these two performance measures provide complementary, yet different information, and both measures should be used in performance analysis (Reilly and Brown, 2000).

Jensen Alpha

Jensen alpha is a measure of how much of the return on a fund is attributable to the manager's ability to achieve above-average returns after adjustment for risk. In the equation:

$$R_{it} - R_{Ft} = \alpha_i + \beta_i[R_{mt} - R_{Ft}] + \varepsilon_{it}$$

The α_i value indicates whether the portfolio manager is superior or inferior in market timing and/or stock selection. Positive α value indicates that the manager has superior forecasting ability or good at predicting market turns and/or selecting undervalued assets. A superior manager has a significant positive α value because of the consistent positive residuals. In contrast, an inferior manager has α that is a significant negative value. For an average manager, the residual returns, Jensen alpha, generally are randomly positive and negative, indicating that the portfolio manager basically matched the market on a risk-adjusted basis and rate of return on such fund normally matches the returns expected on the basis of the CAPM (Reilly and Brown, 2000).

Style Analysis

Sharpe (1988, 1992) developed a model to analyse the performance of mutual funds and to study a fund's implied asset allocation. The model proposed by Sharpe (1992) has the following generic representation:

$$R_i = [b_{i1}F_1 + b_{i2}F_2 + \ldots. + b_{in}F_n] + e_i$$

where R_i represents the return on the fund *i*, F_j represents the value of factor *j*, b_{ij} is the coefficients estimated by the model which represents the *i*th fund's implied asset allocation to the *j*th factor. e_i is the residual component, the error unexplained by the model. A main contribution of this approach is segregation of return into two key components, attribution to style and selection. The sum of the terms in the parenthesis is attributable to style and the residual component is attributable to

selection. In order to estimate the coefficients of the model, Sharpe recommends maximising R-squared, defined as:

$$R^2 = 1 - \frac{\text{Var}(e_i)}{\text{Var}(R_i)}$$

where the right hand side of this equation equals one minus the ratio of unexplained variation to the total variability of returns of fund *i*. R-squared thus indicates the proportion in the variability of the fund's returns explained by the *n* asset class factors, or simply, the explanation power of the model.

RESULTS AND DISCUSSIONS

Risk-adjusted Performance

Exhibit 2 contains the average monthly return, standard deviation, Treynor ratio, Sharpe ratio and Jensen alpha for each of the funds and property indices. Beta and R-squared values from the regressions used to estimate Jensen alpha for each of the funds and indices are also presented. As revealed by the low R-squared values, ranging from 0.13 to 0.32, the ability of the excess return on the All Ordinaries to explain the excess returns for the PSFs and property indices is low. The low R-squared values may be due to the small and medium market capitalisation of many PSFs and unique property factors. The beta values are much lower than one, not greater than 0.50, for all funds and property indices except AUG which records a beta value as high as 1.1. This is not surprising because AUG is also the riskiest among all PSFs, which is reflected by the highest standard deviation. All the beta values are statistically significant from zero. Low beta value of PSF and property indices is consistent with the notion that property is less risky compared with shares.

The funds examined showed quite a range of performance, with the best performing fund having a mean monthly return of 1.077%, which was almost twice the return of worst performing fund. The highest average monthly return was achieved by UBS, and all, except two worst performing funds, have an average return above 0.65%. All PSFs have a positive Jensen alpha with AUG recorded the highest excess return of 0.67%. Positive α value indicates that the manager has superior ability in market timing and/or asset selection. This is consistent with the active investment strategies employed by the fund managers. However, none of the Jensen alphas are significant at 5% level, except AUI. Even with the intention to outperform the benchmark, only one active fund manager has substantiated his/her superior ability in beating the benchmark consistently. AUI also recorded the highest Sharpe ratio (0.2869) but ranked second behind HSBCS (0.0235) in Treynor ratio.

Property indices also show quite a large range of performance, with the best performing property-type, retail, recording a 1.18% average monthly return compared with hotel (-0.23%), with more than 1.4% difference in average monthly return. As expected, the monthly mean return (0.96%) of the composite property index (PT300) falls in between the two. Closely behind retail sector is industrial, which records 0.98% average monthly return, followed by diversified property (0.93%) and commercial property (0.76%). The wide range of property-type returns strongly

suggests that differences in asset allocation with respect to property type selection are a possible source of explanation for the differences in PSF performance.

Exhibit 2: Basic Property Securities Fund Statistics

Fund or Index	Average Return	Standard Deviation	Treynor Ratio	Sharpe Ratio	Jensen Alpha	Alpha p-value	Beta	Beta p-value	R^2
Overall Market Index									
ASX All Ordinaries Acc. Index (A.Ords)	0.616%	3.765%	0.002	0.049	n/a	n/a	n/a	n/a	n/a
S&P/ASX 300 Prop. Acc. Index (PT300)	0.960%	3.125%	0.012	0.169	0.462%	0.181	0.444*	0.000	0.287
UBS-W Diversified 300 (DIV300)	0.928%	3.421%	0.011	0.145	0.436%	0.257	0.463*	0.000	0.259
UBS-W Retail 300 (RET300)	1.184%	3.541%	0.016	0.212	0.693%	0.086	0.470*	0.000	0.250
UBS-W Commercial 300 (COM300)	0.761%	3.056%	0.008	0.108	0.271%	0.432	0.407*	0.000	0.251
UBS-W Industrial 300 (IND300)	0.980%	2.859%	0.014	0.192	0.489%	0.129	0.388*	0.000	0.262
UBS-W Hotel 300 (HOT300)	-0.233%	4.969%	-0.013	-0.134	-0.668%	0.266	0.500*	0.003	0.144
Specific Property Securities Fund									
Advance Property Securities (ADV)	0.698%	3.033%	0.006	0.088	0.201%	0.546	0.434*	0.000	0.290
AMP Property Securities (AMP)	0.836%	2.163%	0.013	0.187	0.349%	0.145	0.307*	0.000	0.286
ANZ Property Securities (ANZ)	0.804%	3.131%	0.009	0.119	0.311%	0.373	0.427*	0.000	0.265
Aust Unity Prop Sect Growth (AUG)	1.039%	8.275%	0.006	0.073	0.670%	0.477	1.065*	0.000	0.235
Aust Unity Prop Sect Income (AUI)	0.646%	0.748%	0.019	0.287	0.189%*	0.022	0.110*	0.000	0.309
Aust Unity Prop Sect Ordinary (AUO)	0.785%	2.902%	0.009	0.122	0.292%	0.365	0.402*	0.000	0.273
BT Property Securities (BT)	0.547%	3.059%	0.003	0.038	0.070%	0.844	0.362*	0.000	0.198
C'Wealth Property Securities (C'W)	0.850%	2.673%	0.014	0.157	0.379%	0.234	0.290*	0.001	0.167
Col First State Prop Sect (CFS)	0.915%	3.003%	0.012	0.161	0.422%	0.209	0.414*	0.000	0.269
Deutsche Palidan Prop Sec (DEP)	0.859%	3.250%	0.010	0.131	0.372%	0.316	0.417*	0.000	0.234
HSBC Aust Prop Securities (HSBC A)	0.859%	3.088%	0.010	0.138	0.369%	0.290	0.410*	0.000	0.250
HSBC Strategic Property (HSBC S)	0.846%	1.859%	0.023	0.223	0.386%	0.090	0.176*	0.005	0.128
IOOF Flex Tr Property (IOOF)	0.774%	3.273%	0.008	0.105	0.287%	0.442	0.424*	0.000	0.237
MLC MKey Unit Tr Prop Sec (MLC)	0.848%	3.124%	0.009	0.133	0.348%	0.307	0.453*	0.000	0.298
NAFM Inv Tr Prop (NAFM)	0.684%	1.443%	0.015	0.175	0.220%	0.195	0.165*	0.001	0.185
Perpetual Inv Ch Prop Sec (PERP)	0.821%	2.990%	0.010	0.130	0.331%	0.326	0.398*	0.000	0.252
Questor Mlt Strategies Trd Prop Fd (QUES)	0.954%	2.602%	0.016	0.201	0.473%	0.118	0.321*	0.000	0.216
STL Premium Property Fund (STL)	0.904%	2.656%	0.014	0.178	0.424%	0.169	0.328*	0.000	0.216
UBS Property Securities (UBS)	1.077%	3.005%	0.014	0.215	0.574%	0.078	0.451*	0.000	0.319
United SMF SLF Property (USMF)	0.972%	3.307%	0.013	0.164	0.484%	0.199	0.430*	0.000	0.240
W'pac Inv Chce Aus Prop Sec Fd (W'PP)	0.865%	2.939%	0.012	0.147	0.384%	0.260	0.356*	0.000	0.208
W'pac PPSI Australian Prop Sec (W'PA)	0.887%	2.945%	0.013	0.154	0.408%	0.236	0.350*	0.000	0.200
W'pac PPSI Macquarie M P Sec (W'PM)	0.507%	3.346%	0.002	0.023	0.020%	0.958	0.434*	0.000	0.239

*** Significant at the 5% level**

Exhibit 3 ranks the funds and indices in accordance with Treynor ratio and Sharpe ratio. This table allows us to identify the outperformers and underperformers. These two measures shall provide similar rankings if the funds are well-diversified. One should be aware that Treynor and Sharpe ratios produce relative, but not absolute, rankings of portfolio performance.

Exhibit 3: Treynor and Sharpe Ratio Ranking

Rank	Fund/Index	Treynor Ratio	Rank	Fund/Index	Sharpe Ratio
1	HSBC S	0.0235	1	AUI	0.2869
2	AUI	0.0195	2	HSBC S	0.2226
3	QUES	0.0162	3	UBS	0.2146
4	**RET300**	0.0160	4	**RET300**	0.2125
5	NAFM	0.0153	5	QUES	0.2006
6	C'W	0.0144	6	**IND300**	0.1919
7	STL	0.0144	7	AMP	0.1870
8	UBS	0.0143	8	STL	0.1780
9	**IND300**	0.0141	9	NAFM	0.1745
10	AMP	0.0132	10	**PT300**	0.1689
11	W'PA	0.0130	11	USMF	0.1635
12	USMF	0.0126	12	CFS	0.1610
13	W'PP	0.0122	13	C'W	0.1565
14	**PT300**	0.0119	14	W'PA	0.1545
15	CFS	0.0117	15	W'PP	0.1474
16	**DIV300**	0.0107	16	**DIV300**	0.1452
17	HSBC A	0.0104	17	HSBC A	0.1384
18	DEP	0.0102	18	MLC	0.1333
19	PERP	0.0098	19	DEP	0.1314
20	MLC	0.0092	20	PERP	0.1302
21	AUO	0.0088	21	AUO	0.1217
22	ANZ	0.0087	22	ANZ	0.1190
23	**COM300**	0.0081	23	**COM300**	0.1076
24	IOOF	0.0081	24	IOOF	0.1046
25	ADV	0.0061	25	ADV	0.0877
26	AUG	0.0057	26	AUG	0.0734
27	BT	0.0032	27	**A.Ords**	0.0490
28	**A.Ords**	0.0018	28	BT	0.0379
29	W'PM	0.0017	29	W'PM	0.0226
30	**HOT300**	-0.0133	30	**HOT300**	-0.1337

The ranking reveals quite a number of fund managers did outperform the benchmark PT300. Again, this finding is comparable to Myer and Webb's (2000) study. Seven out of twenty three PSFs, namely AUI, HSBCS, UBS, QUES, AMP, STL and NAFM, outperform the benchmark in both risk-adjusted performance measurements' ranking. More than half of the PSFs (12 funds) did not achieve their target benchmark, after adjusting for risk, during the 1997-2002 period. However, if it is to compare with shares (All Ords), most of the PSFs have done remarkably well with the exception to a couple of the worst performing funds

As shown in Exhibit 2, the retail sector presents the highest yield property type while hotel is the worst. Treynor and Sharpe ratios ranking supports this finding. Two property types (retail and industrial) rank above the PT300 indicating their superior risk-adjusted performance when contrasted to diversified property, commercial and hotel. Once more, this shows PSF managers' performance will be affected by their property type allocation decisions.

Exhibit 4: Risk-adjusted Performance and Fund Size

Fund	Risk-adjusted rank	Fund size ($ m)
Large PSFs		
DEP	15	550.5
MLC	14	370.7
CFS	10	263.3
W'PP	23	199.9
UBS	8	164.0
QUES	4	150.3
AMP	5	143.7
Average ranks	**11.3**	
Medium PSFs		
ANZ	18	100.0
W'PA	11	94.8
BT	22	89.4
C'W	9	88.9
HSBC A	13	86.5
AUI	1	73.8
NAFM	7	64.7
HSBC S	2	61.5
USMF	3	59.7
Average ranks	**9.6**	
Small PSFs		
STL	6	45.1
AUO	17	43.0
AUG	21	33.7
ADV	20	31.4
PERP	16	11.6
W'PM	12	5.8
IOOF	19	0.2
Average ranks	**15.9**	

Exhibit 4 presents the relationship between fund size and risk-adjusted performance. PSFs are divided into three major groups. PSFs with fund size greater than $100m are categorised as Large Funds, smaller than $100m but greater than $50m are grouped under Medium Funds, and all PSFs with fund size less than $50m are considered Small Funds. 7 PSFs are within the grouping of Large Funds while there are 9 and 7 funds grouped under Medium and Small Funds respectively.

In a study on firm size effect, Newell and Kishore (1998) found that Australia listed property trusts do exhibit "small firm" effect, with small and medium property trusts provide better risk-adjusted performance than the large property trusts over a period of 1992 to 1996.

Overall, the average group risk-adjusted return ranks for Large, Medium and Small Funds were 11.3, 9.6 and 15.9 respectively. This finding shows that generally medium size funds outperform larger and smaller funds. Coefficient of correlation

between risk-adjusted performance and fund size is low (0.12) indicating there is no notable correlation between fund size and performance.

Generally, small PSFs do not perform as well as medium and large PSFs. One explanation for this observation is that the underperforming PSFs receive less funding from public, therefore the fund size remains small. The investment funding from general public naturally flows to the better or outperforming funds, therefore increases the fund size. One might raise a question at this point asking if this statement is true, why large funds do not outperform medium funds? To answer this question, one should look at the investment constraint of large fund. For a medium size fund, the manager can take aggressive buy or sell position in most property trust to boost the fund performance. However, for large fund, to attain the same performance boost, it may need to buy or sell at a level that cannot be absorbed by the market. Furthermore, even the large fund is able to achieve a performance boost from a small trusts, the impact of the boost on the overall portfolio might be too small and insignificant (Property Investment Research, 2001b).

Therefore, the management style for larger and smaller funds is different (Property Investment Research, 2001b). Smaller funds tend to adopt more aggressive strategy through regular trading to enhance return. On the other hand, larger funds often emphasize on index tracking and reducing tracking errors to achieve long-term investment objectives.

Exhibit 5: Correlation Between the Property Indices

	PT300	**DIV300**	**RET300**	**COM300**	**IND300**	**HOT300**
PT300	*1.000*					
DIV300	*0.981*	1.000				
RET300	*0.962*	0.925	1.000			
COM300	*0.893*	0.846	0.786	1.000		
IND300	*0.807*	0.763	0.703	0.794	1.000	
HOT300	*0.330*	0.317	0.226	0.284	0.435	1.000

Exhibit 5 presents the coefficient of correlation matrix between the returns on property indices used in this study. The highest correlation between any of the property type indices is 0.925, between the retail and diversified index. All of the other property type correlations are below 0.85 and many are below 0.50. The low correlation implies the existence of possible diversification benefits among property types. The low correlation also suggests that a difference in asset allocation and selection decisions with respect to property type choices might explain differences in performance. This result, plus the performance results discussed earlier, leave little doubt that there are differences in performance among the property type indices, and that adopting a particular style of management with respect to property type could potentially be exploited to obtain superior performance by a manager possessing the skill to choose the appropriate property type (Myer and Webb, 2000).

Style Analysis

Exhibit 6 shows the basic results for the style analysis of the two indices (the All Ords and PT300), and for each of the funds. Style analysis can be estimated in a number of ways. The first method (Model 1) imposes no constraints to the estimated coefficients with the intercept to be constrained to zero and is expected to provide the largest R-squared value among the three models. However, as cautioned in Sharpe (1992) and Myer and Webb (1996), this method will lead to the implied asset allocation of the fund displaying negative holding in many assets. Negative holdings in this case denote short sale. However, short sale positions are not allowed in most equity and property portfolios, either by legal constrain to or the nature of the asset. Furthermore, the sum of implied proportions can be greater than 100 percent, suggesting a leveraged investment portfolio. Second method, Model 2, would be to impose a constraint requiring the coefficients to sum to 100 percent, but still leads to negative holdings in many asset weights. The final approach (Model 3), and the one recommended by Sharpe (1992) is to constrain the coefficients to sum to 100 percent and require that each coefficient must be greater than or equal to zero. The addition of these constrains reflects the fund's actual investment policy and investment reality. The resulting allocation from Model 3 is more likely to provide meaningful results and thus explanations.

Looking at R-squared values of the indices, it is not surprising that the property type indices do a relatively poor job of explaining the variation in shares (All Ords) as indicated by the low coefficient of determination. It is also not surprising that the property type indices explain 99.9% of the variation in the composite property index (PT300). The property type indices in general are able to explain more than 80% of the variation (Model 3) in the return for most funds with a few exceptions (namely AUG, AUI, BT, HSBCS, NAFM and STL).

Exhibit 6: Style Analysis Results

Fund	Model	DIV300	RET300	COM300	IND300	HOT300	R^2
All Ords	1	-0.092	0.323	0.201	0.172	0.178	0.348
	2	-0.161	0.379	0.289	0.288	0.205	0.323
	3	0.000	0.276	0.246	0.280	0.198	0.321
PT 300	1	0.377	0.341	0.187	0.066	0.021	0.999
	2	0.374	0.343	0.190	0.070	0.022	0.999
	3	0.374	0.343	0.190	0.070	0.022	0.999
ADV	1	0.543	0.198	0.049	0.101	0.022	0.923
	2	0.515	0.220	0.084	0.147	0.033	0.917
	3	0.515	0.220	0.084	0.147	0.033	0.917
AMP	1	0.169	0.281	0.174	0.054	0.004	0.974
	2	0.068	0.362	0.303	0.224	0.043	0.815
	3	0.068	0.362	0.303	0.224	0.043	0.815
ANZ	1	0.424	0.228	0.221	0.110	0.008	0.967
	2	0.422	0.230	0.225	0.114	0.009	0.967
	3	0.422	0.230	0.225	0.114	0.009	0.967
AU G	1	1.740	0.477	-0.118	0.255	0.062	0.913
	2	2.189	0.116	-0.692	-0.502	-0.111	0.697
	3	0.927	0.073	0.000	0.000	0.000	0.615
AU I	1	0.102	0.082	-0.026	0.056	0.015	0.907

	2	0.584	0.229	0.174	0.002	0.011	0.406
	3	0.584	0.229	0.174	0.002	0.011	0.406
AU O	1	0.495	0.273	-0.056	0.105	0.035	0.908
	2	0.449	0.311	0.004	0.184	0.053	0.889
	3	0.449	0.311	0.004	0.184	0.053	0.889
BT	1	0.584	-0.012	0.100	0.040	0.113	0.699
	2	0.529	0.033	0.171	0.133	0.134	0.675
	3	0.529	0.033	0.171	0.133	0.134	0.675
C'W	1	0.450	0.241	-0.010	0.022	0.060	0.858
	2	0.375	0.301	0.086	0.149	0.089	0.800
	3	0.375	0.301	0.086	0.149	0.089	0.800
CFS	1	0.368	0.346	0.161	0.035	0.023	0.981
	2	0.347	0.363	0.188	0.070	0.031	0.978
	3	0.347	0.363	0.188	0.070	0.031	0.978
DEP	1	0.366	0.387	0.172	0.032	0.033	0.937
	2	0.363	0.389	0.176	0.037	0.034	0.937
	3	0.363	0.389	0.176	0.037	0.034	0.937
HSBC A	1	0.371	0.349	0.215	-0.007	0.037	0.987
	2	0.360	0.358	0.229	0.012	0.041	0.986
	3	0.360	0.358	0.229	0.012	0.041	0.986
HSBC S	1	0.023	0.233	0.156	0.073	0.032	0.682
	2	0.715	0.214	0.056	0.010	0.005	0.514
	3	0.715	0.214	0.056	0.010	0.005	0.514
IOOF	1	0.339	0.386	0.156	0.090	0.028	0.917
	2	0.339	0.386	0.157	0.090	0.028	0.917
	3	0.339	0.386	0.157	0.090	0.028	0.917
MLC	1	0.221	0.355	0.288	0.090	0.048	0.944
	2	0.222	0.355	0.287	0.089	0.047	0.944
	3	0.222	0.355	0.287	0.089	0.047	0.944
NAFM	1	0.110	0.110	0.209	-0.063	0.019	0.709
	2	0.657	0.244	-0.041	0.129	0.011	0.535
	3	0.656	0.227	0.000	0.106	0.011	0.533
PERP	1	0.382	0.324	0.136	0.064	0.024	0.969
	2	0.360	0.342	0.164	0.101	0.033	0.965
	3	0.360	0.342	0.164	0.101	0.033	0.965
QUES	1	0.098	0.324	0.251	0.110	0.034	0.884
	2	0.041	0.370	0.325	0.207	0.057	0.848
	3	0.041	0.370	0.325	0.207	0.057	0.848
STL	1	0.308	0.283	-0.062	0.175	0.081	0.827
	2	0.240	0.338	0.025	0.290	0.107	0.779
	3	0.240	0.338	0.025	0.290	0.107	0.779
UBS	1	0.399	0.191	0.091	0.223	0.095	0.972
	2	0.398	0.191	0.092	0.224	0.095	0.972
	3	0.398	0.191	0.092	0.224	0.095	0.972
U SMF	1	0.450	0.324	0.205	-0.074	0.060	0.887
	2	0.439	0.333	0.220	-0.056	0.064	0.886
	3	0.432	0.327	0.186	0.000	0.055	0.885
W'P P	1	0.237	0.258	0.271	0.115	0.033	0.875
	2	0.210	0.280	0.306	0.161	0.044	0.868
	3	0.210	0.280	0.306	0.161	0.044	0.868
W'P A	1	0.249	0.256	0.276	0.092	0.040	0.873
	2	0.222	0.278	0.311	0.138	0.051	0.867
	3	0.222	0.278	0.311	0.138	0.051	0.867
W'P M	1	-0.003	0.491	0.279	0.239	0.060	0.870

	2	0.018	0.474	0.252	0.204	0.052	0.867
	3	0.018	0.474	0.252	0.204	0.052	0.867

Exhibit 7: Average Coefficients and R^2 Based On Three Methods of Estimation

	Model 1	Model 2	Model 3
DIV	0.366	0.438	0.382
RET	0.278	0.292	0.289
COM	0.137	0.135	0.165
IND	0.084	0.094	0.117
HOT	0.042	0.042	0.046
R^2	0.890	0.827	0.824

The ability of style analysis to explain performance is given by the R-squared values. As shown in Exhibit 7, the average R-squared value is 82.4% for Model 3, ranging from the highest of 98.6% (HSBCA) to the lowest of 40.6% (AUI). The average R-squared values (for all 3 models) are higher than those observed by Lee (1999). Webb and Myer (1996), Lee (1999) and Myer and Webb (2000) all report a significant fall in average R-squared values from the unconstrained method (Model 1), compared with the fully constrained analysis (Model 3). Webb and Myer (1996) report a fall in average R-squared from 52% to 32%, and 82% to 64% by Lee (1999). To a lesser extent, this is also the case here. As shown in Exhibit 6, the fall in predictive ability is very marginal as we move from unconstrained estimation to the fully constrained model.

Exhibit 8: Difference in Style for Best and Worst Performing PSFs

Fund	Model	RET300	IND300	DIV300	COM300	HOT300
HSBC S	3	-38%	-86%	91%	-70%	-77%
AU I	3	-33%	-97%	56%	-9%	-49%
BT	3	-90%	89%	41%	-10%	507%
W'P M	3	38%	189%	-95%	33%	136%

Exhibit 8 shows the difference between the implied property type allocation for Model 3 (implied allocation sum to one and are all greater than zero) for the two best performing funds (HSBCS and AUI) and the two worst performing funds (BT and W'PM) compare with composite property index (PT300). Hotel was the worst performing property-type followed by commercial property. There is an obvious difference in implied allocation to hotel and commercial property for the best and the worst performing funds. It is very likely that this lower implied allocation by both best performing funds has contributed to their superior performance. For BT and W'PM, the largest difference was very high implied allocation to hotel which is likely to be a source of their poor performance. For BT, the second largest difference was a lower implied allocation to retail, which was the best performing property type. The result is consistent with the findings of Myer and Webb (2000) and Gallo et al (2000) that worst(best) performing funds over-(under-) weight the worst performing sectors relative to the benchmark allocation.

However, not all of the differences between the styles of the best and worst performing funds are so convincing. Retail was the best performing property type. Both best performing funds have lower implied allocation to retail sector but the worst performing fund, W'PM, has a higher allocation. This result is somewhat contradicting. Lower implied allocation to industrial sector for both best funds was assumed to offset the higher allocation in diversified property. Considering all the differences, it does appear that the style analysis has potential for explaining a substantial amount of the difference in performance between PSFs.

CONCLUSION

This paper examines the performance of 23 property securities funds over a five-year period to June 2002. The sample of funds constituted the bulk of the property securities market in Australia.

The best performing PSFs are selected on risk-adjusted basis simply because the consistency of returns is equally important as the absolute value of return. AUI and HSBCS are two best performing funds, as both occupy the top positions in Treynor and Sharpe ratios ranking. With the intention to add value, all PSF fund managers in this study employ active investment strategies. However, as evaluated by Jensen alpha test, the statistical result shows only one manager (AUI) is able to deliver consistent excess returns.

The defensive characteristic of property securities funds is clearly evident as the beta values are much lower than one. When looking at size effect, medium size funds generally outperform large and small funds. However, the correlation between performance and fund size is low.

This study also suggests that the use of implied property type allocations is useful in explaining the performance of PSFs. The wide range of property-type returns suggests that differences in asset allocation are a possible source of explanation for the differences in PSF performance. The low correlation among property types, with the exception to diversified property, implies the existence of possible diversification benefits among property types.

High R-squared value in style analysis suggests that more than 80% of variations in PSF performance can be explained by the fund's implied allocation. Superior performance of fund managers can be attributed to their skill to choose the 'right' property type. As evident in style analysis, there is an obvious difference in implied allocation to the best and the worst performing property type for the best and the worst performing funds. The superior performance of both best performing funds can be explained by their lower implied allocation in worst performing property type (hotel). Parallel to this finding, the two worst performing funds have higher implied allocation to hotel. However, the implied allocation to the best performing property type (retail) is not so convincing. The two best performing funds have lower implied allocation to retail while the one of the worst performing funds has a higher implied allocation to retail.

After considering all the differences, it seems that the style analysis has potential for explaining a substantial amount of the difference in performance among PSFs. The findings also imply that property securities fund managers can add value via their allocation decisions across property types.

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