

## Size and Investment Performance: A Research Note

This study examines the performance of actively managed Australian equity funds and the extent to which both fund size and manager size is related to risk-adjusted returns. Larger investment managers, by definition, engage in higher trade volume. The literature documents that transaction costs and trade difficulty increase with trade size, given difficulties associated with 'large' trades and their potential market impact on security prices. Therefore, *ceteris paribus*, large orders are consistent with lower levels of efficiency in trade execution and higher transaction costs. While larger investment managers may experience material disadvantages relative to their smaller counterparts, the Australian literature to date has largely ignored the issues of asset size and the long run performance of investment offerings. This paper, employing returns and fund size data that controls for survivorship bias, documents that while large retail active equity funds earn higher risk-adjusted returns (after expenses) than small funds, the difference in mean performance is not significantly different. In the institutional sphere, the study also finds no significant performance differences (net of expenses) between funds on the basis of portfolio size. These findings suggest the hypothesis that performance declines with fund size is not supported empirically.

**Key words:** Active Management, Size, Investment Performance, Equity Funds

DAVID R. GALLAGHER is an Associate Professor of Finance at the University of New South Wales and a Research Director at SIRCA Ltd. KYLE M. MARTIN is from the Commonwealth Bank of Australia. Helpful comments are acknowledged by the authors from Graeme Dean (the Editor) and two anonymous referees. Research funding from SIRCA is also gratefully acknowledged.

This article examines the relationship between the size of actively managed Australian equity funds (and managers) and risk-adjusted performance in the period 1991 – 2000. The issue of portfolio asset size and the implications for investment performance has been acknowledged by academics, fund managers, asset consultants and investors as being of critical importance in selection process of investment managers. However, the empirical evidence concerning the relationship between fund manager performance and fund asset size in Australia is surprisingly scarce. Size also has implications for performance related to transaction costs

(the ease with which investment managers can successfully exploit information), performance measurement given Sharpe's (1991) arithmetic of active management, and the growth-rate of a manager (i.e. fund flows). From an institutional setting, the relationship between size and performance is also important given the concentrated nature of the Australian investment industry. Rainmaker (2000) documents that the largest 10, 20 and 30 domestic equity managers account for more than 60, 80 and 90 percent of the total market, respectively.

The importance of fund size, total assets under management and investment performance has certainly captured widespread attention, and sparked debate amongst industry participants. Consider media headlines such as "Size does matter when it comes to funds management", "Too big for their boots" and "Big players hampered by too much baggage".<sup>1</sup> This size phenomenon has also led to some large active managers placing a ceiling (or cap) on their total funds under management, to limit the diseconomies of scale in their pursuit of active returns. Given the concentrated nature of the Australian investment industry, investors have also considered alternatives to large fund managers, and in recent times boutique fund managers have not only recorded good performance, but their attractiveness in terms of being more nimble relative to larger managers has resulted in a number of new start-up entities and growth in this segment of the market.<sup>2</sup> Therefore, in light of this debate between manager size and performance, and limited empirical evidence, this study represents an important contribution to the literature.

Active management involves substantially higher trading activity than a passive buy-and-hold approach – hence active management translates into significantly higher transaction costs (Keim and Madhavan (1997)). Given that transaction costs are directly related to trade size, larger informationally motivated trades translate into higher explicit costs (i.e. brokerage commissions) and higher implicit costs (i.e. market or price impacts and opportunity costs).<sup>3</sup>

While implicit costs are more difficult to measure than explicit costs, the relative size of the trade and the investment style of a trader have an important bearing on the magnitude of implicit trading costs.

Size is also an important consideration for active managers in terms of Sharpe's (1991) 'Arithmetic of Active Management'. Sharpe (1991) asserts that on average, active investors (in aggregate) cannot outperform the returns derived from passive investment strategies. The reasoning is that the performance of the index equals the weighted-average return of both active and passive investors before investment expenses. Accepting Sharpe's (1991) law concerning the aggregate return of investors equating to the market return, by definition, active management must be a zero-sum game.<sup>4</sup> Given that larger fund managers account for a higher proportion of the total market, Sharpe's law concerning active management must act as a disadvantage, *ceteris paribus*. Hence, the probability of a large manager achieving superior returns to the market must decline as their relative size increases.

Size should also become an issue (eventually) for successful and growing asset managers. The literature strongly supports the relationship between past performance and fund inflows. This phenomenon, where investors 'chase' past performance, has been documented in both Australian (e.g. Sawicki (2000)) and U.S. markets (e.g. Gruber (1996) and Zheng (1999)). Perold and Salomon (1991) and Beckers and Vaughan (2001) highlight the irony that is likely to eventuate for successful active managers. Given the empirical evidence, superior past performance translates into a growth in total assets under management and an increase in revenue (where management fees equate to a fixed percentage of assets under the investment manager's control). Where fund inflows are significant and the manager's total size increases, incumbent investors are likely to be averse to future increases in the size of portfolios, given the likelihood of diseconomies of scale. An increase in the size of funds

under management eventually leads to higher trade sizes, higher trading costs, lower flexibility in the management of portfolios and lower portfolio performance (Perold and Salomon (1991)). As a consequence of their size, larger managers may then have a higher propensity to invest in small-cap stocks (see Golec (1996)), which exhibit lower levels of liquidity and higher transaction costs, and this may also adversely impact on portfolio returns. Beckers and Vaughan (2001) report that a sizable increase in the asset base of funds translates into a material decrease in alpha and the information ratio.

The literature evaluating fund performance on the basis of asset size reports mixed findings. Grinblatt and Titman (1989b) find evidence of smaller U.S. mutual funds outperforming large funds on a risk-adjusted basis, gross of expenses. However, an interesting finding is that smaller funds are generally concentrated in the best performing aggressive growth class. Therefore, in terms of their results, performance may not necessarily be wholly a function of fund size, but rather investment style. Yet, after consideration of expenses, portfolio performance is indifferent on the basis of asset size. Other studies have reported the absence of a significant relationship between risk-adjusted performance and size. In the U.S. these include Grinblatt and Titman (1994) and Ciciotello and Grant (1996). Dahlquist, Engstrom and Soderlind (2000) also report similar results for Swedish mutual funds, and Droms and Walker (1994) document the absence of a relationship between size and performance for international mutual funds. In Australia, the evidence supports the majority of studies confirming that fund performance is unrelated to portfolio size (Bird, Chin and McCrae (1983), McCrae (1998), and Sawicki (2000)).

## DATA AND METHODOLOGY

### *Data*

This work employs monthly returns (after management expenses) and fund size data for a total sample of 387 actively managed Australian equity funds in the period January 1991 to December 2000. Table 1 provides descriptive statistics of the equity funds sample. The data was obtained from the *Morningstar Total Access CD-ROM* that includes both surviving and non-surviving (defunct) funds. The equity funds included in the sample are imputation and general equity funds that invest in Australian equity securities, where the most appropriate index for performance comparison is the S&P/ASX 300 Accumulation Index.<sup>5</sup>

TABLE 1  
DESCRIPTIVE STATISTICS OF TIME SERIES DATA

This table presents the sample statistics of funds comprising the dataset in the period January 1991 to December 2000. Funds are partitioned into retail (Panel A) and institutional (Panel B) categories. It presents the total number of funds for each year, average asset size, average net fund flow, average returns, median return and the standard deviation of returns.

<b>Year</b>	<b>Total No. of Funds</b>	<b>Average Asset Size (Millions) (\$)</b>	<b>Average Flow Size (Millions) (\$)</b>	<b>Average Return (%)</b>	<b>Median Return (%)</b>	<b>Standard Deviation (%)</b>
<i>Panel A – Retail Funds</i>						
1991	172	18.147	0.387	1.974	1.613	4.164
1992	167	23.551	0.361	0.023	-0.509	3.492
1993	169	32.158	0.065	3.540	3.671	4.365
1994	196	37.086	0.490	-1.196	-1.01	3.700
1995	243	30.241	-0.332	1.754	1.480	2.929
1996	247	33.204	0.404	0.978	1.155	4.943
1997	308	43.564	0.602	0.821	1.632	6.483
1998	341	45.846	-0.004	0.652	1.384	5.277
1999	363	52.793	0.966	0.541	1.02	7.610
2000	354	62.301	0.373	0.095	0.713	9.850
<i>Panel B – Institutional Funds</i>						
1991	29	29.112	-0.138	1.292	0.576	3.436
1992	34	54.513	-0.177	1.215	0.757	3.222
1993	34	43.706	0.188	0.843	-0.070	3.764
1994	44	46.479	-0.360	2.471	2.435	4.460
1995	51	42.444	1.714	-0.487	0.500	3.720
1996	65	52.142	1.373	1.759	1.116	2.770
1997	80	79.262	2.598	1.344	1.497	3.085
1998	101	92.171	2.442	1.134	1.810	4.700
1999	111	114.59	3.347	1.179	1.637	3.691
2000	121	158.76	3.642	0.479	2.432	4.577

Where *Morningstar* noted the existence of cross-selling of funds (where a manager ‘re-badges’ a competitor’s fund), these funds were excluded to avoid double counting. The risk-free rate used in the study is the 13-week Treasury note (converted to a monthly rate) and was obtained from the Reserve Bank of Australia website.<sup>1</sup> Investment style (growth-value) and market capitalization of stocks (small-large) were proxied using the Salomon Smith Barney All Growth and All Value Accumulation indices, and the S&P/ASX Small Ordinaries Accumulation Index and S&P/ASX 20 Accumulation Index over the 10-year period to December 2000.

#### *Performance Measurement*

Risk-adjusted performance is examined using both the single index and multi-factor risk adjustment models following Elton *et al.* (1993). The three-index model controls for fund returns attributable to an active manager loading up on the factors that explain cross-sectional patterns in equity returns. The three-index model is estimated using ordinary least squares regression, where an active fund’s return in excess of the risk-free rate is regressed on the excess return of the market proxy portfolio and index mimicking style factors:

$$R_{pt} = \alpha_{3p} + \beta_M R_{Mt} + \beta_{GV} GV_t + \beta_{SL} SL_t + \varepsilon_{pt} \quad (1)$$

where:

$R_{pt}$  = the return of fund  $p$  in period  $t$  in excess of the risk-free rate;

$\alpha_{3p}$  = the unconditional risk-adjusted excess return of fund  $p$  in the period;

$\beta_M$  = systematic risk of the fund

$R_{Mt}$  = the return on the market portfolio in period  $t$  in excess of the risk-free rate;

$\beta_{GV}$  = factor risk related to the growth and value index mimicking portfolio

$\beta_{SL}$  = factor risk related to the an index mimicking portfolio based on small and large-cap stocks; and

$\varepsilon_{pt}$  = an error term.

The model was also evaluated with reference to a fourth factor controlling for fixed interest securities, consistent with Elton *et al.* (1996a). However, while equity managers hold very small levels of cash, our results do not change whether or not we include or exclude a bond market proxy.<sup>6</sup>

#### *Asset Size and Performance*

The possibility that an investment manager's performance may be adversely affected by the asset size under the control of the firm requires a rationale for how size might be proxied over the fund's life. This is important given the variability in asset size we might reasonably expect to occur during the life of the fund. This view can be supported given the evidence associated with fund flow activity and past performance. The literature reports evidence consistent with investors chasing past performance, witnessed in the correlation between performance and fund flow activity (for example, Sawicki (2000)).

The evaluation of risk-adjusted performance relative to fund size was performed as follows. Fund size is measured as the natural logarithm of a fund's net asset value. Performance is estimated using risk-adjusted returns for the three-index model. Funds are then partitioned into two groups on the basis of whether the fund is an institutional or retail product. In terms of the period of evaluation, this study employs two methods. First, in a manner consistent with most other studies, the evaluation period for performance and size is considered over the

---

<sup>1</sup> See the URL [http://www.rba.gov.au/Statistics/Bulletin/index.html#table\\_f](http://www.rba.gov.au/Statistics/Bulletin/index.html#table_f)

total sample period January 1991 to December 2000. However, given that fund size is not constant through time, the 9-year period is also evaluated using three-year sub-periods: January 1992 - December 1994, January 1995 - December 1997 and January 1998 - December 2000.<sup>7</sup> In terms of analyzing performance and size, the study considered alternative proxies for measuring a fund's size, namely the average size, median size and average growth rate over time. Results were consistent across size proxies, and only average fund size in the period is reported. The samples are partitioned into deciles for retail funds and quintiles for institutional funds.

The relationship between size and performance is evaluated using two approaches. First, pooled (cross-section and time-series) regressions are performed, where risk-adjusted excess returns ( $\alpha_3$ ) are regressed on average fund sizes in the respective periods examined. Second, statistical tests are performed to determine statistically whether significant differences in mean alphas existed on the basis of fund size.

## EMPIRICAL RESULTS

The empirical results evaluating the relationship between risk-adjusted performance and equity fund size are evaluated using the described sample periods. This approach arose since a fund's aggregate asset size varies through time due to capital flows between the fund and investors and the portfolio's capital growth over time. The sample is also partitioned into retail and institutional groups, given the differential in fund magnitudes between investment vehicles.

*Analysis of Actively Managed Retail and Institutional Australian Equity Funds*



### *Retail Equity Fund Results*

The results presented in Table 2 shows the risk-adjusted performance of retail equity funds, where the deciles are formed on the average asset size of funds in the respective sample periods evaluated. The study defines large funds as having aggregate assets in the ‘Top 20 percent’ and small funds accounting for the ‘Lowest 20 percent’. Panel A indicates that small funds outperform larger funds on risk-adjusted basis in the sample period, where fund size is measured as the average portfolio value over the 9-year period. However, statistical tests reveal that the difference in mean alpha is not significant. While the use of a methodology over the long-term time period is consistent with other studies, it is argued that such analysis does not provide the most reliable test of the size-performance relationship, given the variability in fund size that occurs through time.

An improved technique is one that analyses performance over shorter time-periods that can better account for the time variation in fund asset size. Employing a three-year evaluation period, the performance results reveal that the average large equity fund earns higher alphas after expenses than for small funds. While this difference is statistically indistinguishable at conventional levels, it is interesting to note that the  $p$ -value of 0.13 closely approximates rejection of the null hypothesis that large retail funds have superior performance. While theory suggests that larger equity managers experience increased difficulties in trade execution, these results suggest that over periods of three-years large fund performance is not significantly disadvantaged relative to the performance of smaller equity funds. However, given that retail equity funds are generally much smaller in aggregate asset sizes than is the case for institutional equity funds, it may be the case that retail equity funds sizes are not significantly large enough to materially disadvantage performance.

TABLE 2

## RETAIL ACTIVE AUSTRALIAN EQUITY FUND MANAGERS – PERFORMANCE AND FUND SIZE

This table presents the estimates derived from the three-factor model ( $R_{it} - R_{ft} = \alpha_i + \beta_M(R_{mt} - R_{ft}) + \beta_{SI}(R_{st} - R_{ft}) + \beta_{GI}(R_{gt} - R_{vt}) + e_{it}$ ). This table presents the alphas, size-weighted alpha, market beta (M), Growth Value (GV) and market capitalisation factor (SL). Panel A presents the regression estimates for the entire nine-year sample. Panel B shows the results where three, three-year periods are considered, given the variability in fund sizes across time. Average values for each decile group are presented, where deciles are sorted by fund size in the period. Decile 1 comprises the largest funds by fund size and Decile 10 accounts for the smallest funds.

	No. Funds	$\alpha_3$	$\alpha_3$ weighted	$\beta_M$	$\beta_{SL}$	$\beta_{GV}$	Adjusted $R^2$
Panel A – Entire Nine Year Sample							
Average Values	204	-0.004	-0.030	0.815	0.059	0.038	0.788
Distribution of parameters							
1 (Largest)		-0.019	-0.038	0.827	0.068	0.046	0.818
2		-0.055	-0.036	0.841	0.037	0.035	0.796
3		0.035	0.020	0.854	0.048	-0.045	0.774
4		0.006	0.011	0.779	0.093	0.030	0.673
5		-0.049	-0.049	0.814	0.053	0.077	0.804
6		-0.193	-0.198	0.695	0.022	0.181	0.739
7		0.087	0.086	0.837	0.058	0.021	0.793
8		0.029	0.045	0.794	0.065	0.031	0.835
9		0.061	0.047	0.873	0.082	0.051	0.814
10 (Smallest)		0.049	0.008	0.792	0.077	-0.001	0.795
Large Funds (>80%)							
Average Values		-0.037	-	0.834	0.053	0.040	-
Small Funds (<20%)							
Average Values		0.054	-	0.829	0.079	0.023	-
<i>Difference of Means (Large – Small)</i>							
t-statistic		-1.28	-	0.13	-1.05	0.42	-
p-value		0.204	-	0.896	0.297	0.670	-
Panel B – Individual Three Year Periods (1992-2000)							
Average Values	384	0.009	0.050	0.861	0.169	0.030	0.872
Distribution of parameters							
1 (Largest)		0.086	0.055	0.864	0.225	0.104	0.921
2		0.025	0.011	0.884	0.178	0.053	0.851
3		0.152	0.157	0.845	0.224	0.070	0.877
4		0.030	0.026	0.823	0.171	0.006	0.871
5		-0.002	0.009	0.868	0.191	0.000	0.871
6		-0.038	-0.051	0.870	0.145	0.001	0.846
7		-0.048	-0.051	0.830	0.193	0.069	0.811
8		-0.058	-0.061	0.875	0.204	0.008	0.864
9		-0.005	-0.004	0.858	0.082	0.029	0.928
10 (Smallest)		-0.055	-0.070	0.895	0.064	-0.039	0.873
Large Funds (>80%)							
Average Values		0.056	-	0.874	0.202	0.079	-
Small Funds (<20%)							
Average Values		-0.030	-	0.877	0.071	-0.005	-
<i>Difference of Means (Large – Small)</i>							
t-statistic		1.52	-	-0.10	3.04	2.47	-

<i>p</i> -value	0.130	-	0.918	0.003	0.015	-
-----------------	-------	---	-------	-------	-------	---

In terms of the performance of retail equity funds related to their factor sensitivities, notably the two major investment styles exhibited by funds reveals that large funds' performance is significantly more reliant on holdings of small-cap securities and an emphasis on growth strategies. Larger managers have significantly higher factor loadings on both the SL and GV style factors. In terms of systematic risk, the results indicate that small and large funds do not exhibit a statistically significant difference in betas.

An alternative analysis (not reported directly) of the relationship between size and performance was examined by regressing retail fund alphas on the natural logarithm of fund size for the three-year periods (controlling for autocorrelation and heteroskedasticity). In comparison to the findings reported in Panel B of Table 2, larger funds were found to earn higher risk-adjusted excess returns to smaller funds.

#### *Institutional Equity Fund Results*

Table 3 presents the empirical results examining the relationship between risk-adjusted performance and fund size for institutional equity funds. The results failed to reveal a significant relationship between the both variables, irrespective of the interval period examined. While larger institutional equity funds show evidence of higher risk-adjusted returns after expenses, the mean difference is not statistically significant to the average performance of smaller equity funds. As noted, these results control for survivorship biases, given that the sample includes terminated or defunct funds. In terms of the other regression estimates, Panel B shows larger funds are not significantly different from smaller funds on the basis of systematic risk, SL or GV. However, the *p*-value relating to SL for larger funds closely approximates standard confidence levels associated with larger funds exhibiting significantly greater emphasis on small-cap stocks.

TABLE 3

INSTITUTIONAL ACTIVE AUSTRALIAN EQUITY FUND MANAGERS –  
PERFORMANCE AND FUND SIZE

This table shows the results of the three factor model  $R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \beta_{si}(R_{st} - R_{ft}) + \beta_{gi}(R_{gt} - R_{vt}) + e_{it}$  for the alphas, weighted size alphas, market beta (M), market capitalisation (SL), Growth Value (GV) and Adjusted R<sup>2</sup>. Panel A represents the single nine-year segmentation whereas Panel B exhibits the results for the aggregated three-year sub-periods. Results are also measured sorted by quintile, where Quintile 1 represents the largest funds and Quintile 5 represents the smallest fund sizes.

	No. Funds	$\alpha_3$	$\alpha_3$ weighted	$\beta_M$	$\beta_{SL}$	$\beta_{GV}$	Adjusted R <sup>2</sup>
<i>Panel A – Entire Nine Year Sample</i>							
Average Values	90	0.094	0.090	0.906	0.059	0.048	0.828
Distribution of parameters							
1 (Largest)		0.051	0.044	0.877	0.037	0.038	0.816
2		0.307	0.308	0.931	0.100	0.029	0.827
3		0.001	0.036	0.928	0.074	0.047	0.833
4		0.179	0.142	0.899	0.074	0.070	0.814
5 (Smallest)		-0.059	-0.104	0.894	0.002	0.050	0.844
<i>Difference of Means (Large – Small)</i>							
t-statistic		1.04	-	-0.28	0.90	-0.18	-
p-value		0.308	-	0.782	0.381	0.860	-
<i>Panel B – Individual Three Year Periods (1992-2000)</i>							
Average Values	123	0.123	0.128	0.636	0.048	0.042	0.864
Distribution of parameters							
1 (Largest)		0.206	0.132	0.718	0.090	0.066	0.861
2		0.119	0.106	0.681	0.042	0.067	0.857
3		0.116	0.101	0.459	0.007	0.001	0.877
4		0.085	0.136	0.694	0.067	0.014	0.891
5 (Smallest)		0.085	0.032	0.631	0.033	0.062	0.831
<i>Difference of Means (Large – Small)</i>							
t-statistic		0.96	-	-0.69	1.66	0.04	-
p-value		0.341	-	0.493	0.106	0.967	-

The relationship between performance and institutional fund size was also performed using pooled regression analysis (not reported directly) for all institutional equity funds over the three-year sub-periods (which controls for heteroskedasticity and autocorrelation). While the coefficient on the independent variable (log of fund size) was positive, the *t*-statistic did not provide for rejection of the slope estimate as non-zero. Therefore, this work failed to detect evidence that large institutional equity funds indicates that there is no evidence that large

funds have different risk-adjusted performance than small funds. In contrast, the results indicate that the average large fund does not experience significant performance disadvantages on the basis of portfolio asset size.

## SUMMARY

This article evaluates the relationship between risk-adjusted performance and fund size for active Australian equity investment managers. It reveals that small equity retail funds do not significantly outperform larger retail funds, and portfolio size is also shown to be unrelated to portfolio performance. Overall, these findings do not support the assertion that size acted as a performance constraint in the long term for large equity funds over the period studied. These findings are consistent when risk-adjusted performance models control for the predominant investment styles exhibited by active managers. Further, the absence of a relationship between performance and fund size is consistent with the international literature. While larger funds should experience increased difficulties in the efficient execution of their trades as compared to smaller funds, *ceteris paribus*, in the long term the Australian evidence suggests that size, on average, has not been a significant disadvantage. Given that the Australian investment industry is highly concentrated, this work should prove useful to investors in their consideration of the fund size and performance conjecture.

The absence here of a relationship between fund size and performance supports the findings of a number of published international studies documenting the absence of a significant relationship between these variables (e.g. Grinblatt and Titman (1994), Droms and Walker (1994) and Dahlquist *et al.* (2000)). Further research is warranted using more frequent trade-level information to ascertain whether large funds' trading activity negatively affects performance compared to smaller funds. In particular, such research should examine whether

scale is related to liquidity in terms of larger managers (and funds) subsequently increasing their stock holdings by transacting in smaller stocks which exhibit higher transaction costs. In addition future research should examine the extent to which the rate of growth/decline in assets under management has a detrimental impact on fund risk-adjusted returns. These issues are already the focus of current research.

#### REFERENCES

- Bird, R., H. Chin and M. McCrae, 'The Performance of Australian Superannuation Funds', *Australian Journal of Management*, Vol. 8(1), 1983.
- Beckers, S., and G. Vaughan, 'Small Is Beautiful', *Journal of Portfolio Management*, Summer, 2001.
- Cicotello, C., and C. Grant, 'Equity Fund Size and Growth: Implications for Performance and Selection', *Financial Services Review*, Vol. 5(1), 1996.
- Dahlquist, M., S. Engström, and P. Söderlind, 'Performance and Characteristics of Swedish Mutual Funds', *Journal of Financial and Quantitative Analysis*, Vol. 35(3), 2000.
- Droms, W., and D. Walker, 'Investment Performance of International Mutual Funds', *Journal of Financial Research*, Vol. 27(1), 1994.
- Elton, E., M. Gruber, S. Das and M. Hlavka, 'Efficiency with Costly Information: A Reinterpretation of Evidence from Managed Portfolios', *Review of Financial Studies*, Vol. 6(1), 1993.
- Elton, E., M. Gruber and C. Blake, 'The Persistence of Risk-Adjusted Mutual Fund Performance', *Journal of Business*, Vol. 69(2), 1996a.
- Golec, J., 'The Effects of Mutual Fund Managers' Characteristics on Their Portfolio Performance', *Financial Services Review*, Vol. 5(2), 1996.
- Grinblatt, M., and Titman, S. 'Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings', *Journal of Business*, Vol. 62(3), 1989b.
- Grinblatt, M., and S. Titman, 'A Study of Monthly Fund Returns and Performance Evaluation Techniques', *Journal of Financial and Quantitative Analysis*, Vol. 29(3), 1994.
- Gruber, M., 'Another Puzzle: The Growth in Actively Managed Mutual Funds', *Journal of Finance*, Vol. 55(3), 1996.
- Keim, D., and A. Madhavan, 'Transaction Costs and Investment Style: An Inter-Exchange Analysis of Institutional Equity Trades', *Journal of Financial Economics*, Vol. 46(3), 1997.
- McCrae, M., 'The Effect of Portfolio Asset Size on the Performance of Australian Superannuation Fund Managers', Department of Accounting and Finance, University of Wollongong, 1998.
- Perold, A., and R. Salomon, 'The Right Amount of Assets Under Management', *Financial Analysts Journal*, Vol. 47(3), 1991.
- Rainmaker Roundup, Report for the December Quarter 2000.
- Sawicki, J., 'Investors Response to the Performance of Professional Fund Managers: Evidence from the Australian Wholesale Funds Market', *Australian Journal of Management* Vol. 25(1), 2000.
- Sharpe, W., 'The Arithmetic of Active Management', *Financial Analysts Journal*, Vol. 47(1), 1991.
- Zheng, L., 'Is Money Smart? A Study of Mutual Fund Investors' Fund Selection Ability', *Journal of Finance*, Vol. 54(3), 1999.

#### ENDNOTES

---

<sup>1</sup> 'Size does matter when it comes to funds management', *The Age*, 18 October 2003; 'Too big for their boots', *Business Review Weekly*, 6 June 2002; 'Big players hampered by too much baggage', *The Australian*, 18 June 2003.

<sup>2</sup> 'Boutique is in the eye of the beholder', *The Australian*, 29 October 2003; 'Boutique babes enjoy sweet smell of success', *The Sun-Herald*, 2 August 2003; 'Boutiques perform well, after a fashion', *The Australian*, 13 July 2003.

<sup>3</sup> Bid-ask spreads are also an implicit cost of trading; however they are not necessarily influenced by trade size. Market impact costs are associated with large orders, which cannot be entirely filled at the prevailing bid and ask quotes, can move security prices in the same direction as the trade. Opportunity costs are incurred when the size of the trade cannot be filled entirely, and there is a delay in execution of the total order. There is a cost of patiently executing an order because active managers, using information, will only have their informational advantage for a limited time-period before other participants acquire the same information. Therefore, the value of information decays over time.

<sup>4</sup> If index assets as a proportion of the total index increases, *ceteris paribus*, the average active investor must still earn the return on the underlying index, such that active management remains a zero sum game. The assumption is active and passive investors select stocks from the same basket (or universe) of securities, with the only difference being their relative weighting.

<sup>5</sup> The ASX All Ordinaries Accumulation Index is used as the index prior to 1 April 2000, given the changes to index construction performed by the Australian Stock Exchange and Standard and Poor's. Both indices are calculated with respect to changes in the capital value of constituent stocks as well as the inclusion of dividend payments by stocks.

<sup>6</sup> While the bond factor was excluded, an analysis was also performed to consider the effect on risk-adjusted performance where the UBS Warburg Composite Bond Index was used as an additional factor.

<sup>7</sup> For example, during the first three-year period there were 108 funds of which 61 doubled in size during that period.