
THE INVESTMENT PERFORMANCE OF AUSTRALIAN SUPERANNUATION FUNDS

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EXECUTIVE SUMMARY

This paper examines the interrelationships between three key operational features of Australian Superannuation Funds: returns, volatility of returns and expenses. We analyse differences in these key measures across fund types, asset sizes and over time.

Using the APRA Annual Data (1996 – 2002) our main findings are:

- For the sample of funds submitting annual returns in the seven years to 2002, the average fund has an annual net return on assets (ROA) of 6.69%, volatility of 6.21% and annual expense ratio (ER) of 1.28%.
- Significant differences exist across fund types. Retail and industry funds have the lowest returns and volatility and highest expenses, while public sector and corporate funds have the highest returns and volatility, and lowest expenses.
- There is a positive relationship between ROA and fund size and a negative relationship ERs and fund size.
- Expense ratios have not declined over time.
- 74% of superannuation members belong to funds with expenses greater than 1% per annum.

Using the Quarterly Survey Data (1995 – 2002) our main findings are:

- For the sample of large funds (greater than \$60m in assets) submitting quarterly returns in all 29 quarters, the average fund has annual net return on assets (ROA) of 7.66%, volatility of 6.86% and expenses of 1.22%.
- Differences in risk-return profiles of superannuation funds reflect differences in fund types. Retail funds dominate the low return – low volatility segment, while corporate funds dominate the high return – high volatility segment. Industry and public sector funds have medium levels of return and volatility.
- There is a positive relationship between returns and fund size.
- Using the Sharpe Ratio as a measure of performance, many funds (particularly retail) have underperformed relative to a risk free investment in Treasury notes.
- High expense funds generally have lower gross and net returns.

1. INTRODUCTION

Underlying the extensive body of research examining performance of asset managers is the overriding principle that performance measurement should be based on the calculation on risk-adjusted returns. While the methodologies in the funds management literature are well developed and potential biases in the methodologies well understood¹, the applicability to evaluating superannuation fund performance is limited by the fact that most superannuation funds do not have a publicly listed share price, and detailed data on asset allocations are not available. As a result, research examining the risk-adjusted returns of Australian superannuation funds has been restricted to small subsets of publicly-listed retail funds (see for example Drew, Stanford and Veeraraghavan (2002)), while other research has focused on the expenses and returns of superannuation funds without examining risk (see for example Bateman (2001) and Clare (2001)).

While it is clearly valuable to understand the expenses of superannuation funds, comparing the performance of funds also requires an evaluation of risk and returns. Rice and McEwin (2002, p.1) for example note that:

“If any education is needed it should be targeted at the decisions consumers actually need to make in practice, ie aimed at improving consumer knowledge of the final product, not its components. Superannuation investors need to know fund performance (net of expenses) relative to risk, not the cost of any component.”

The focus on expenses in much of the recent research and ongoing debate over the performance of superannuation funds may be attributed to the inability of

¹ The key methodological issues relate to the performance measure, choice of the benchmark portfolio, adjustments for market timing, and survivorship bias (see Grinblatt and Titman (1995))

researchers to calculate reliable estimates of risk due to data limitations, and the view that superannuation funds have greater ability to influence costs rather than gross returns. Moreover, scrutiny of the cost of superannuation services is likely to have intensified as a result of recent negative investment returns earned by a large number of funds.

In this study we evaluate the overall performance of Australian superannuation funds by examining the relationship between risk, returns and expenses over the period 1995 to 2002. We examine how performance varies by total assets, by fund type, and over time. An important contribution of this study is the utilisation of two large cross-sectional and time series databases, which not only allows us to provide reliable estimates of volatility, but also overcomes the small sample limitations of prior research.

We use two large data sets in this study, *Annual Data* and *Quarterly Survey Data*. The *Annual Data* includes details on all APRA- regulated superannuation funds and therefore provides universal coverage of the regulated superannuation sector. The *Quarterly Survey Data* is limited to large funds (including non-regulated funds) with assets in excess of \$60 million. Although the *Quarterly Survey Data* has limited coverage in terms of number of funds, the superannuation funds in this database account for the majority of superannuation members. A further advantage of the *Quarterly Survey Data* is the greater frequency in reporting, which allows for the calculation of better investment performance measures.

While there would be advantages in examining performance by different asset classes (eg bonds, balanced funds, property, international equities), this is currently

not feasible due to data limitations. Nevertheless, our single fund measures have several advantages, including:

- The production of a single performance measure is consistent with the fact that most superannuation members do not diversify their investments across superannuation funds on the basis of performance in different asset classes.
- The production of single performance measures may be used to construct superannuation league tables, which will assist individual members, employers and the advisory industry in making informed superannuation assessments. Moreover, the publication of such data would increase transparency and competition and therefore improve the long-run performance of the superannuation industry.
- The analysis in this paper suggests that even at the overall fund level, superannuation performance is broadly consistent with the risk-return framework. To the extent that a particular fund has invested in higher or lower risk asset classes, this will be reflected in the overall risk and return of the fund.

The main findings of the study are: (i) public sector and corporate funds report the highest returns and volatility, while returns and volatilities of retail and industry funds are significantly lower; (ii) retail and industry funds have significantly higher expense ratios than corporate and public sector funds (iii) expense ratios have not declined over time; (iv) in all seven years of the study (1996 to 2002) retail funds have the lowest average returns, while corporate funds have the highest average

returns; and (v) there is a significant positive relationship between returns and fund size and a significant negative relationship between expenses and fund size.

The rest of the paper is structured as follows. In the following section we provide a brief overview of existing Australian research. Section 3 outlines the data sources, and defines the key variables and fund types. Section 4 utilises the *Annual Data* to examine the relationship between three performance measures: returns, volatility and expenses, and the effect of asset size and fund type on these performance measures. Section 5 uses the *Quarterly Survey Data* to again examine superannuation returns, volatility and expenses, and presents a simple method for identifying under-performing funds, as well as measuring performance using the Excess Return Sharpe Ratio. Section 6 concludes.

2. EXISTING AUSTRALIAN EVIDENCE

There have been several recent studies on superannuation fees and charges. Clare (2001, Association of Superannuation Funds of Australia (ASFA)) uses a combination of APRA data and ASFA survey data. The ASFA data is based on a survey of 300 superannuation funds, of which a total of 60 non-retail funds responded. Clare (2001) finds that overall superannuation costs are 1.3% of assets, with public sector funds having the lowest cost, followed by corporate and industry funds.

Rice and McEwin (2002, Investment & Financial Services Association (ISFA)) focus on the effect of competition on superannuation fees. They conclude that, based on the large number of products and suppliers within each segment and a falling expense ratio, there is a high level of competition within the industry. They

find fees as a percentage of assets have fallen from an average of 1.24% of assets in 1999 to an average of 1.20% in 2000.

Using APRA annual data, Bateman and Mitchell (2001) examine the administration costs of 1,920 superannuation funds with at least 10 members and one million dollars in assets in the 1998/1999 financial year. On average, they find administration expenses of superannuation funds to be 1.07% of assets. Using a cost function methodology they also find evidence of very large economies of scale in Australian superannuation funds. Holding constant the number of fund members, a 1% increase in assets is estimated to raise costs by 0.5%. Moreover, Bateman (2001) shows that fees of 1% per annum can reduce eventual retirement income by 22%.²

Malhotra, Marisetty and Ariff (2001) estimate a translog cost function to examine the extent to which economies of scale exist in Australian retail superannuation funds over the period 1999 to 2000. Based on a sample of 96 funds obtained from the ASSIRT rating agency, Malhotra et al. (2001) find no evidence of economies of scale in retail superannuation funds. This is in direct contrast to the finding of large scale economies reported in the Bateman and Mitchell (2001) study.³

In one of the few studies to measure risk adjusted performance, Drew, Stanford and Veeraraghavan (2002) use a sample of 148 Australian Equity Superannuation Funds to test hypotheses relating to performance persistence. They

² Calculations assume annual investment real investment returns of 5%, real wages growth of 1%, 9% contributions, zero inflation, and no taxes.

³ The difference in scale economy findings between Malhotra et al. (2001) and Bateman and Mitchell (2001) is likely to be due to a combination of significantly different data samples, and differing specifications of the translog cost function.

find no evidence to support performance persistence, and therefore little value in basing investment allocation decisions on past performance.

3. VARIABLE DEFINITIONS, DATA, AND FUND TYPES

3.1 Key Variables

(a) Expense Ratios

The calculation of expenses for superannuation funds is complicated by data limitations. Administration and investment expenses reported in APRA's annual and quarterly superannuation returns do not separately account for investment costs charged by external fund managers, pooled superannuation trusts (PSTs) and life insurance companies. These external expenses are typically deducted from gross returns on externally managed investments, with data reported on the rate of return net of expenses.

An estimate of external management costs may be obtained by assuming that all externally managed assets incur the same rate of expenses. In this paper we follow this approach and assume that expenses on externally managed investments are equal to 0.45% of assets externally managed. The 0.45% adjustment is based on the average management expense ratio (MER) reported in the annual returns of a sample of 25 superannuation funds reporting in either the 2001 or 2002 calendar year.⁴ The 0.45% adjustment is similar to that used in Rice and McEwin (2002) who use an adjustment range of 0.45% to 0.60% depending on asset size. Our adjustment is conservative,

⁴ This assumption is limiting and biases the results against finding economies of scale, as larger funds are typically able to negotiate lower charges from external managers.

when compared to KPMG studies (quoted in Clare (2001)), which use a 0.70% adjustment factor.

The Expense Ratio (ER) of a superannuation fund is defined as the sum of administration expenses, investment expenses and estimated external management expenses divided by total assets. It is important to note that expenses do not necessarily correspond to fees charged by superannuation funds to members. As fee data (including information on entry and exit fees) is unavailable, in this study we rely on expense data.

(b) Return on Assets and Volatility

The overall performance of a superannuation fund is measured by its average return on assets and the volatility in its returns. We define the net return on assets (ROA) of a superannuation fund as the sum of net investment income plus unrealised gains and losses less investment and administration expenses, divided by total assets. The volatility of a fund is defined as the standard deviation of ROA.

An advantage of examining returns rather than expenses is that ROA is defined as net of expenses, and therefore it is not necessary to adjust the data for estimated external management expenses charged to the super fund by asset managers. It should be noted however that the returns reported in this study do not necessarily reflect the investment return or 'crediting rate' passed on to members of superannuation funds. Some superannuation funds keep a portion of their profits in reserve to smooth results when investment returns are poor or negative. Rice and McEwin (2002) estimate that less than 0.1% of earnings are now retained for income smoothing, having been as high as 0.5% within the last 5 years.

3.2 Fund Types

APRA regulated superannuation funds may be classified into six groups: corporate funds, industry funds, public sector funds, retail funds, Pooled Superannuation Trusts (PSTs), and Small APRA Funds (SAFs). The fund types differ by maximisation objective (non-profit or for-profit organisations); varying degrees of membership restriction; and benefit structures (defined benefit, accumulation funds or hybrid funds). In addition, APRA collects data on Exempt Public Sector Superannuation Schemes (EPSSS).

Corporate funds are sponsored by a single employer or group of related employers, with membership of the fund restricted to employees of the single employer or employer group. Employees, either directly or via union representation, are equally represented on the trustee board overseeing the investments of the fund. Public sector funds operate in a similar manner to corporate funds, with the difference being the fund sponsor is a government department, agency or government controlled business enterprise, rather than a non-government entity.

Industry funds were originally created as part of industrial award agreements between unions and employer representatives. As part of negotiations, agreements were reached for a fixed percentage of salaries to be paid into a particular superannuation fund. Board members of the trustee company are equally represented by employee and employer representatives.

Retail funds are managed by professional financial institutions to make a profit on the provision of superannuation services (eg administration, communication, insurance and investment services) to the fund. These funds may include a corporate division (master trusts) and a personal division which provides superannuation

products to individuals on a voluntary basis. Unlike the other fund types there is no member representation on the board of the trustee. Under standard employer sponsored (SES) funds, a policy committee is usually formed with equal employee and employer representatives. The policy committee has no legal power and exists to communicate and liaise between the trustee and employees of the given SES fund.

SAFs are superannuation funds supervised by APRA which must have an approved trustee and fewer than 5 members. Given the small coverage of SAFs (by assets and members), they are excluded from this study.

PSTs are wholesale funds that can only be used to invest the assets of superannuation funds and are regulated by APRA. We do not include PSTs in the main body of the analysis, however for information purposes we provide data on PSTs in Appendix 1.

3.3 Data

In this study, we use data obtained from the APRA Quarterly Survey of Superannuation and Annual Returns for APRA Regulated Superannuation Funds

(a) Annual Data

Under the *Superannuation Industry (Supervision) Act 1993* (SIS Act), all prudentially-regulated superannuation funds are required to submit an annual return to APRA. The database includes information on investment and administration expenses, taxation expenses, total assets, fund type, net investment income, unrealised gains and losses, number of members, and benefit structure of the fund (defined benefit, defined contribution or hybrid).

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Excluding SAFs, approximately 3,098 SIS regulated superannuation funds were in existence as at June 2002, representing 98% of all superannuation member accounts.⁵ From this sample we extracted all 1,453 corporate, industry, public sector and retail funds with seven years of annual expense and income data over the period 1996 to 2002. After calculating the average ER and ROA for each fund over the seven year period, we identified several funds with implausible data. Hence we omitted superannuation funds with an average ER less than 0.1% or greater than 5%, or an average ROA greater than 20% or less than -20% on the basis that these funds are outliers. This reduced the sample by a further 96 funds, resulting in an annual database of 1,357 funds to be used in this study.

The decision to restrict the analysis to those funds with complete data over the period reduces the sample size, and may lead to “survivorship” bias, as better performing funds are more likely to have survived over the 7 years of the study. However, including funds that exist for only part of the sample period also affects the analysis in this study. For example, relatively new funds have not benefited from the investment bull market of the late 1990’s and thus report on average poor performance when compared to funds that have been in existence for the full sample period. Moreover, it is not possible to construct reliable estimates of volatility for funds with few observations, be they new funds or funds no longer in existence. For these reasons, we restrict the analysis to the sample of 1,357 funds with complete data over the sample period. However, where appropriate we provide additional results in

⁵ See APRA, Superannuation Market Statistics, June 2002.

the appendix using the full sample of funds, to show that the data does not materially affect the results.

(b) The Quarterly Survey Data

The survey data, which APRA collects on behalf of the Australian Bureau of Statistics, requires superannuation funds with more than \$60 million in total assets to submit a quarterly survey.⁶ As at June 2002, 366 funds submitted quarterly survey returns, including non-regulated EPSSS. After omitting EPSSS from the sample and funds with incomplete data, we have a sample of 237 funds with complete quarterly return and expense data over the sample period 1995(Q2) to 2002(Q2). These funds account for approximately 71% of total superannuation industry assets and approximately 77% of superannuation members.

4.PERFORMANCE ASSESSMENT USING THE ANNUAL DATABASE

In this section of the paper we use the annual database of 1,357 funds to examine the performance of Australian superannuation funds. In the following analysis we examine the relationship between ROA, volatility and ERs, and how these measures vary over time, with fund type and by fund size.

4.1 ROA, Volatility and Fund Type

The average annual ROA and return volatility are reported in Table 1. For all superannuation funds over the period 1996 to 2002, the average annual ROA is 6.68%

⁶ A superannuation fund is not required to submit a quarterly return when total assets of the fund fall below \$60 million for three consecutive quarters. Hence some funds move in and out of the survey over time, or enter the survey for first time after 1995.

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and the average annual volatility is 6.21%. Comparing ROA across fund types, corporate funds have the highest ROA (6.96%) followed by public sector funds (5.99%), industry funds (5.82%) and retail funds (4.51%). Relative to corporate funds, all other funds have a significantly lower average ROA. The average ROA reported by corporate funds is 54% higher than the ROA reported by retail funds.⁷

The variation in returns across fund types is also observed in Super Review (2002) and ASFA (2002). Similarly, these studies generally find that corporate and public sector funds have higher returns than industry and public sector funds.

Consistent with the principal that higher returns require higher risk, average annual volatility follows the same pattern as returns. Corporate funds have the highest annual return volatility (6.44%), followed by public sector funds (5.45%), industry funds (5.08%) and retail funds (4.85%). Relative to volatility in corporate funds, all other fund types have significantly lower volatility at the 95% or 99% confidence level.⁸

⁷ Asset-weighted ROA figures are presented in Appendix 2.

⁸ The significant difference in ROA and volatility across fund types is not driven by differences in benefit structure. To illustrate, for the 673 corporate accumulation funds, the average annual ROA is 6.73% and volatility is 6.36%, which remains significantly different from the other fund types.

TABLE 1
Average Annual ROA and Volatility
Annual Return Database: 1996 to 2002

	Average ROA	Average Volatility	Number of Funds
Corporate	6.96%	6.44%	1134
Industry	5.82% ***	5.08% ***	100
Public Sector	5.99% **	5.45% **	27
Retail	4.51% ***	4.85% ***	96
All Funds	6.68%	6.21%	1357

***, ** indicate that the mean ROA (volatility) is significantly different from the mean ROA (volatility) in corporate funds at the 99%, and 95% confidence levels respectively.

4.2 ROA, Volatility and Asset Size

An article by ASFA (2000) highlighted the restricted investment management opportunities of small superannuation funds and proposed a possible link between volatility and fund size. With limited resources, small funds may not be able to adequately diversify the ‘growth’ bias in their managers’ investment strategy. This may result in small funds having higher volatility than large funds.

In Table 2 we calculate average ROA and volatility across asset size categories for all funds and within each fund type.⁹ Based on real average asset size over the period 1996 to 2002, each fund is sorted into one of four asset size categories: \$1 million to \$10 million; \$10 million to \$100 million; \$100 million to \$500 million; and greater than \$500 million.¹⁰ For industry funds, average ROA systematically increases with asset size. Across the other fund categories, average

⁹ We exclude funds with assets below \$1 million.

¹⁰ Note that the asset data is converted into 2002 dollars using the CPI prior to calculating real average assets over the sample period.

ROA also generally increases with asset size, although there is some discontinuity associated with the \$10 million to \$100 million asset class.

Within each fund category, we test whether the average ROA of the first three asset categories are significantly different to the largest asset category. The results show that there are statistically significant size effects in corporate and industry funds. Larger funds earn significantly higher returns. The average ROA in the largest size category (>\$500m) for corporate and industry funds is always higher than the ROA in the other size categories. Across each size grouping, corporate funds have the highest returns, while retail funds consistently report the lowest returns. These results confirm that differences in fund type are not driven by size effects, and therefore reinforce the findings of Table 1.

A positive relationship between return and volatility is also observed in Table 2. Whether a comparison is made across fund types (within an asset class) or across size classes for a given fund type, higher returns are generally correlated with higher volatility. For example, with the \$10 million to \$100 million asset category, fund types with a high ROA always have higher average volatility.

TABLE 2
Average ROA and Volatility by Total Asset
Annual Return Data: 1996 to 2002

	Corporate	Industry	Public Sector	Retail	ALL
\$1m<TA<\$10m					
<i>Average ROA</i>	7.11% **	4.67% ***	5.16%	3.76%	6.95%
<i>Average Volatility</i>	6.21%	4.20%	4.41%	3.01% ***	6.07%
<i>Number of Funds</i>	477	15	6	9	507
\$10m<TA<\$100m					
<i>Average ROA</i>	7.05% ***	5.37% ***	6.49%	4.79%	6.74%
<i>Average Volatility</i>	6.10%	5.18%	5.28%	4.42% *	5.89%
<i>Number of Funds</i>	334	36	7	27	404
\$100m<TA<500m					
<i>Average ROA</i>	8.22%	6.42%	5.76%	4.15%	6.77%
<i>Average Volatility</i>	7.68% *	5.62%	6.04%	4.73%	6.43%
<i>Number of Funds</i>	57	31	4	26	118
TA>\$500m					
<i>Average ROA</i>	8.26%	6.85%	6.23%	4.77%	6.18%
<i>Average Volatility</i>	6.50%	4.93%	5.96%	5.77%	5.80%
<i>Number of Funds</i>	18	15	10	34	77

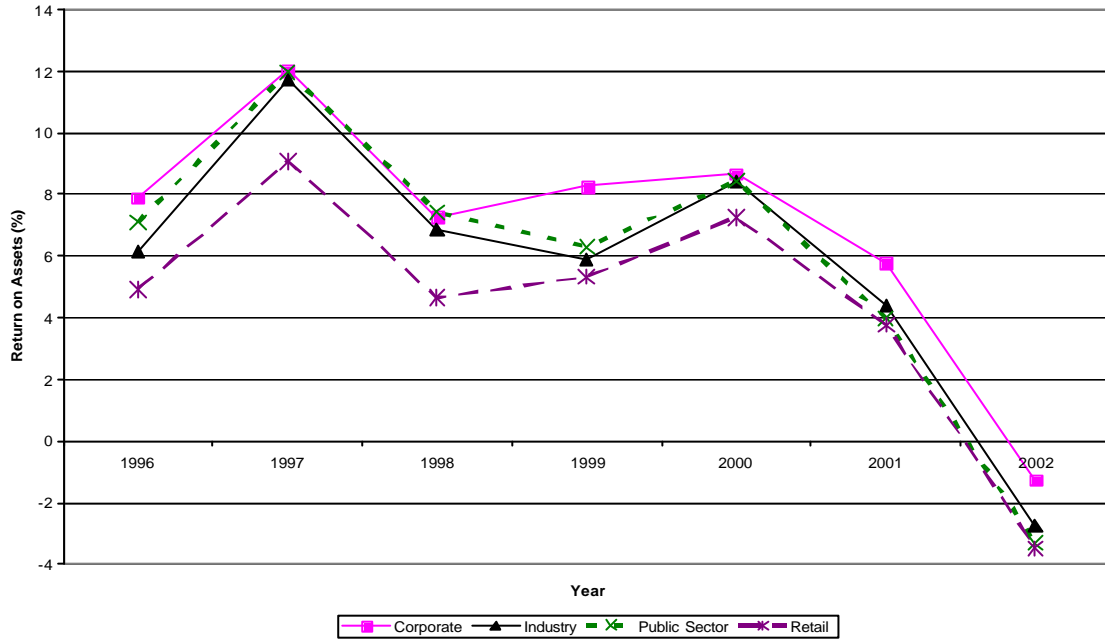
***, **, * indicate the average ROA (or volatility) for a given fund type is significantly different from the average ROA (or volatility) for funds in the largest asset size category (TA > \$500 m) at the 99%, 95%, and 90% confidence levels respectively.

4.3 ROA over Time

Figure 1 displays the average ROA across fund types on a year by year basis (In Appendix 2, we provide the raw data for Figure 1, along with comparable tables using asset-weighted ROA, and tables that include data on the complete sample of funds in the *Annual Return Database*). All fund categories follow a similar trend with average returns peaking in 1997 and 2000 and declining markedly over the last two years to negative levels in 2002. Interestingly, corporate funds consistently report higher returns than other fund types with retail funds consistently reporting the lowest returns. It is surprising that retail funds have reported the lowest returns during the

recent market downturn. Given the lower volatility of these funds, it would be expected that these funds would perform relatively better during a market downturn.

FIGURE 1
Average ROA by Fund Type Reported Year-by-Year: 1996 to 2002



4.4 Expenses and Fund Type

In Table 3 we report average ERs for each fund type averaged over the sample period 1996 to 2002. The averages are calculated on both an equal-weighted basis and an asset-weighted basis. The equal-weighted average is useful when comparing performance across funds, but may not accurately reflect the expenses incurred by most Australian superannuants. Hence, asset-weighted (or industry aggregate) averages are also presented, which weight the importance of a superannuation fund's expense ratio by the relative size of the fund. The average equally-weighted ER for all superannuation funds over the period 1996 to 2002 is 1.28%, while the average asset-weighted ER is substantially lower at 1.07%. The equal-weighted average expense

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ratios are consistently and substantially higher than the asset-weighted ERs across all fund types, which suggests the presence of significant expense scale economies.

These ratios are similar to those reported in Rice and McEwin (2002) and Clare (2001), however they are higher than those found by Bateman and Mitchell (2001), which may be due to the fact that Bateman and Mitchell (2001) do not include investment expenses. Approximately 26% of members belong to super funds with ERs less than 1%. This figure is considerably lower than that reported by Clare (2001) who estimated that 97% of fund members with compulsory Superannuation Guarantee contributions faced fees and costs not in excess of 1%.¹¹ The results of this study imply that the majority of Australian superannuation fund members are incurring superannuation expenses in excess of 1% of assets per annum.

TABLE 3
Average Expense Ratios over the period 1996 to 2002

	Equal-Weighted Expense Ratio	Asset-Weighted Expense Ratio	Equal-Weighted Expense to Gross Return Ratio	Number of Funds
Corporate	1.24%	0.87%	13%	1134
Industry	1.56% ***	1.30%	20% ***	100
Public Sector	1.33%	0.58%	17%	27
Retail	1.56% ***	1.32%	28% ***	96
All Funds	1.28%	1.07%	15%	1357

*** indicate the mean ER within a particular fund category is significantly different from the mean ER for corporate funds at the 99% confidence level.

¹¹ It is interesting to note that using an MER of 0.70% results in an asset-weighted ER across all funds of 1.25%, which is similar to the overall ER reported in Clare (2001).

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The disaggregation of ERs in Table 3 shows that the average equal-weighted ERs are, relative to corporate funds, significantly higher in industry and retail funds. On both an equal-weighted and asset-weighted basis, industry and retail funds have the highest reported expense ratios. The average equal-weighted ER for both retail and industry funds is 1.56%, which on an asset-weighted basis falls to approximately 1.30%.

Corporate funds have the lowest equal-weighted ER at 1.24% and second lowest asset-weighted ER of 0.87%. The sample of public sector funds is most affected by whether or not the expenses are weighted by the fund's asset size. The equal-weighted ER for public sector funds is 1.33%, however the asset-weighted ER is very low at 0.58% implying that there are some very large public sector funds with very low expenses.

These results are similar to the findings of Clare (2001) and Rice and McEwin (2002), who find public sector funds have ERs of 0.49% and 0.43% respectively. Moreover, Clare (2001) finds that public sector funds have the lowest costs, followed by corporate and industry funds. Our asset-weighted ER results support this view, and in addition suggest that retail funds have ERs that are comparable to industry funds. The high expenses reported by industry funds may be due to the low average account balance in these funds, while for retail funds higher costs may be due to the fact that these funds incur greater marketing expenses, have higher distribution costs, and typically provide more choice of investment strategy to fund members.

The ratio of average equal-weighted expenses to average gross returns is also reported in Table 3.¹² For all funds, expenses account for 15% of total fund returns on an equal-weighted basis. This implies that superannuation members received an average of 85% of their fund's investment returns over the seven years to June 2002. Although investment returns should be the primary focus on measuring superannuation performance, these results suggest that the cost efficiency or cost inefficiency of superannuation operating procedures has the potential to significantly affect returns to members.

Comparing across fund types, the expense to return ratio is highest for retail and industry funds (28% and 20% respectively) and lowest for corporate funds (13%). Corporate funds have the lowest costs and highest returns, whereas retail and industry funds have significantly higher costs and significantly lower returns relative to corporate funds.

4.5 Expenses and Asset Size

The large difference between equal-weighted and asset-weighted ERs reported in Table 3 strongly suggests size of a superannuation fund has a significant impact on its ER. To the extent that superannuation fund expenses have a large fixed cost component, larger funds should benefit from scale economies and should therefore have lower expenses as a percentage of total assets.

¹² Average expenses and average income is calculated over the seven year period for each fund, before forming the ratio of expenses to gross returns. This avoids the problem associated with negative income which may occur in a given year.

The existing evidence on whether scale economies exist in Australian superannuation funds and the magnitude of the scale benefits is mixed. Bateman and Mitchell (2001) and Rice and McEwin (2002) both find evidence of increasing returns to scale in Australian superannuation funds. However, Malhotra et al. (2001) conclude that there is no evidence of economies of scale in their small sample study of retail superannuation funds. Similarly, in Super Review (2002) funds with assets of between \$250 million and \$500 million have administration fees which are 12% less than funds with assets of more than \$500 million.

To investigate the effect of asset size on administration and investment expenses, superannuation fund ERs are calculated for each fund type across the following four asset ranges: \$1 million to \$10 million; \$10 million to \$100 million; \$100 million to \$500 million; and greater than \$ 500million. The asset categories are based on average real assets over the 1996 to 2002 period, adjusted using the CPI and expressed in 2002 dollar terms.

The results reported in Table 4 support the existence of increasing returns to scale. Average ERs decrease as asset size increases for the full sample of funds and across all fund types. This is particularly evident for corporate funds where average ERs systematically and significantly decrease with asset size. The greatest scale effect is observed in public sector funds, where the average ER for funds in the smallest asset category is 2.42%, which is statistically and economically significantly higher than the average ER for the largest public sector funds of 0.65%. The large benefits associated with scale economies observed in public sector funds (and other fund types) is consistent with the substantial variation between equal-weighted and asset-weighted ERs reported in Table 3.

TABLE 4
Equal-Weighted Expense Ratios by Total Asset
Annual Return Data: 1996 to 2002

	Corporate	Industry	Public Sector	Retail	ALL
\$1m<TA<\$10m					
<i>Average ER</i>	1.33% ***	1.74% **	2.42% ***	2.00%	1.37% ***
<i>Number of Funds</i>	477	15	6	9	507
\$10m<TA<\$100m					
<i>Average ER</i>	1.19% ***	1.84% **	1.35%	1.55%	1.27% **
<i>Number of Funds</i>	334	36	7	27	404
\$100m<TA<\$500m					
<i>Average ER</i>	0.93% ***	1.44% *	1.34% **	1.74% **	1.26% **
<i>Number of Funds</i>	57	31	4	26	118
\$500m<TA					
<i>Average ROA</i>	0.79%	1.18%	0.65%	1.32%	1.08%
<i>Number of Funds</i>	18	15	10	34	77

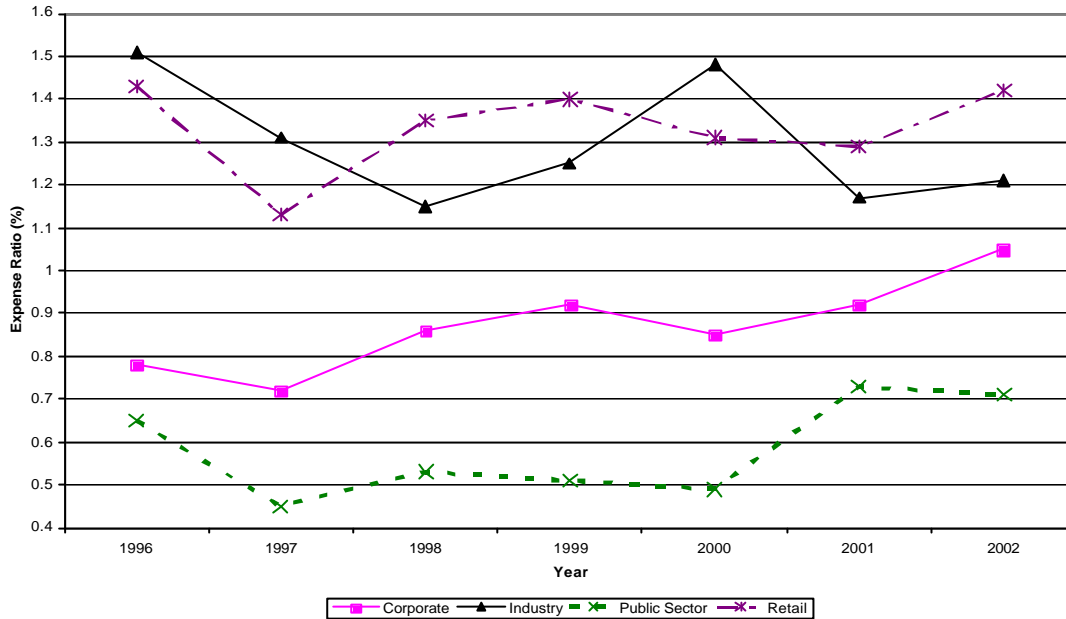
***, **, * indicate the mean ER within a particular fund category is significantly different from the mean ER for funds with TA greater than \$500m at the 99% , 95% , and 90% confidence level.

4.6 Expenses over Time

In this section we examine how ERs have varied over the years 1996 to 2002. Several factors may have affected expense ratios over the sample period. Rice and McEwin (2002) argue that increasing levels of competition within the industry, as well as the conversion of some smaller funds to master trusts has led to a reduction in ERs over time.¹³ However, there has also been a trend over the last few years to increase the proportion of assets in equities and overseas assets. As investment in these assets typically cost more to administer, this may have led to an increase in administration and investment expenses.

¹³ They also estimate that the introduction of the GST in July 2000 increased fees by 2.5% (approximately 3 basis points in real terms).

FIGURE 2
Asset-Weighted Expense Ratios by Fund Type
Reported Year-by-Year: 1996-2002



In Figure 2, we report on a year by year basis the asset-weighted ER by fund type over the period 1996 to 2002. (Data for Figure 2, along with a comparable table using the complete sample of funds in the *Annual Data* is provided in Appendix 3). Despite the increase in average fund size, asset-weighted ERs show some increase over time.¹⁴ Although there is considerable yearly variation in the ERs, certain patterns emerge. Retail and industry funds consistently have the highest ER, though the difference between these fund types and corporate funds has steadily narrowed over time. Despite some yearly variability, public sector funds report the lowest expenses in the all seven years. The substantial yearly variation in expense ratios observed in Figure 2 supports the calculation of average ERs over time as reported in Tables 3 and 4.

¹⁴ The same pattern is observed using equal-weighted ERs.

5. PERFORMANCE ASSESSMENT USING QUARTERLY SURVEY DATA

5.1 ROA and Volatility by Fund Type

In order to calculate reliable estimates of superannuation return volatility, in this section of the study we limit our analysis to 237 superannuation funds that submit quarterly return data using the APRA quarterly survey. For each fund in the sample, ROA and volatility are calculated using 29 quarterly observations. The results are reported in Table 5. The results are presented in annualised form to facilitate comparison with the earlier analysis.

For the sample of 237 superannuation funds the average annual ROA is 7.66%, and average standard deviation of returns is 6.86%. Comparing across fund types, significant differences in both volatility and return are observed. Corporate funds have the highest volatility and return, followed by public sector funds, industry funds and retails funds. Corporate funds have a mean return of 8.70% and mean return volatility of 8.04%, which is significantly higher than retail funds which have a mean return of 5.83% and mean return volatility of 5.51%. These results reinforce the findings from Table 1 using the *Annual Data*.¹⁵

¹⁵ As noted in the earlier discussion, similar results are obtained when the analysis is restricted to accumulation funds.

TABLE 5
Average Annual ROA and Volatility by Fund Type
Quarterly Survey Data: 1995(Q2) to 2002(Q2)

	Average ROA	Average Volatility	Number of Funds
Corporate	8.70%	8.04%	108
Industry	7.55% ***	5.85% ***	43
Public Sector	8.08%	7.02% **	22
Retail	5.83% ***	5.51% ***	64
ALL	7.66%	6.86%	237

*** (**) indicate the mean annual ROA (volatility) within a fund category is significantly different from the mean ROA (volatility) for corporate funds at the 99% (95%) confidence level.

5.2 ROA and Volatility by Asset Size

In Table 6 we calculate average ROA across asset size categories for all funds and within each fund type. Based on real average asset size over the period 1996 to 2002, each fund is sorted into one of three asset size categories: \$60 million to \$100 million; \$100 million to \$500 million; and greater than \$500 million.¹⁶

For each fund type we test whether the average quarterly ROA and volatility in the two smaller size categories are significantly different from the ROA and volatility in the largest size category (>\$500m). For industry and public sector funds average volatility increases with asset size, while for corporate funds volatility decreases with asset size. The smallest corporate and industry funds exhibit significantly lower returns than the largest corporate and industry funds respectively, while there is no significant return difference in public sector funds across size

¹⁶ Note that the asset data is converted into 2002 dollars using the CPI prior to calculating real average assets over the sample period.

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categories. However, the reverse pattern is observed in retail funds with the smallest funds (\$60m to \$100m) reporting a significantly higher ROA (7.45%) than the largest retail funds (greater than \$500m) with an average ROA of 5.84%.

TABLE 6
Average Annual ROA and Volatility by Total Asset and Fund Type
Quarterly Survey Data: 1995(Q2) to 2002(Q2)

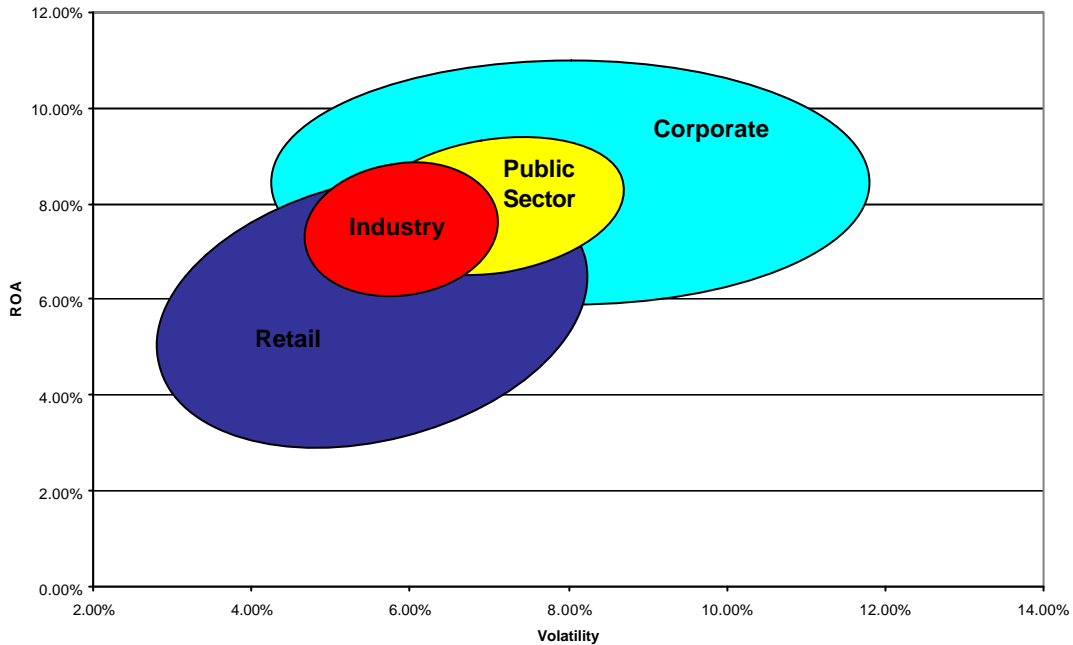
	Corporate	Industry	Public Sector	Retail	ALL
\$60m<TA<\$100m					
<i>Average ROA</i>	7.19% ***	6.60% ***	n/a	7.45% *	7.22%
<i>Average Volatility</i>	8.93%	5.07% **	n/a	5.98%	8.29% *
<i>Number of Funds</i>	27	1	0	6	34
\$100m<TA<\$500m					
<i>Average ROA</i>	9.21%	7.27% **	8.05%	5.46%	7.96%
<i>Average Volatility</i>	7.88% **	5.86%	6.13%	4.92%	6.75%
<i>Number of Funds</i>	68	26	6	27	127
\$500m<TA					
<i>Average ROA</i>	9.19%	8.08%	8.08%	5.84%	7.36%
<i>Average Volatility</i>	7.01%	5.87%	7.36%	5.93%	6.40%
<i>Number of Funds</i>	13	16	16	31	76

***, **, * indicate the mean ROA (or volatility) within a fund category is significantly different from the mean ROA (or volatility) for funds with TA greater than \$500m at the 99%, 95% and 90% confidence levels respectively.

To further illustrate the variation in return and volatility across funds, the distribution of return and volatility by fund type is shown in Figure 3. For each fund type an ellipse is formed around the mean return and volatility, with the boundary of the ellipse representing one standard deviation from the mean.¹⁷ This provides an alternative presentation of the data summarised in Table 5, and reinforces the conclusion that funds are segmented in risk – return space.

¹⁷ The tilt of the ellipse (β) is estimated by the following regression: ROA = a (CONSTANT) + b (VOLATILITY).

FIGURE 3
ROA and Volatility by Fund Type
1995(Q2) to 2002(Q2)



The segmentation of funds into different return-volatility segments may be due to several factors: (i) portfolio composition may systematically differ by fund type; (ii) differences in remuneration mechanisms across fund types may provide an incentive for greater (less) risk taking by corporate (retail) funds; and (iii) systematic differences in the risk preferences of members across fund types may exist.

5.3 Identifying Under-Performance

Based on the sample of 237 funds, the average volatility and return, and standard deviation of volatility and return are calculated, and funds are then sorted into one of four volatility buckets, and one of four return buckets. The four buckets are denoted Low, Low-Medium, High-Medium, and High. The low return category is defined as returns that are more than one standard deviation below the mean return.

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Low-medium returns range from the average return to the average return less one standard deviation. High-medium returns range from the average return to average returns plus one standard deviation. High returns are more than one standard deviation above the mean. A similar procedure is used to define the four volatility buckets. This results in a 4 by 4 matrix of volatility and returns, and hence a total of 16 return-volatility buckets within which the 237 superannuation funds are assigned.

Table 7 displays the categorisation of the 237 funds. By definition the majority of the funds should lie in one of the middle 4 buckets (as under a normal distribution 68% of observations lie within 1 standard deviation of the mean). This is the case with the most populated boxes (70%) being the medium return and volatility categories. A feature of the matrix is that only 3 funds place in the 'best' three buckets compared to 15 funds in the 'worst' three buckets.

TABLE 7
The Relative Performance of 237 Australian Superannuation Funds
Quarterly Survey Data: 1995(Q2) – 2002(Q2)

	Volatility				
		<i>Low</i>	<i>Low-Medium</i>	<i>High-Medium</i>	<i>High</i>
Returns	<i>High</i>	0	3	14	6
	<i>High-Medium</i>	0	47	46	5
	<i>Low-Medium</i>	6	52	20	3
	<i>Low</i>	8	15	7	5

5.4 Excess Return Sharpe Ratio (ERSR)

To obtain an overall risk-adjusted measure of performance, we calculate the Excess Return Sharpe Ratio (ERSR) for each of the 237 funds in the sample. The ERSR, developed by William F. Sharpe, provides a measure of the return received for

incurring an additional unit of risk.¹⁸ The quarterly ERSR is defined for each fund as the average quarterly excess return (Quarterly ROA less the yield on the 13 Week Treasury Note) divided by the standard deviation of the quarterly excess return. The quarterly ERSR is then scaled to form an annual ERSR for each fund. The higher the ERSR the better the performance of the fund.

In Table 8 we report the average ERSR for funds sorted into the 4 by 4 matrix of return and volatility. The ERSR corresponds fairly accurately to a fund's bucket location. Moving down the diagonal from top left to bottom right, the ERSR steadily worsens. The highest ERSR (1.01) is found in the high return, low-medium volatility bucket. A large number of funds have negative ERSRs implying that superannuation members could have achieved higher returns by placing their money in risk-free instruments such as government bonds. When returns are negative, a low volatility can lead to lower ERSRs because on a volatility-adjusted basis, in poor investment times, such funds should outperform higher-volatility funds.

The average annualised ERSR across all funds is 0.32 corresponding to fairly poor performance. Corporate funds, industry funds, and public sector funds all achieve higher average ERSRs (0.47, 0.40, and 0.40 respectively) while retail funds record an average ERSR of -0.02. On a volatility-adjusted basis, many retail funds underperform 'risk-free' instruments such as Treasury notes.

¹⁸ See Sharpe (1997) for a concise explanation of the ERSR and other performance measures.

TABLE 8
Sharpe Ratios of Superannuation Funds by Return-Volatility Buckets
Quarterly Survey Data: 1995(Q2) to 2002(Q2)

	Volatility				
		<i>Low</i>	<i>Low-Medium</i>	<i>High-Medium</i>	<i>High</i>
Returns	<i>High</i>		1.01	0.86	0.76
	<i>High-Medium</i>		0.60	0.48	0.27
	<i>Low-Medium</i>	0.16	0.25	0.16	0.09
	<i>Low</i>	-0.87	-0.24	-0.16	-0.24

Note: Sharpe Ratios are annualised Excess Return Sharpe Ratios (ERSR).

5.5 Expenses and Fund Type

In Table 9, we report the average expense ratios (ERs), asset-weighted ERs, and Expense to Return Ratios for each of the four fund types in the *Quarterly Survey Data*. Similar to the *Annual Data* results, corporate and public sector funds have the lowest expense ratios on both an equal (0.89% and 0.88% respectively) and asset-weighted basis (0.83% and 0.77% respectively). In contrast, retail and industry funds have the highest equal-weighted expense ratios (1.77% and 1.39% respectively) as well as the highest asset-weighted expense ratios (1.62% and 1.32%). Industry and Retail fund ERs are significantly higher than the ERs of corporate funds at the 99% confidence level.

Consistent with results using the *Annual Data*, industry and retail funds also report significantly higher expense to return ratios than corporate funds. Expenses account for 32% of the gross returns of retail funds compared to only 10% of gross returns for corporate funds.

TABLE 9
Annual Expense Ratios Using the Quarterly Survey Data
1995(Q2) to 2002(Q2)

	Equal-Weighted ER	Asset-Weighted ER	Equal-Weighted Expense to Return Ratio	Number of Funds
Corporate	0.89%	0.83%	10%	108
Industry	1.39% ***	1.32%	18% ***	43
Public Sector	0.88%	0.77%	11%	22
Retail	1.77% ***	1.62%	32% ***	64
ALL	1.22%	1.15%	17%	237

*** indicate the mean ER within a particular fund category is significantly different from the mean ER for corporate funds at the 99% confidence level.

5.6 Expenses and Asset Size

In Table 10, we present average equal-weighted expense ratios by asset size for all 237 funds and within each fund type. For this sample of large funds, there is no significant difference in ERs across asset size categories. This is likely to be due to the small number of funds in some of the asset size/fund type categories and the fact that these funds already represent the largest 10% of funds in the industry.

TABLE 10
Equal Weighted Expense Ratios by Total Assets
Quarterly Survey Data: 1995(Q2) to 2002(Q2)

	Corporate	Industry	Public Sector	Retail	ALL
\$60m<TA<\$100m					
<i>Average ER</i>	0.98%	1.22%	n/a	1.63%	1.10%
<i>Number of Funds</i>	27	1	0	6	34
\$100m<TA<\$500m					
<i>Average ER</i>	0.88%	1.47%	1.06%	1.95%	1.24%
<i>Number of Funds</i>	68	26	6	27	127
\$500m<TA					
<i>Average ER</i>	0.78%	1.27%	0.82%	1.65%	1.24%
<i>Number of Funds</i>	13	16	16	31	76

5.7 Return, Volatility and Expenses

Rice and McEwin (2002) and Clare (2001) both argue that higher fees are often positively correlated with higher returns. Typically investments in growth assets have higher costs than investments in cash or capital-guaranteed funds. Moreover, investment managers often receive a fee dependent on the investment performance of a fund. Therefore a more expensive fund may deliver higher returns to its members.

In the earlier analysis we reported evidence of significant differences in returns and the ratio of expenses to returns across fund types. In this section we extend the analysis to examine whether returns and volatility are related to expenses. In Table 11, we report the average ROA and volatility of returns for funds classified by expense ratio. Funds are sorted into one of three expense ratio categories: High-expense (ER greater than 2%), Medium-expense (ER between 1% and 2%), and Low-expense (ER less than 1%).

There is statistically significant evidence that high-expense corporate, industry, and public sector funds (ER > 2%) have lower average returns than low expense funds, which suggests that the returns in high expense funds are not sufficient to offset the higher expenses incurred by the funds. Although there is no significant difference in returns between high-expense and low-expense retail funds, high-expense retail funds do have significantly higher volatility.

TABLE 11
ROA, Volatility and Equally-Weighted Expense Ratios
1995(Q2) to 2002(Q2)

	Corporate	Industry	Public Sector	Retail	ALL
ER < 1%					
<i>Average ROA</i>	8.59%	8.47%	8.17%	5.92%	8.19%
<i>Average Volatility</i>	7.71%	6.08%	7.18%	4.69%	7.12%
<i>Number of Funds</i>	79	10	17	15	121
1% < ER < 2%					
<i>Average ROA</i>	9.18%	7.43% *	8.08%	6.89%	7.89%
<i>Average Volatility</i>	8.95%	5.71%	6.31%	5.01%	6.61%
<i>Number of Funds</i>	28	30	4	23	85
ER > 2%					
<i>Average ROA</i>	4.85%***	5.79% **	6.42%***	4.85%	4.99%***
<i>Average Volatility</i>	8.55%	6.39%	7.16%	6.43% **	6.51%
<i>Number of Funds</i>	1	3	1	26	31

***, **, * indicate the mean ROA (or volatility) within a fund category is significantly different from the mean ROA (or volatility) for funds with expense ratios less than 1% at the 99%, 95% and 90% confidence levels respectively.

6. CONCLUSIONS

6.1 Summary of Results

This paper examines the interrelationships between three key operational features of Australian Superannuation Funds: returns, volatility of returns, and expenses over the period 1995 to 2002. We analyse differences across fund types, asset size, and time, and extend existing research in two areas. Firstly, we incorporate two large cross-sectional and time series databases of superannuation funds. The *Annual Data* includes funds of all asset sizes, while the *Quarterly Data* includes larger funds and greater reporting frequency to allow for more accuracy in the calculation of the performance measures. This overcomes small sample limitations of previous studies. Secondly, we provide a first attempt at exploring interrelationships between returns, volatility, and expenses for Australian superannuation funds.

Using the annual data, we estimate that the average superannuation fund has an average return on assets (ROA) of 6.68%, volatility of returns of 6.21%, and expenses of 1.28%. Using the quarterly data, the average large superannuation fund has an average annualised ROA of 7.66%, with volatility of 6.86%, and an average expense ratio of 1.22%.

Holding other factors constant, expenses are higher for retail funds, industry funds, and smaller funds. There is evidence of economies of scale with expense ratios decreasing as fund size increases. Moreover, expense ratios have not declined over time.

Returns are highest for corporate funds and lowest for retail funds. Retail funds dominate the low return – low volatility segment, while corporate funds dominate the high return – high volatility segment. Industry and public sector funds have medium levels of return and volatility. Larger funds also generate higher returns.

An interesting finding that may have implications for superannuation fund members, managers and policy makers is that there is evidence of a negative relationship between returns and expenses. This suggests that fund members receive little advantage from investing in superannuation funds with high expenses.

Using the Excess Return Sharpe Ratio to measure performance, we find there are many funds (particularly retail) that record returns below the ‘risk-free’ interest rate earned by treasury notes (a negative Sharpe ratio). Ignoring any other benefits that may arise from the expenses incurred, this corresponds to considerable ‘underperformance’.

6.2 Implications for Prudential Supervision

This paper is focussed on industry outcomes, but APRA supervises at the individual fund level. There are several helpful implications for APRA in this material.

As a general rule, variance from industry standards gives APRA helpful early indications of potential prudential problems. In the superannuation case, we now know that industry benchmarks should be driven by fund type as well as fund size. For larger funds, fund type is far more important than fund size. This could lead to adjustments in APRA's outlier searches. Funds generating lower (and higher) returns than average will need closer examination to determine their possible exposure to inappropriately risky or otherwise questionable investments. We note that variance from an industry benchmark is not by itself a signal of problems, but is a valid signal for APRA to look more closely at the fund in question.

Similarly, substantial variance from industry benchmarks on expenses warrants closer APRA attention. Too low an expense ratio could signal a fund devoting insufficient resources to administration and risk management (or an efficient fund, or a subsidy from a sponsor, which is common in corporate funds). Too high an expense ratio could indicate insufficient trustee attention to fund member interests (or justifiable transient costs, among other things).

At the sector level, corporate funds have the highest returns, but generate the most volatility in returns. This is consistent with APRA's supervisory experience to date. Most corporate fund prudential issues are related to poor investment performance, often tied to insufficient investment sophistication among trustees.

Conversely, retail funds exhibit potential problems with low returns and high fees. The latter indicates the potential for agency risk, ie trustees not acting appropriately in the member interest. APRA's supervisory experience indicates that the few serious prudential issues we have dealt with in retail funds are related to poor trusteeship. Low investment returns have been a lesser problem.

To improve APRA's ability to use its statistical collections to drive supervisory attention, we need better information on individual fund portfolio compositions and expense compositions. Planned improvements to APRA's superannuation collections from June 2004 will achieve this outcome.

As APRA moves towards better individual fund data, we may be able to provide more assistance to our colleagues at ASIC. Issues such as fees and expenses are indirectly important to APRA because they can provide a signal to look more closely at a fund's prudential position. The same information may be directly important to ASIC in that agency's investor protection role.

6.3 Directions for Future Research

This paper has used APRA's statistical collections to produce the first comprehensive analysis of returns, volatility, and expenses in the Australian superannuation sector. APRA's data has the advantage of comprehensive ness: unlike voluntary surveys, superannuation trustees must report a statutory data set to APRA.

For prudential supervision purposes, the data set is weak in assessing individual fund asset allocations, and individual fund expense composition. Planned improvements in data collection (scheduled for June 2004) could lead to a stronger

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data set for research by APRA and other parties, into long term performance assessments across industry sectors and at the individual fund level.

In our ongoing research program, we intend to devote more attention to the following areas:

- Cost drivers in superannuation funds, in particular costs associated with number of members and average member balances.
- Differentiating factors between accumulation and defined benefit funds in corporate superannuation.
- Further analysis of the underperformance of low volatility funds retail funds in 2002, when low volatility funds should have outperformed in a down market.

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APPENDIX 1

TABLE A1.1
Pooled Superannuation Trusts: 1996 to 2002

	ALL	TA \$1m - \$10m	TA \$10m - \$100m	TA \$100m - \$500m	TA > \$500m
Average Annual ROA	7.30%	6.83%	6.67%	7.97%	7.40%
Average Annual Volatility	7.93%	6.19%	8.20%	8.66%	6.98%
Equally Weighted Expense Ratio	0.95%	1.23%	0.90%	1.00%	0.78%
Asset Weighted Expense Ratio	0.84%	-	-	-	-
Expenses to Gross Returns	9%	-	-	-	-
Number of Funds	79	8	25	30	15

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APPENDIX 2

TABLE A2.1
Average Asset-Weighted ROA for each Fund Type

	Corporate	Industry	Public	Retail	ALL
Annual Data	8.11%	6.69%	6.09%	4.43%	6.21%
Quarterly Survey Data	9.23%	7.87%	8.07%	5.68%	7.45%

TABLE A2.2
Average ROA for each Fund Type
Annual Database of 1357 Funds: 1996 to 2002 (see Figure 1)

	Corporate	Industry	Public	Retail	ALL
1996	7.90%	6.17%	7.11%	4.93%	7.55%
1997	12.04%	11.75%	11.97%	9.08%	11.81%
1998	7.27%	6.84%	7.43%	4.65%	7.06%
1999	8.27%	5.91%	6.29%	5.34%	7.85%
2000	8.68%	8.42%	8.44%	7.27%	8.55%
2001	5.77%	4.39%	3.99%	3.78%	5.49%
2002	-1.25%	-2.75%	-3.31%	-3.47%	-1.56%

TABLE A2.3
Average asset-weighted ROA for each Fund Type
Annual Database of 1357 Funds: 1996 to 2002

	Corporate	Industry	Public	Retail	ALL
1996	10.32%	6.93%	7.26%	4.93%	7.30%
1997	13.75%	13.18%	12.64%	7.40%	11.10%
1998	9.88%	7.25%	7.41%	4.80%	7.19%
1999	11.02%	7.29%	7.34%	6.41%	8.16%
2000	11.07%	9.64%	10.41%	8.33%	9.71%
2001	5.44%	4.93%	2.40%	3.48%	4.18%
2002	-3.84%	-2.32%	-4.83%	-4.05%	-3.81%

TABLE A2.4
Average ROA for each Fund Type
Annual Database of All Funds: 1996 to 2002

	Corporate	Industry	Public	Retail	ALL
1996	7.45%	5.92%	7.17%	4.90%	7.14%
1997	11.31%	11.36%	12.07%	8.85%	11.30%
1998	6.92%	6.52%	6.84%	4.48%	6.72%
1999	7.45%	5.83%	6.21%	4.58%	7.08%
2000	8.36%	8.28%	8.34%	6.96%	8.35%
2001	5.30%	4.34%	4.07%	3.65%	5.07%
2002	-1.04%	-2.82%	-3.00%	-3.47%	-1.40%

APPENDIX 3

TABLE A3.1
Average Asset-Weighted ER for each Fund Type
Annual Database of 1357 Funds: 1996 to 2002
 (see Figure 2)

	Corporate	Industry	Public Sector	Retail	ALL
1996	0.78%	1.51%	0.65%	1.43%	1.13%
1997	0.72%	1.31%	0.45%	1.13%	0.95%
1998	0.86%	1.15%	0.53%	1.35%	1.05%
1999	0.92%	1.25%	0.51%	1.40%	1.10%
2000	0.85%	1.48%	0.49%	1.31%	1.09%
2001	0.92%	1.17%	0.73%	1.29%	1.07%
2002	1.05%	1.21%	0.71%	1.42%	1.17%

TABLE A3.2
Average Asset-Weighted ER for each Fund Type
Annual Database of All Funds: 1996 to 2002

	Corporate	Industry	Public Sector	Retail	ALL
1996	0.81%	1.07%	0.69%	0.82%	0.86%
1997	0.72%	0.92%	0.38%	1.02%	0.78%
1998	0.81%	0.94%	0.55%	1.16%	0.88%
1999	0.85%	1.16%	0.53%	1.00%	0.91%
2000	0.79%	1.32%	0.62%	1.14%	0.98%
2001	0.79%	1.16%	0.93%	1.18%	0.99%
2002	0.94%	1.16%	0.77%	1.05%	1.02%