COST, PERFORMANCE AND PORTFOLIO COMPOSITION
OF SMALL FUNDS IN AUSTRALIAN SUPERANNUATION

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ABSTRACT

Compared with large institutional superannuation funds, there is relatively little published research on small funds, which are defined in Australian legislation as funds with less than five members. Small funds account for more than 20% of total superannuation assets and they are one of the fastest growing sectors and therefore play a significant part in the savings strategy for national retirement income. This paper contributes to the needed research by analysing the more granular data collected for the subset of small funds regulated by the Australian Prudential Regulation Authority (APRA) over the last few years. The analysis provides new insights into the operating costs involved in running the funds, the investment performances and portfolio compositions of Small APRA Funds (SAF).
1. INTRODUCTION

Small funds are defined as superannuation funds which have less than five members and they are called colloquially “Do-It-Yourself” (DIY) funds. At 30 June 2005, there are about 300,000 Small Funds holding about $175 billion or 23% of all superannuation assets, second in asset size only to the Retail sector (with 32%), well ahead of Public Sector, Industry or Corporate sectors (in that order). If the trend growth rate of over 23% p.a. averaged over the last few years continues for the Small Fund sector, then the sector could hold the most assets of any sectors within the next few years. Also, within the limits set by the SIS Act, small funds have the greatest freedom of choice by members, as the investment decisions are largely directed by the members. With the freedom come potential risks which need to be identified and quantified and hence more research is needed for this sector.

In this paper, we contribute to the research on several thousand small funds regulated by the Australian Prudential Regulation Authority (APRA) by analysing the empirical data collected by APRA. The more extensive and detailed data collection of the past few years has facilitated the research into issues which would have been difficult or impossible before. This provides a rare opportunity to learn about how individuals invest and manage composite portfolios. The findings may have important commercial and regulatory implications for the superannuation industry. This is particularly pertinent when recent research in behavioural finance suggests individual investors may make irrational choices under situations of risk and uncertainty.

Using recent data we continue earlier APRA research on Small APRA Funds (SAF) by a study of some important issues which were raised in earlier work. In this paper we contribute to SAF research in the following ways.

Firstly, we provide estimates on the running cost of Small APRA Funds. The reported data on SAF expenses are probably the most accurate of all superannuation funds because there is no agent incentive to under-state or under-report expenses. It has often been asserted that small funds would have high running costs due to the lack of economies of scale. On this issue, we provide distributions of expense ratios and fund asset sizes and their statistical relationships.

Secondly, we calculate SAF investment returns from the recent data and provide an analysis of SAF investment performance. To answer the question about how small funds perform relative to professionally run institutional funds, we provide a distribution of the return on assets and compare their average returns to those of institutional funds.

Thirdly, we provide data on SAF portfolio composition, estimate average asset allocations in terms of traditional asset classes and quantify their differences to average institutional asset allocation. The analysis suggests there are some systematic portfolio differences in the portfolio composition of small funds.

Finally, we offer a possible explanation for the observed differences between small funds

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2 See APRA (2006b).
3 Most small funds have one or two members (see below). Data on the composition of individual investor portfolios are relatively scarce. Service providers such as stockbrokers, fund managers and financial planners would have partial portfolio information and they have little commercial incentive to publish or to make the data widely available.
4 See Benartzi and Thaler (1995) for one of many possible examples on this subject.
5 See Esho et al. (2004) and Coleman et al. (2006).
6 We are not implying funds deliberately under-report expenses, see a discussion below.
7 The observed differences largely confirm earlier findings for which we offer in this paper a possible explanation using more the granular data available in the last few years.
and institutional funds. We hypothesize an explanation in terms of idiosyncratic and systematic factors, associated with portfolio composition, demographics and fund operation.

In the next section, we describe the new empirical data used and the main reasons for the way the data sample is selected for this research. This is followed in Section 3 by some background statistics of the data sample. In section 4, we provide estimates of the running cost of Small APRA Funds and show their relationships to asset sizes. In section 5, the distribution of investment performances of Small APRA funds for June 2005 is shown and their annual returns are compared with those of institutional funds over the last nine years. In section 6, we study the SAF portfolio composition data and estimate their average asset allocation in terms of more familiar asset classes. We note some portfolio characteristics which are idiosyncratic to the Small Funds sector.

Given the observed differences in investment performances and portfolio compositions between SAF and non-SAF portfolios, we apply a well-known approach in section 7 to assess the degree to which the differences in investment performances can be explained by the differences in asset allocation. On finding that there are residual differences in investment performance which cannot be accounted for by asset allocation differences, we hypothesize possible explanations rising from likely differences in tax expenses due to different demographics and from likely differences in operating expenses due to variations in fund operations.

In the section 8, we summarise the empirical findings and our explanatory hypothesis for the investment performance differences between the SAF and non-SAF sectors. In the final section we briefly discuss the some potential implications for the superannuation industry.

2. DATA DESCRIPTION AND SELECTION

Small funds with member trustees called Self-Managed Superannuation Funds (SMSF) are regulated by the Australian Taxation Office (ATO), while those with external approved trustees called Small APRA Funds (SAF) are prudentially regulated by APRA. Whilst there are many more funds in the SMSF sectors than in the SAF sector, the difference in trusteeships appears less important than the common feature of Small Fund members largely directing their own investments. We will exploit the similarities to interpret some of the SAF statistics.

Through the Financial Sector (Collection of Data) Act 2001, APRA has been empowered to collect data from SAFs and other APRA-regulated superannuation funds. Since 2004, APRA has been collecting electronically more detailed SAF data on investment performance and asset allocation. These data details have not been published officially or analysed before and are therefore open to possible subsequent revisions. In this paper, we analyse the data but only draw conclusions which are robust against potential imprecision of the numbers used. Where there are any potential uncertainties, numbers are rounded to indicate the appropriate level of precision.

As more than 90% of Small APRA Funds have only one or two members, the data provide a significant sample of how individual superannuation investors have performed and how their retirement portfolios are structured. In contrast to most published research where aggregate performances are reported, the new data provides a rare and significant opportunity to report individual variations from disaggregated data. The density and the extent of the tails of cost and performance distributions provide valuable insights into the

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8 See Brinson et al. (1986, 1991) and Ibbotson and Kaplan (2000).
quantification of the risk of how many individuals may potentially have insufficient retirement income.

To obtain accurate estimates of costs and performances, we need to select a sample from the full population of over 7,000 Small APRA Funds in June 2005. The published numbers (APRA, 2006a, 2006b) include many funds which have wound up or were in the process of winding up, but which have not yet completed the formalities of ceasing to be APRA regulated entities. By law, these funds were still considered regulated and therefore must be included in statistical publications.

Many of those exiting funds have either missing data or very large cash flows, making estimates of costs and performances highly inaccurate. It is well known that large cash flows with unknown timings over a one-year period could lead to significant errors in the estimates of investment returns. Through some simulations studies where we optimize the trade-off between sample sizes against computational accuracy, we have excluded funds with absolute component cash flows greater than 8% of total assets. The numbers of Small APRA Funds which satisfy this criterion were 6,357 and 6,225 for June 2004 and June 2005 respectively, representing more than 85% of the notional populations.

3. BACKGROUND STATISTICS OF THE SAMPLE

On 30 June 2005 the aggregated total asset of the SAF sample of 6,225 funds was about $3 billion, owned by about 9,500 members, with an average total asset per member of over $300,000. This far exceeds the superannuation industry average member account balances of about $26,000. Even taking into account that there are over 27 million member accounts in the industry and therefore there are members with multiple accounts, the SAF sector has retirement savings of members who have accumulated substantially more wealth.

The vast majority (93%) of the funds has only one (57%) or two (36%) members. The frequency distribution of SAF total assets is shown in Chart 1, which appears log-normal, with the logarithm to base 10 of fund total assets having a mean 5.49 and a standard deviation 0.41.

About two thirds of our sample of funds are within one standard deviation on either side of the mode at $309,000, in the range $132,000 and $721,000. The largest total assets for some SAF portfolios in this dataset are over $10 million.

This distribution is at first surprising, since classical studies of Pareto suggest that wealth has a power-law distribution with fatter tails, whereas the observed distribution suggests strong cut-off mechanisms in operation at the high value end. The thin tail at the low value end below $100,000 can be explained by the fact, as shown empirically below, funds with low total assets suffer high expense ratios, as commonly asserted. They therefore

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10 The available research by Roberts (2002), Esho et al. (2004) and Vivian (2006) generally suggests a high degree of statistical similarity between SMSF and SAF, in terms demographics, performance and asset allocation.
11 Typically the percentage error of the rate of return itself is much less than 4% e.g. an actual 10% return would have an estimate well inside the range 9.6% to 10.4%.
12 See APRA (2006b).
13 Roberts (2002) shows similar SMSF statistics for member account balances.
14 But a D-statistic of 0.030425 for Kolmogorov-Smirnov test rejects the hypothesis. The cut-off for a significance level (alpha) of 10% is 0.03858. Chi square tests also reject the lognormal hypothesis.
seek to invest economically more efficiently through other vehicles such as public offer funds.

On the other hand, very high net worth individuals with total assets approaching $1 million and beyond appear not to employ the superannuation vehicle to substantially manage their retirement savings. Possible reasons include the existence of limits\textsuperscript{15} to the level of contributions which receive tax concessions and the greater opportunities for wealthy individuals to use other tax effective strategies.

Net Contribution Flows consist of member contributions, rollovers and insurance proceeds minus contribution tax, benefit payments and insurance costs. A fund is growing (declining) if its net contribution flow is positive (negative) and it is mature if the net contribution flow is zero.

<table>
<thead>
<tr>
<th>Net Contribution Flows</th>
<th>Fund Phase</th>
<th>2004/2005 Average (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Growing</td>
<td>34</td>
</tr>
<tr>
<td>Zero</td>
<td>Mature</td>
<td>21</td>
</tr>
<tr>
<td>Negative</td>
<td>Declining</td>
<td>45</td>
</tr>
</tbody>
</table>

For the year to June 2005, the growing funds had a total of about $208 million net contribution inflows, while the declining funds had a total of about $127 million net

\textsuperscript{15} Recent “Simpler Super” legislation could complicate the statistics with a large one-off boost for 2006 and with a more limited tax concession on contributions after 1July 2007.
contribution outflow. The total investment for growing funds was about $1.1 billion, for mature funds was about $0.4 billion and for declining funds was about $1.5 billion. About 48% of the funds were paying out benefits totalling around $164 million.

These statistics are consistent with an older demographic profile\textsuperscript{16} of Small Funds compared with the other funds, where over 50% of SMSF members are 50 or over and whereas only 20% of non-SMSF members are 50 or over. The relative high proportion of Small APRA Funds paying benefits could be related to this demographic factor. About half of SMSF members have industry classifications\textsuperscript{17} in the finance, insurance, real estate and business services sector. The average total income of SMSF members is more than double\textsuperscript{18} that of non-SMSF members.

The empirical evidence suggests small funds generally have high levels of accumulated assets by members who are more likely to be older professional workers or small business owners with greater than average familiarity and confidence with managing investments. About 30% more funds may be paying benefits.

4. RUNNING COST OF SMALL APRA FUNDS

The cost of running a superannuation fund is measured by the expense ratio which is defined as the sum of investment expenses and operating expenses divided by the average total assets over the period.

About 66% of the institutional fund assets\textsuperscript{19} are invested through other funds, where each fund could have many types of expenses from distribution, marketing, advisory fees, brokerage, manager fees, custodian fees, administration fees etc. To track all these sources down and accurately account for them would involve a non-negligible cost to the entities for which there would be negative commercial benefit resulting from reporting higher expense ratios. The current regulatory reporting standard requires entities to only supply information that is readily available (e.g. supplied by service providers). Often funds are simply reporting returns net of expenses. Hence there is a natural bias to under-report expenses.

Moreover there are as well other important ways where expenses could be under-reported by institutional funds. For example, investment performance fees by managers may be paid through incentive allocation of options or units in a fund of funds situation\textsuperscript{20}. Soft-dollar arrangements where higher transaction costs are paid via higher bid-offer spreads by broker principal dealing would contribute to an invisible expense. Many other practices such as free-switching and late-trading by managers also are potential ways which add to invisible costs of managed funds.

Compared to institutional funds, the problems of under-reporting of expenses are greatly diminished for small funds, the agent’s incentive to under-report expenses is absent and indeed, the bias might even operate in the opposite direction, where a fund would want to claim maximum tax benefits by declaring fully all expenses\textsuperscript{21}. Moreover most of SAF assets are directly invested, for example more than 50% in direct shareholdings, making

\textsuperscript{16} See Roberts (2002).
\textsuperscript{17} Fund income tax return requires funds to identify their membership industry classification (Roberts, 2002).
\textsuperscript{18} In 2002, the average total income for SMSF members is $73,000, while for non-SMSF members it is $32,000 (Roberts, 2002).
\textsuperscript{19} See APRA (2005) for the published data.
\textsuperscript{20} See Asher (2004) and Brown et al. (2004).
\textsuperscript{21} They are likely to include at least all expenses which are not possible to get higher tax deductions through the personal income tax system.
investment expenses easier to monitor. Hence the SAF data are potentially the most accurate data on investment expenses of all types of superannuation funds.

These potentially more accurate SAF data on expense ratios are shown in Chart 2, where we see quite a broad distribution of outcomes.

Chart 2: Distribution of Expense Ratios Of the SAF Sample

About 75% of total expenses are attributable to administration fees, which contribute principally to make operating expenses\(^{22}\) being more than 90% of total expenses. That is, Small APRA Funds have relatively low investment expenses. Obviously, SAF members could spend significant amounts of time in managing their investments and since this effort has not been expensed, it is not accounted for in their expense ratios. The chart shows how the expense ratio is widely distributed among the funds. The “equal weighted” or arithmetic average over individual funds is 2.6%, whereas the asset weighted average\(^{23}\) falls to 1.8%.

The significant difference between the two averages suggests an asset size effect. The arithmetic average is elevated by high expense ratios of very small size funds with less than $100,000 in total assets, as Chart 3 shows the expense ratio generally falls as fund size increases, confirming the widely held views\(^{24}\) on the benefits from the economies of scale.

The chart shows a significant statistical relationship with relatively few outliers. Most extreme outliers with high expenses occur at low asset levels. The two discernible nonlinear tails at the low assets end may be associated with different cost structures of the two main external approved trustees. The proportion of extreme outliers in expense ratios starts to decline substantially when total assets are greater than $100,000. The expense ratio approaches SAF sample averages of about 2% and further decreases as total assets increases beyond about $200,000.

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\(^{22}\) These may include some investment expenses paid by the external trustee for the fund.

\(^{23}\) These reported expense ratios are higher than recent estimates by Rice Warner Actuaries (Rice, 2007) of 0.94% for SMSF sector which does not use external trustees.

\(^{24}\) See Esho et al. (2004).
5. SAF INVESTMENT PERFORMANCE

Return on assets (ROA) is defined as net earnings divided by the average assets for the period. Net earnings is the sum of investment income (including capital gains) and other income less investment expenses, operating expenses and tax expenses on earnings.

As the following chart shows most Small APRA Funds have enjoyed strong returns in 2005, even though there was significant variability and a small number of funds had negative returns. The equal-weighted average return was 16.3%, lower than the asset-weighted return of 17.1%. This may be explained by very small funds with total assets less than $100,000 having very high expense ratios (as seen above) dragging down their own returns and the sector average return.

As may be expected the range of investment outcomes is greater for small funds than for institutional funds. The standard deviation of the ROA is about 10.5% for the above SAF sample whereas the corresponding standard deviation for non-SAF or institutional funds regulated by APRA is 8.5%.

At 17.1% ROA for the year to June 2005, the SAF sample out-performed by 6% the non-SAF sector which returned 11.1%. Obviously, there are differences within the non-SAF sector which consists of the Public Sector, Corporate, Industry and Retail sectors, with the Retail sector being “for-profit” and the other sectors being “non-profit”. There appears to be systematic performance differences between the “for-Profit” and “non-profit” sectors which may be related to agency costs of profit making firms. In this paper, we focus on individual versus institutional investor investment performance and behaviour. We therefore ignore the sector distinctions between institutional funds and called them collectively the non-SAF sector for brevity.

Including performance data from APRA research for previous years\textsuperscript{26}, the following comparison table for annual investment performances in terms of asset-weighted ROA between SAF sector and the non-SAF sector is obtained for the past nine years.

\begin{table}[h]
\centering
\caption{Return on Assets of Small APRA Funds And Other APRA Regulated Funds}
\begin{tabular}{|c|c|c|c|}
\hline
Year To June & SAF ROA (%) & Non-SAF ROA (%) & Difference ROA (%) \\
\hline
1997 & 15.25 & 11.10 & 4.15 \\
1998 & 3.17 & 7.19 & -4.02 \\
1999 & 11.28 & 8.16 & 3.12 \\
2000 & 8.87 & 9.71 & -0.84 \\
2001 & 7.64 & 4.18 & 3.46 \\
2002 & 0.86 & -3.81 & 4.67 \\
2003 & 1.94 & -1.06 & 3.00 \\
2004 & 13.10 & 11.20 & 1.90 \\
2005 & 17.10 & 11.10 & 6.00 \\
\hline
\end{tabular}
\end{table}

It is interesting to observe that the SAF sector out-performed the non-SAF sector in seven periods out of nine and that the SAF sector had no negative return periods, whereas the non-SAF sector had two years of loss. The t-statistics for the performance difference is 2.33, indicating a 95% probability that the results are not random.

The simple average ROA over the period for SAF sector at 8.80% p.a. is more than 2% higher than that for non-SAF sector\textsuperscript{27} at 6.42%. The geometric mean returns are 8.66% p.a. and 6.29% respectively and average compound out-performance is 2.2% p.a. by the SAF

\textsuperscript{26} See Coleman et al. (2003) and Esho et al. (2004).
sector over the non-SAF sector. The total return over the nine-year period was 111% for the average Small APRA Fund and 80% for the average institutional fund.

The volatility of average returns for the SAF sector at 5.90% is slightly higher than that for non-SAF sector at 5.55%. Assuming an average after tax return on Treasury bill rate of 5% for the nine year period, the Sharpe ratio for net investment performance of the SAF sector at 0.64 is higher than that of non-SAF sector at 0.26. This suggests that there are potentially systematic explanations for the investment performance differences.

6. SAF PORTFOLIO COMPOSITION

It is well-known to the reader that asset allocation is a major determinant of investment performance in explaining return levels, variability over time or variability across funds. Hence an analysis of the new asset allocation data for APRA regulated superannuation funds should provide substantial insights into possible explanations for the observed differences in the investment performances between the SAF and non-SAF sectors.

The available asset allocation data are expressed in terms of allocations to investment vehicles to the more familiar allocations to asset classes, we use an aggregation procedure where the Cash asset class represents deposits. Fixed Interest consists of loans and debt securities with individuals, unlisted corporations, unlisted private trusts and all others. Listed Equity is composed of equity securities of listed corporations and units in listed unit trusts. Unlisted Equity includes equity securities of unlisted corporations, units in unlisted private trusts and interests in ventures. Direct property consists of both incomplete and completed property. Diversified Trusts include investments in Pooled Super Trusts, unlisted retail/public offer unit trusts and Wholesale trusts. Other includes direct holdings of derivative financial instruments, investments in leased assets, insurance policies held in statutory fund of life companies and any other investments.

The following table provides the asset-weighted average asset allocations of SAFs for the financial year ending 2004 and 2005.

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Jun 2004 Allocation (%)</th>
<th>Jun 2005 Allocation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>13.9</td>
<td>13.4</td>
</tr>
<tr>
<td>Fixed Interest</td>
<td>3.2</td>
<td>3.3</td>
</tr>
<tr>
<td>Listed Equity</td>
<td>52.5</td>
<td>54.0</td>
</tr>
<tr>
<td>Unlisted Equity</td>
<td>17.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Direct Property</td>
<td>1.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Diversified Trusts</td>
<td>11.9</td>
<td>27.1</td>
</tr>
<tr>
<td>Other</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

27 Of the non-SAF sectors, the best performance was about 7% p.a. by the Corporate sector over the period.
28 See Brinson et al. (1986, 1991) and Ibbotson and Kaplan (2000).
29 See the definitions and names of the investment vehicles used in the SRF 310.0 form of APRA annual returns.
The change in asset allocation from Unlisted Equity to Diversified in June 2005 is likely to be apparent rather than real, as the definitions of those two asset classes can have overlapping interpretations and as 2004 was the first year when the new forms were used. This glitch in the data collection may be useful in suggesting that over half of Diversified assets are probably equity investments in unlisted trusts. We note that apart from this data glitch, the average portfolio composition remains relatively constant from 2004 to 2005.

The average asset allocation of SAFs does not depend significantly on whether the funds are growing or declining or whether they are paying benefits as the following table shows for June 2005.

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Growing Funds (%)</th>
<th>Mature Funds (%)</th>
<th>Declining Funds (%)</th>
<th>Funds Paying Benefits (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>16.6</td>
<td>13.9</td>
<td>10.8</td>
<td>11.4</td>
</tr>
<tr>
<td>Fixed Interest</td>
<td>3.3</td>
<td>2.8</td>
<td>3.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Listed Equity</td>
<td>53.0</td>
<td>55.5</td>
<td>54.3</td>
<td>53.6</td>
</tr>
<tr>
<td>Unlisted Equity</td>
<td>0.5</td>
<td>0.9</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Direct Property</td>
<td>1.6</td>
<td>1.5</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Diversified</td>
<td>24.7</td>
<td>24.8</td>
<td>29.5</td>
<td>29.8</td>
</tr>
<tr>
<td>Other</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

The relatively small shifts in asset allocation between different retirement portfolios suggest the most beneficiaries are likely to be in the early stages of retirement. Since in such cases the post-retirement portfolios may need to be paying benefits still for many years to come, there needs to be at most only a gradual transition to more conservative portfolios with fewer growth assets.

Defining growth assets as the sum of Listed Equity, Unlisted Equity, Direct Property and half of Diversified Trusts, then the impact of asset allocation to growth assets on investment performance as measured by ROA for the year to June 2005 can be seen in Chart 5, which shows a statistically significant relationship with relatively few outliers.

The chart evidently supports our definition of growth assets and confirms that there are obvious benefits in having high weightings in growth assets in periods of strong economic growth. It is likely the SAFs on average over an extended period have about 70% or more in equity or growth assets, which is higher than 56% to 64% as typically stated by the institutional funds’ default investment strategies.

The non-linear relationship between weighting to growth assets and portfolio performance apparent in the above chart suggests the possible existence of gearing in some portfolios, which may be achieved through such investment products as instalment warrants.

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Roberts (2002) and Vivian (2006) indicate SMSF sector has also relatively constant asset allocation, but with about 5% more cash instead of equity compared to the average SAF portfolio.
The average equity portfolio of SAF sector also appears to have a strong home country bias. Only 29 Small APRA Funds declared a total of about $4.5 million in foreign investment holdings\(^{31}\) (out of a total asset of $3 billion for the SAF sector in June 2005). The exposure to foreign investments by Small Funds is likely to be understated because it is possible to invest in foreign equities directly through listed investment companies on the Australian Stock Exchange and indirectly through diversified managed funds and to report such holdings as domestic investments. Even though the negligible foreign investment is almost certainly understated, a home country bias is still highly likely when compared with a 23% allocation to international equities stated by institutional funds for their default investment strategies\(^ {32}\).

It is possible to provide additional evidence to support hypothesis of the existence of a strong home country bias in the SAF sector, because of clearly identifiable events which drove the significant differences in Asian and US financial market performances in past decade, as we will discuss below. From an Australian investor’s point of view, any differences in portfolio performance are likely to depend mostly on differences in asset allocation between Australian and international equities, driven mainly by US equities.

We use the performances of the ASX All Ordinaries Index and the S&P 500 Index as proxies for the average performances of domestic equities and international equities. We compare the differences in Australian and US equities performances with the differences in investment performances of the SAF and non-SAF sectors to see whether there is a statistical relationship between these differences.

A minimization of the residual sums of squares of the deviations that leads to the best

\(^{31}\) The SMSF sector (Roberts, 2002; Vivian, 2006) have also negligible foreign investments recorded consistently over several years.

\(^{32}\) See APRA (2006b).
correlation between the differences if on average over the nine years to June 2005 the average SAF portfolio had about 15% more Australian equities than international equities compared to the average non-SAF portfolio. This result is consistent with the 23% allocation to international equities stated by the institutional funds for their default investment strategies (APRA, 2006b). The results are summarised in the following comparison table.

Table 5: Relative Australian/US Equity And SAF/non-SAF Investment Performance

<table>
<thead>
<tr>
<th>Year To June</th>
<th>AU/US Difference</th>
<th>SAF/non-SAF Difference</th>
<th>15% AU/US Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>-7.89</td>
<td>4.15</td>
<td>-1.19</td>
</tr>
<tr>
<td>1998</td>
<td>-23.58</td>
<td>-4.02</td>
<td>-3.56</td>
</tr>
<tr>
<td>1999</td>
<td>-8.10</td>
<td>3.12</td>
<td>-1.22</td>
</tr>
<tr>
<td>2000</td>
<td>3.55</td>
<td>-0.84</td>
<td>0.54</td>
</tr>
<tr>
<td>2001</td>
<td>24.91</td>
<td>3.46</td>
<td>3.76</td>
</tr>
<tr>
<td>2002</td>
<td>14.24</td>
<td>4.67</td>
<td>2.15</td>
</tr>
<tr>
<td>2003</td>
<td>-3.70</td>
<td>3.00</td>
<td>-0.56</td>
</tr>
<tr>
<td>2004</td>
<td>0.56</td>
<td>1.90</td>
<td>0.08</td>
</tr>
<tr>
<td>2005</td>
<td>14.74</td>
<td>6.00</td>
<td>2.23</td>
</tr>
</tbody>
</table>

Some of the more extreme differences in this table have well recognised explanations. The Asian currency crisis starting in July 1997 had led to a “flight to quality” to US assets, leading to a strong relative out-performance of US equities compared to Australian equities in the year to June 1998. The inflation of the “tech bubble” (partly associated with the Y2K anxiety) in 1999 led to stronger performance of US equities relative to Australian equities, but widespread scepticism might have kept the non-SAF sector from a full participation in the mania. The collapse of the “tech bubble” in April 2000 and the September 11 terrorist attack on New York City in 2001 led to strong relative out-performance of Australian equities in 2001 and 2002.

Finally, the year to June 2005 shows extraordinary out-performance of the SAF sector relative to non-SAF sector (6%), more than appears reasonable from the relative performances of the benchmark indices. However, from 2004, the rise in energy prices accelerated, the ASX Energy Index out-performed the All Ordinaries Index in the year to June 2005 by a factor of three at over 64% return in that financial year. Hence even a modest over weighting in the resources or energy sectors would have a dramatically positive effect on investment outcomes.

In spite of the fact that in the last two columns of Table 5 there are opposite signs in four cases out of nine, the correlation coefficient is still about 64% and an Ordinary Least Squares regression gives a slope of 0.46, due high correlations in extreme events. Hence the data suggests home country bias may be a significant explanatory variable for the differences in the average SAF and non-SAF investment performances.

In conclusion, we estimate that the average SAF portfolio has likely differences relatively to the average non-SAF portfolio of about 10% more growth assets and about 15% more domestic equities in place of international equities. These portfolio composition idiosyncrasies may be persistent over the nine-year period of analysis, as the SIS Act requires funds to generally adhere to stated investment strategies.

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33 Two-sample tests give t-statistics 1.6925 and D-statistics (Kolmogorov-Smirnov) 0.5556 attaching about 11-13% of the explanation for the ROA differences to home country bias.
7. SAF PERFORMANCE ATTRIBUTION

The average performance difference between the average SAF and non-SAF portfolio is about 2.2% p.a. compounded over the nine years to June 2005. The standard performance attribution suggests a significant role played by the idiosyncratic differences in composition of market exposure between SAF and on-SAF portfolios. On an aggregated basis over a large number of portfolios we assume “alpha” cancels out, since gains in stock selection and market timing in some portfolios are cancelled out by losses in other portfolios.

A study of benchmark indices suggests an average investment performance differential between growth and non-growth assets of about 5% over the past decade. Hence about 0.5% p.a. of out-performance of the SAF sector relative to the non-SAF sector may be attributed to about 10% more growth assets held by the SAF sector.

A similar analysis shows the home country bias of 15% more domestic equities versus international equities has benefited the SAF portfolios to produce extra returns of about 0.4% p.a. over the period. About 0.25% is due to capital gains difference and 0.15% is due to dividend imputation benefits. Of the 2.2% p.a. out-performance by the SAF sector, we conclude about 0.9% may be accounted for by strategic asset allocation. This leaves about 1.3% out-performance by the SAF sector as yet unexplained by portfolio idiosyncrasies.

Some of the remaining out-performances may be explained by systematic demographic differences between SAF and non-SAF memberships. If we assume there are 30% more funds in the SAF sector paying benefits than those in the non-SAF sector and if we assume 30% of total SAF earnings are tax-free, because of funds getting tax rebates from using annuities and allocated pension arrangements, then we estimate up to about 0.4% p.a. may be attributable to this tax advantage.

The remaining factors which may explain the relative performance differences are operating costs, since institutional funds and small funds have very different cost structures from having operations of entirely different scales and business requirements. Institutional funds may need expensive computer systems for administration, accounting and reporting requirements. They may also need to advertise or use external custodians. Many also use asset consultants, actuaries and legal services. The trend away from direct investment and towards indirect investment through fund managers also increases investment expenses. These additional costs may not be fully compensated by other savings through the economies of scale of institutional funds.

In a recent research report sponsored by the Investment and Financial Services Association (IFSA), Rice Warner Actuaries provided estimates of expense ratios for different market segments and sectors. The estimates are based on research on known expenses revealed in a variety of sources including reported expenses from APRA publications and product disclosure statements (PDS) of retail funds. It is likely that the expense estimates set lower bounds for true expenses because of the existence of invisible costs mentioned above. We assume the relative expense ratios estimated across segments are more accurate than their absolute values.

We use the estimates given by Rice (2007) and calculate an asset-weighted non-SAF expense ratio for June 2005 by averaging the ratios calculated from its 2004 and 2006 published values. The expense ratio at 1.44% is 0.5% higher than 0.94% found for the SMSF sector from a similar calculation. Hence we hypothesize that 0.5% of the SAF out-performance may be attributable to cost savings from running funds with simpler operating structures. The remaining 0.4% out-performance still not accounted for we put down

34 See Brinson et al. (1986, 1991) and Ibbotson and Kaplan (2000).
35 See Rice (2007) for estimates of expense rates or expense ratios.
provisionally to invisible and other cost savings. Apart from invisible costs e.g. arising from soft dollar arrangements and other cost shifting mechanisms, there might be costs from institutional funds providing on average more services such as insurance and financial advice.

The above decomposition of SAF out-performance is summarised in the following table.

<table>
<thead>
<tr>
<th><strong>Explanation</strong></th>
<th><strong>Factor</strong></th>
<th><strong>Return (% pa) Added</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiosyncratic</td>
<td>Higher growth assets 10%</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Home country bias 15% less foreign equities (capital gains and dividend imputation)</td>
<td>0.4</td>
</tr>
<tr>
<td>Systematic</td>
<td>Lower tax for more funds paying benefits&lt;sup&gt;36&lt;/sup&gt;</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Visible cost savings&lt;sup&gt;37&lt;/sup&gt;</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Invisible and other cost savings&lt;sup&gt;38&lt;/sup&gt;</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>All factors</td>
<td>2.2</td>
</tr>
</tbody>
</table>

The above performance attribution of the 2.2% p.a. SAF out-performance over the nine years to 2005 suggests 0.9% p.a. is due to idiosyncratic asset allocation differences, 0.4% is due to likely tax advantage from demographic differences and 0.9% is due to cost savings from running simpler operations. Included in the cost savings are possibly savings from not paying investment management fees because many SAF members may use their own experience and effort to direct their own investments.

If we accept that the expense ratio calculated from reported SAF data is the most accurate available from accounting data, then it can be used to calibrate expense ratios of other superannuation funds. The above performance attribution would suggest an average expense ratio of 2.3% to 3.1% for non-SAF portfolios, based on a 1.8% expense ratio for the SAF sector. The same line of reasoning would put the expense ratio for the average retail fund at over 3% based on the segment relativities of the Rice Warner Report<sup>39</sup>. A survey of the fees set out in publicly available product disclosure statements of retail funds would indicate that an average expense ratio over 3% is quite plausible.

8. SUMMARY

The collected data for 2005 show Small APRA Funds generally have high levels of accumulated assets (over $300,000 per member) owned by members who are more likely to be older professional workers or small business owners with greater than average familiarity and confidence with managing investments. Our sample of about 6,000 funds is similar in this respect to the more numerous funds in the SMSF sector.

We find from the 2005 SAF data that the cost of running Small APRA Funds was 1.8% p.a. on an asset weighted basis. We confirm the existence of economies of scale, where costs for asset sizes less than $100,000 were very high and decline rapidly from $100,000 to

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<sup>36</sup> Assuming 30% more Small Funds are paying benefits and obtaining tax rebates.

<sup>37</sup> See Rice (2007) for expense differentials between institutional funds and the SMSF sector.

<sup>38</sup> This is essentially a balancing item attributed to possibly known but unaccounted for costs.

<sup>39</sup> See Rice (2007). The Industry sector funds have expense ratios about 1% less than those of the Retail sector funds, making the Industry sector expense ratios closer to those of the SAF sector.
$200,000, at which point the expense ratio approach average SAF values and continues to
decrease for higher asset values.

Averaged over the nine years to June 2005, Small APRA Funds perform 2.2% p.a. better than institutional funds, on an asset weighted basis, though the spread in investment outcomes between portfolios are larger for SAF than for non-SAF portfolios. The asset allocation data suggest the existence of a home country bias in fund portfolios with 15% less foreign equities than institutional funds and the portfolios also have on average 10% more growth assets.

Both the home country bias and higher allocation to growth assets have advantaged the SAF sector and we estimate that this results in 0.9% p.a. out-performance over the period. We hypothesize that systematic factors coming from tax advantage of having more SAF fund paying benefits may account for up to 0.4% p.a. of the out-performance. We suggest the remaining 0.9% p.a. performance differential comes from savings on operating cost and other invisible costs not born by small funds. Whilst we have not analysed in detail SMSF expense ratio, performance and portfolio composition, we believe the sources of savings on operating cost are likely to be similarly applicable.

Assuming the average expense ratio for the SAF sector estimated from reported data is unusually accurate and assuming the performance attribution does indicate cost savings from simpler management of SAF portfolios, then our study suggests expense ratios for non-SAF portfolios are higher than current estimates from simply summing up known expenses.

9. DISCUSSION

Our research has contributed to the understanding of a number of topical issues in the superannuation industry relating to running cost of funds, investment performance and portfolio composition. There are some potential implications for the superannuation industry.

The past several years have seen keen competition in the superannuation industry based on costs between public offer funds. If merit is based on cost alone, small funds have a cost advantage, from the results of this paper, only if they have $200,000 or more in assets. While younger workers have little choice but accept or select an institutional fund, older and financially savvy workers who have accumulated sufficient assets appear to be taking the “Do-It-Yourself” route, judging by the rapid growth of the Small Funds sector in recent years.

The hypothesis that the larger than expected equity premium found in historical data might be due to myopic loss aversion by investors, appears to apply less to individual investors than to institutional investors, as our data show the SAF portfolios have higher growth assets and hence higher market risk than non-SAF portfolios.

The past decade has seen the home country bias worked to the advantage of the SAF sector relative to the non-SAF sector. However, this advantage may not be sustainable in

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40 This out-performance is even more marked over a five-year period to 2005 with the small funds performing well ahead other institutional sectors.
41 This is consistent with the estimates of Rice Warner Actuaries (Rice, 2007).
42 See Rice (2007).
43 See ASIC (2005).
44 There is a slight suggestion from the empirical data that among the non-profit funds, public offer funds cost more to run than non public offer funds.
the long-term. There are both financial and economic reasons to have adequate exposure to foreign investments. Finance theory shows the existence of portfolio benefits from international diversification, particularly for small economies such as Australia, which has less than 2% of global economic production.

Studies have shown uninformed individuals following a simple diversification strategy could do as well as most superannuation funds. These studies confirm empirically the compelling argument that for investors in aggregate they can only get market returns and hence a key strategy for a large portfolio is to have adequate market exposure at the lowest cost. Indeed this appears to be supported by the fact that the estimated expense ratios seem to be inversely correlated to investment performance.

The operational risks faced by SAF and non-SAF sectors are qualitatively different. The operational risks of institutional funds arise mainly from those associated with the “principal and agent” problem and regulatory efforts recognising those risks have led to the licensing of superannuation trustees of all non-SAF funds in 2006.

Given their simpler structures, risks such as poor corporate governance, poor disclosure, related party dealings, fraud etc. which may apply to non-SAF sectors, are less relevant for the SAF sector, though other risks remain. There are funds with abnormally high contributions and withdrawals relative to their total assets which appear unusual from the data, which may have legitimate or illegitimate reasons. Illegitimate reasons may include some forms of money laundering, tax avoidance, improper or early access of superannuation funds (to purchase or consume goods and services). There have been calls to consider more regulation for the Small Funds sector, particularly for the SMSF sector. We note that any regulation should not erode the low cost and simplicity apparently enjoyed by this part of the industry.

In this study, the available evidence from our research suggests Small Fund sector assets are on average no less efficiently managed than institutional funds. Indeed by fund members’ own efforts, which have not been separately accounted for, a small fund can save about 1% p.a. on average by having lower operating expenses than institutional funds, provided it has a sufficient asset size.

Individual freedom in investing by small funds also produces a substantially wider range of outcomes in terms of financial results, leading to increased risk that those at the lower end of the outcome range may have insufficient savings for their retirement. The social concern of having an acceptably narrow range of outcomes to provide a secure foundation for national retirement income has been highlighted in other studies. The challenge to the investment industry is to create more low cost products providing market exposure, particularly to international equities, to help small fund investors.

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47 See e.g. Bateman and Thorp (2005).
49 The portfolio of national savings is clearly a large portfolio. Even the Future Fund’s chairman has publicly stated (see Barrett, 2007) that he seeks low cost exposure to “cheap beta” of the market through index funds.
50 See Rice (2007).
51 See Coleman et al. (2003) and APRA (2006c).
53 See Venkatramani (2004).
55 There is evidence (Rice, 2007; Coleman et al., 2003) that non-profit funds have lower expense ratios and perform significantly better than for-profit funds.
56 See Burtless (2003).
REFERENCES


