Are Australian Investors Smart?

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Abstract

This paper examines the smart money effect on Australian superannuation funds. Specifically, we investigate whether Australian investors make smart choices in selecting funds. We build on previous research which shows that sophisticated investors have the ability to invest in funds that subsequently perform well. Our findings deviate from the existing literature in that we fail to uncover supporting evidence for a smart money effect in the Australian superannuation fund industry. However, we do find some evidence of investors who are able to identify funds whose future performance will be poor and who disinvest accordingly. Our findings have serious policy implications, as we show that investors generally are not able to recognise high performing superannuation funds.

JEL Classification: G10, G11 and G15

Keywords: Smart money effect; Fund performance; Momentum; Australian superannuation funds

1. Introduction

The ability of investors to select funds whose future performance is superior has been termed the smart money effect. This paper examines the smart money effect on Australian superannuation funds.[1] Specifically, we investigate whether Australian investors make smart choices in selecting funds. Although numerous papers have studied the performance of fund managers,[2] few have investigated the ability of investors to select funds. In a landmark paper, Gruber (1996) documents that sophisticated investors show an ability to invest in funds that subsequently perform well. He also finds that funds with net cash inflow display above-average performance. Similar results are reported by Zheng (1999), who shows that funds with net cash inflows outperform funds with net cash outflows. Interestingly, Zheng (1999) finds that the strategy of betting on winners only applies for small funds and thus concludes that fund size plays an important role in the smart money effect.

In an important paper, Sapp and Tiwari (2004) assess whether the smart money effect of Gruber (1996) and Zheng (1999) can be explained by the momentum factor of Carhart (1997).[3] To test their conjecture, they analysed the smart money effect using the Fama-French (1993) three-factor model and the Carhart (1997) four-factor model. Sapp and Tiwari (2004) document that the smart money effect reported in Gruber (1996) and Zheng (1999) disappears when the Carhart model (1997) is used to assess performance. In a more recent paper, Sapp and Tiwari (2006) show that when fund performance is assessed using the Fama and French (1993) model, there is some evidence of a smart money effect but that this effect disappears after controlling for return momentum. This finding clearly shows that investors are not 'smart', as they do not possess selection ability. They also report that investors tended to chase funds that were recent winners rather than selecting funds based on a momentum style. Another possible explanation is the "weight of money effect", which can be explained as follows. Fund managers tend to use the monies received from new investors to increase the holdings of stocks which are already held in the

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[1] Superannuation is a pension scheme in Australia, which is similar to 401(k) in the US.

[2] Jensen (1968, 1969), Ippolito (1989), Elton et al. (1993, 1996), Elton and Gruber (1999), Grinblatt and Titman (1989, 1992, 1993), Hendricks, Patel and Zeckhauser (1993), Brown and Goetzmann (1995), Grinblatt, Titman and Wermers (1995), Malkiel (1995), Gruber (1996) and Carhart (1997).

[3] Stock return momentum is best described as short-term persistence in stock returns. It was first documented by Jegadeesh and Titman (1993).

portfolio. As a result, this action puts upward pressure on the share price of the stocks within the fund manager's portfolio which translates to an improvement in the fund's performance (the reverse is true with large withdrawals). It is not hard to imagine that this effect is more severe with smaller size funds and/or funds that hold less liquid stocks.[4] Currently, little research has been published outside the United States on the existence of the smart money effect. For instance, Sawicki and Finn (2002) and Gharghori, Mudumba and Veeraraghavan (henceforth GMV) (2007) are the only papers that have examined the smart money effect in Australia.[5] Although both papers confirm the existence of the smart money effect, GMV (2007) contends that the smart money effect cannot be explained by return momentum.

There are a number of factors underlying this study. First, superannuation plays a pivotal role in the Australian retirement scheme. In 1992, the Australian Government introduced a compulsory superannuation system to address concerns about Australia's ageing population. This scheme was mandated by law under the Superannuation Industry Act 1993. Since its introduction, the government has raised the compulsory superannuation contribution to 9 percent, and provides various tax incentives for voluntary contributions to the superannuation scheme. The superannuation funds industry has grown from A$120 billion to almost A$750 billion and has become the major component of the Australian managed funds industry. In a recent speech, Kevin Rudd (2006) stated that superannuation is the key factor underlying the success of Australia's funds management industry and it is the main reason why Australia has the largest funds management industry in Asia and the fourth largest in the world. More recently, the government introduced 'super choice legislation', which allows employees to (a) change funds when their current fund is not available with a new employer; (b) consolidate superannuation accounts to cut costs; (c) change to a lower-fee fund; and, (d) change to a better performing fund. These legislative changes make it even more important to address the issue of the smart money effect in superannuation funds.

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[4] We thank an anonymous referee for suggesting this argument.

[5] Sawicki and Finn (2002) employed a cross-sectional regression framework to examine the smart money effect. A limitation of this study is that it does not employ performance models in its analysis. GMV (2007) tested the smart money effect on Australian equity funds. As yet, no one has examined smart money in the context of superannuation funds.

The second major motivation is that there is no published research on the existence of the smart money effect in the Australian superannuation industry. Typically, research on Australian superannuation funds has focused on performance (see, for instance, Coleman, Esho and Wong (2003), and Drew, Stanford and Veeraraghavan (2002)), or policy and/or structure (e.g., Langford, Faff and Marisetty (2006); Rice and McEwin (2002); Clare (2001)). As yet, no study has evaluated performance from the investor's perspective. This paper is the first to examine whether Australian investors make smart choices in selecting superannuation funds. Our objectives are two-fold. First, we attempt to identify whether a smart money effect exists in the Australian superannuation funds industry. Second, we examine whether momentum can explain any observed smart money effect.

Our findings can be summarised as follows. First, we do not find any evidence of a smart money effect in the Australian superannuation fund industry. However, we do find that investors are able to identify funds whose future performance is poor and they disinvest accordingly. Second, fund size analysis indicates that there is no indication of a smart money effect in either the small or large fund portfolios. Third, we find that investors tend to direct their money to smaller funds whose subsequent performance tends to be poor. Our findings have serious policy implications; we show that investors are not smart enough to choose high performing superannuation funds.

This paper proceeds as follows. Section 2 presents a discussion on the Australian superannuation fund industry. Section 3 discusses data and methodology. Section 4 reports empirical findings, and Section 5 concludes.

2. The Australian Superannuation Fund Industry

The Australian investment management industry is a trillion dollar industry.[6] The most important factor that has contributed to the substantial growth of this industry is superannuation. In fact, superannuation funds dominate the Australian managed funds industry (see Figure 1) and account for more than 50 percent of the value of this industry.[7] Thus, it is not surprising that Australia had the 'second highest growth

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[6] The total assets under management are AUD1.29 trillion as of September 2006.

[7] If superannuation funds that are held in life offices are included, the figure would jump to over 70%.

rate in superannuation funds of all OECD countries during the 1990s' (Axiss Australia, 2004).

[Insert Figure1 about here]

Superannuation funds are regulated by the Australian Prudential Regulatory Authority (APRA) and the Australian Securities and Investment Commission (ASIC). In 1992, the Australian government introduced the Superannuation Guarantee Charge (SGC), with a minimum level set at 3 percent. The SGC has been increasing gradually and in July 2002, the government increased it to 9 percent. The arrangement is that an employer will contribute to each employee's superannuation fund, which in turn invests this money in order to earn a level of return that will be sufficient to finance retirement. Income contributed to superannuation funds is taxed at a lower rate relative to the personal income tax rate. Since the introduction of the SGC scheme, funds under management have grown from A$120 billion to almost A$750 billion. The growth rate of the industry has been noteworthy; funds under management have grown by over 15 percent per annum over the past 13 years (see Table 1). Further, the move to compulsory superannuation has resulted in a 50 percent increase in the superannuation coverage of the workforce (Axiss Australia, 2004).[8]

[Insert Table 1 about here]

Table 2 shows that almost half the assets in Australian superannuation funds are invested in equities and units in trust. This is the largest allocation of superannuation fund assets to any single asset class. The second largest asset class is overseas assets (22.4 percent). This is followed by interest bearing securities (12 percent) and cash and deposits (9.9 percent). Table 2 clearly shows that the percentage of superannuation funds allocated to equities has increased since 1995. Given the significant growth in the funds management industry and the shift in asset allocations from fixed income to equities, it is important to investigate whether Australian investors make smart choices in selecting funds.

[Insert Table 2 about here]

[8] In the mid-1980s, around 40% of the workforce was covered by superannuation. This figure has risen to over 90 per cent in recent years (Axiss Australia, 2004).

There are at least two major differences between the superannuation system in Australia and the pension scheme in the US (401(k)). First, superannuation is compulsory whilst 401(k) is voluntary. Second, the minimum level of contribution is set by the government and superannuation contributions are made by the employer. In contrast, US employees can choose the proportion of their salary directed to their 401(k) accounts. In some instances, employers will match the employee contribution to his/her 401(k) account. Third, most US employees can select how their 401(k) money is invested while Australian employees rely on their employer to invest their superannuation funds.[9] However, the introduction of 'super choice legislation' in July 2005 enables Australian employees to have control over how their superannuation funds are invested. In short, this legislation allows eligible employees to choose their own superannuation fund.

3. Data and Methods

3.1 Data

We obtain the superannuation fund data from the Morningstar Total Access Database Version 4.1. The Total Access Database categorises funds into sectors based on their investment profiles. We choose the 'Super Funds Australian Equity' sector, which comprises 943 superannuation funds[10]. We apply several filters to our original sample of 943 funds. These filters reduce our sample to 510 funds,[11,12] spanning the period January 1990 to October 2005. Our sample is free of survivorship bias since the total access database contains data on finalised funds. To further reduce the effect of survivorship bias, we adopt Gruber's (1996) 'follow the

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[9] In most cases, employees are restricted to invest in employer nominated superannuation funds. Many funds allow employees to choose their investment strategy (e.g. balance or growth) within the fund.

[10] Table 3 details the maximum, minimum and average number of superannuation funds in each year of the sample period.

[11] Specifically, 231 funds were removed because they did not invest at least 70% of assets in domestic equities, and 202 funds were removed because they did not have a minimum of 24 monthly returns over the sample period. This resulted in a final sample of 510 funds.

[12] GMV's (2007) sample consisted of 239 managed funds. The sample in the current study is more than twice as large as the GMV (2007) sample.

money approach'.[13] We then collect the following variables for each fund in our sample. First, fund returns are calculated as monthly compounding returns using end of month index values.[14] Second, total net assets (TNA) are collected at monthly intervals to measure funds under management. Third, management expense ratios (MER), and entry and exit fees are obtained in percent-per-annum terms.

Monthly stock returns, market capitalisation, market index returns and returns on the risk-free rate are obtained from the AGSM database. We obtain accounting data from Aspect Financial. Monthly stock returns and accounting data are used to construct the Fama-French factors and the momentum factor. We use the value-weighted market index and the monthly return on the 13-week Treasury note as proxies for the market return and the risk-free return, respectively. We follow the Fama and French (1993) approach to construct the mimicking portfolios for size and book-to-market and Carhart (1997) for the mimicking portfolio on momentum.

We use standard performance measures (Jensen 1968), multifactor measures (Fama and French (1993) three-factor model and Carhart (1997) four-factor model), and conditional performance measures to assess fund performance. As in Ferson and Schadt (1996), we use conditional performance measures to ensure that any observed abnormal performance is not due to investors exploiting publicly available information to earn abnormal returns. We follow two Australian studies (Sawicki and Ong (2000) and Holmes and Faff (2004)) in selecting our set of public information variables. We obtain this data from Datastream and the RBA website. The conditioning variables we employ are defined as follows:

1. 13-week Treasury note yield (TBY_{t-1}):
   TBY_{t-1} is the monthly yield on the 13-week Treasury note.
2. Dividend yield on the All Ordinaries Accumulation Index (DY_{t-1}):
   DY_{t-1} is defined as the average market dividend yield for the past 12 months.
3. Term structure of interest rates (TS_{t-1}):

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[13] The assumption under the 'follow the money' approach is that the investor places his or her wealth in the surviving fund. If a fund merges with another it is assumed that the investor places his or her wealth in the continuing fund.

[14] Please note that the fund return data in our sample is pre-tax. We acknowledge that the findings of our analysis may change if post-tax returns were used. Post-tax returns are not available from Morningstar. We thank an anonymous referee for highlighting this point.

TS_{t-1} is defined as the annual yield on the 10-year Treasury bond yield less the annual yield on the 3-month Treasury bill.

4. Dummy variable for the month of July (D_{Jul}):

   D_{Jul} equals 1 if the month is July and 0 otherwise.

In addition, we construct the following variables that serve as inputs to the performance models and for sorting funds by net cash flow (the raw data are obtained from the Total Access database):

1. Quarterly fund returns are calculated as follows:

$$r_{i,q_t} = [(1+r_{i,m_t}) \text{ x } (1+r_{i,m_{t-1}}) \text{ x } (1+r_{i,m_{t-2}})]-1, \quad (1)$$

   where $r_{i,qt}$ is the return of fund i in quarter t and $r_{i,mt}$ is the return of fund i in month t.

2. Quarterly total net assets (TNA) is calculated as follows:

$$TNA_{i,q_t} = (TNA_{i,m_t} + TNA_{i,m_{t-1}} + TNA_{i,m_{t-2}})/3, \quad (2)$$

   where $TNA_{i,qt}$ is the TNA of fund i in quarter t and $TNA_{i,mt}$ is the TNA of fund i in month t.

3. Net cash flow (NCF) is calculated as follows:

$$NCF_{i,t} = TNA_{i,t} - TNA_{i,t-1} * (1+r_{i,t}), \quad (3)$$

   where $TNA_{i,t}$ is the TNA of fund i at the end of quarter t, $TNA_{i,t-1}$ is the TNA of fund i at the end of quarter t−1, and $r_{i,t}$ is the return on fund i for quarter t.

4. Normalised net cash flow (NNCF) is calculated as follows:

$$NNCF_{i,t} = NCF_{i,t} \big/ TNA_{i,t-1}, \quad (4)$$

   where $NCF_{i,t}$ is the net cash flow for quarter t, and $TNA_{i,t-1}$ is the TNA for fund i at the end of quarter t−1.

3.2 Summary Statistics

Descriptive statistics on fund characteristics are presented in Table 4. The table shows that funds in our sample have an average (median) size of A$20.80 (20.03) million. The average quarterly net cash flow into funds is $A0.83 million and the average quarterly normalised net cash flow is 27 percent of fund assets. The management expense ratio (MER) is 1.69 percent per annum and on average, funds charge higher entry fees (3 percent per annum) relative to exit fees (0.40 percent per annum).

[Insert Table 4 about here]

Descriptive statistics for the equal-weighted positive and negative cash flow portfolios, and cash flow–weighted positive and negative cash flow portfolios are presented in Table 5. These portfolios are aggregated as follows. At the beginning of each quarter, funds are split into positive and negative categories based on net cash flows during the previous quarter. We then calculate the returns on these portfolios using equal and cash flow weighting. The results for all funds, small and large, are reported in panels A, B and C of Table 5, respectively.[15]

[Insert Table 5 about here]

In panel A, results for equal weighting show that the average excess return of the negative cash flow portfolio exceeds the positive cash flow portfolio by 0.14 percent.[16] This result challenges the existence of a smart money effect in Australian superannuation funds. In contrast, findings for cash flow weighting suggest that the average and median excess returns of the positive net cash flow portfolio are higher than that of the negative cash flow portfolio. However, if investors are truly smart, the returns on the cash flow–weighted positive portfolio should be higher than the returns on the corresponding equal-weighted portfolio. In fact, the opposite is observed. This is further evidence against a smart money effect. Conversely, for the negative cash flow portfolios, the lower return on the cash flow–weighted portfolio compared with the equal-weighted portfolio is consistent with the smart money effect. The equal-weighted portfolio returns reported in panels B and C of Table 5 for small and large funds, respectively, are broadly consistent with those for all funds. Specifically, the equal-weighted negative cash flow portfolio outperforms the positive cash flow portfolio for both subsamples. Thus, it is unlikely that this anomalous finding is driven by fund size. The notable difference between the full and subsample analysis is that for the cash flow–weighted portfolios, the negative cash flow portfolio outperforms the positive cash flow portfolio for both small and large funds. Further, the average return of the positive cash flow portfolio is negative for small funds (−0.96 percent). These

[15] The small (large) group consists of funds with TNA below (above) the median TNA.

[16] However, the median return on the equal-weighted positive cash flow portfolio is slightly larger than for the negative cash flow portfolio (0.02%).

findings are also inconsistent with a smart money effect. Nevertheless, although the findings of the portfolio return analysis suggest that it is unlikely that a smart money effect will be observed, our inferences in this regard will be driven primarily by the results of the performance tests.

It is important to note that terminated funds are included in the sample so our data is survivorship bias free. 128 of the 510 superannuation funds in our sample (25%) either terminate or cease to exist under the same fund name (that is, they might have merged with other funds) over the period 1990 to 2005. We report the summary statistics of terminated funds in Table 6. The table reports the summary statistics for the entire period and also in 5-year intervals. It is not surprising to see that the funds that ceased to exist, on average, under perform relative to the market (excess mean monthly return is -1.39%). The majority of the terminations/mergers (104 funds) occur during the 2000-2005 period.[17]

[Insert Table 6 about here]

3.3 Measures of Performance

3.3.1 Unconditional Performance Evaluation

Our first research question investigates whether the smart money effect exists in the Australian superannuation funds industry. We then explore whether momentum can explain the smart money effect. We employ three unconditional performance evaluation models to test whether a smart money effect exists. We start with the Jensen model (1968) and then use the three-factor model of Fama and French (1993) and the four-factor model of Carhart (1997). The Jensen model is shown as follows:

$$r_{p,t} = \alpha_p + \beta_p RMRF_t + e_{p,t} \quad (5)$$

The Fama-French three-factor model is represented as follows:

$$r_{p,t} = \alpha_p + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + e_{p,t} \quad (6)$$

The four-factor model of Carhart (1997) is shown as follows:

$$r_{p,t} = \alpha_p + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + \beta_{4,p} UMD_t + e_{p,t} \quad (7)$$

[17] The fact that the rate of underperformance during the 2000-2005 period is the lowest relative to the other 5-year periods can be viewed as supportive evidence for this conjecture.

where $r_{p,t}$ is the excess return on fund portfolio p, $RMRF_t$ is the excess return on the market, SMB_t is the return on the zero cost portfolio for size, HML_t is the return on the zero cost portfolio for book-to-market, and UMD_t is the return on the zero cost portfolio for momentum. Following Sapp and Tiwari (2004), we use equal and cash flow–weighted portfolios to measure returns. We evaluate portfolio performance by analysing the intercept (alpha) from the three models described above. The null hypothesis is that the alpha is zero. If the regression alpha is zero, this indicates that the model explains the returns on the fund portfolio and that there is no abnormal performance. Thus if the null hypothesis is rejected, this means that a smart money effect exists. In short, the intercept from the regressions will be used to assess the presence of a smart money effect.

3.3.2 Conditional Performance Evaluation

This section describes the conditional performance measures employed to assess fund performance. We use conditional measures such as Ferson and Schadt (1996) to show that conditioning on public information controls for biases in traditional market timing models. The conditional Jensen model is represented as follows:

$$r_{p,t} = \alpha_p^c + \beta_{1,p} RMRF_t + \delta_{1,p}\left(z_{t-1} * RMRF_t\right) + \varepsilon_{p,t} \quad (8)$$

The conditional Fama-French model can be shown as follows:

$$\begin{aligned} r_{p,t} = {} & \alpha_p^c + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + \delta_{1,p}\left(z_{t-1} * RMRF_t\right) \\ & + \delta_{2,p}\left(z_{t-1} * SMB_t\right) + \delta_{3,p}\left(z_{t-1} * HML_t\right) + \varepsilon_{p,t} \end{aligned} \quad (9)$$

Finally, the conditional Carhart model is as follows:

$$\begin{aligned} r_{p,t} = {} & \alpha_p^c + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + \beta_{4,p} UMD_t + \delta_{1,p}\left(z_{t-1} * RMRF_t\right) \\ & + \delta_{2,p}\left(z_{t-1} * SMB_t\right) + \delta_{3,p}\left(z_{t-1} * HML_t\right) + \delta_{4,p}\left(z_{t-1} * UMD_t\right) + \varepsilon_{p,t} \end{aligned} \quad (10)$$

where z_{t-1} represents the vector of pre-determined information variables.

In accordance with Sawicki and Ong (2000) and Holmes and Faff (2004), the vector z_{t-1} consists of the four variables described in Section 3.1.

Thus, $z_{t-1} = \left[TBY_{t-1}, DY_{t-1}, TS_{t-1}, D_{Jul}\right]$.

3.3.3 Analysis of Fund Size

Zheng (1999) and Sawicki and Finn (2002) document that the smart money effect is stronger in small funds. In contrast, GMV (2007) find that fund size has no influence on the smart money effect. Given the mixed and inconclusive evidence, we investigate the relationship between fund size and the smart money effect. As in GMV (2007), we separate our sample into groups based on the median TNA. The small (large) group consist of funds with TNA below (above) the median TNA. We then apply performance measurement models to the portfolios formed on fund size to assess whether fund size has any influence on performance.

3.4 Determinants of Funds Flows

In addition to performance tests, Sapp and Tiwari (2004) also analysed whether certain variables are significant in explaining fund flows. Variables that have been investigated in this context are recent past performance, fund size, turnover, MERs, and entry and exit fees. Given that these factors are public information, it can be argued that they influence investor fund flows. Motivated by evidence that the smart money effect can be explained by stock return momentum, Sapp and Tiwari (2004) investigated whether a fund's momentum factor loading could influence fund flows. Their argument was that the smart money effect might be driven by investment in funds that employ momentum trading strategies. To test for this, they first estimated momentum loadings for individual funds and then included these loadings in their cross-sectional regressions. As a result, they found evidence supporting their hypothesis.

Building on this work GMV (2007) included momentum factor loadings for individual funds as an explanatory variable in their analysis, yielding contradictory findings. We perform a similar analysis to determine whether any observed smart money effect is influenced by momentum in the Australian superannuation industry. Similarly to Sapp and Tiwari (2004) and GMV (2007), we employ a cross-sectional regression framework to assess which variables influence fund flows. The model can be expressed as

$$NNCF_{i,t} = \left\{R_{i,t-1}, UMD_{i,t}, \ln(TNA)_{i,t-1}, NNCF_{i,t-1}, MER_{i,t}, ENTRY_{i,t}, EXIT_{i,t}\right\} \quad (11)$$

where $NNCF_{i,t}$ is the normalised net cash flow of fund i in quarter t, $R_{i,t-1}$ is the return on fund i in the previous quarter, $UMD_{i,t}$ is the momentum factor loading for fund i in quarter t, $\ln(TNA)_{i,t-1}$ is the logarithm of previous quarter's total net assets, $NNCF_{i,t-1}$ is the previous quarter's net cash flow for fund i, $MER_{i,t}$ is the expense ratio for fund i in quarter t, $ENTRY_{i,t}$ is the entry fee charged by fund i in month t, and

$EXIT_{i,t}$ is the exit fee charged by fund i in month t. The model represented by equation 11 is estimated each quarter. The time series averages and standard errors of the quarterly regression coefficients are used to infer the significance of the variables.

4. Results

4.1 Unconditional Performance Evaluation

In order to examine the existence of the smart money effect, three unconditional performance models are employed — the Jensen (1968) model, the Fama and French (1993) model, and the Carhart (1997) model. These models are estimated using monthly portfolio returns. We are particularly interested in analysing estimated alphas from the above mentioned models. The results are presented in Table 7, where panel A (B) displays results for equal (cash flow)–weighted portfolios.

[Insert Table 7 about here]

In Table 7, panel A, we report findings for new-money portfolios formed using equal-weighting. Our findings show no support for a smart money effect in the positive cash flow portfolio, as the alpha is insignificant for all three performance models. For the negative cash flow portfolio, the alphas are positive and significant at the 10 percent level. These findings indicate that Australian investors do not possess the ability to select funds whose future performance is superior. The consistency in alphas across the three models and the insignificant loadings on the size, book-to-market and momentum factors indicate that these factors are not useful in explaining fund returns. The results of cash flow–weighted portfolios are presented in panel B. Under this approach, higher weight is assigned to funds that experience larger cash flows. Our findings show that the Jensen alpha for the positive cash flow portfolio is negative and significant, which is inconsistent with the smart money effect. Although the multifactor (Fama-French and Carhart) alphas are negative for the positive cash flow portfolio, they are not statistically significant. The strongest evidence of a smart money effect is observed in the negative cash flow portfolio. We find that for all three performance models, the alphas are negative and highly significant. This finding suggests that funds that have the largest cash outflows are the funds whose subsequent performance is worst.

4.2 Conditional Performance Evaluation

Conditional models are used to filter out superior performance that can be replicated using widely available public information variables. Table 8 reports the performance of new-money portfolios using conditional measures. Our findings (Panel A) show no evidence of a smart money effect, as the alphas are insignificant. Further, the conditional performance models explain the mild abnormal performance of the equal-weighted negative cash flow portfolio reported in Table 7. The findings from the conditional evaluation on the cash flow–weighted portfolio (panel B) are very similar to those reported in Table 7. Specifically, the Jensen alpha for the positive cash flow portfolio is negative and significant, but the Fama-French and Carhart alphas, although negative, are not significant. Once again the strongest evidence of smart money is observed in the cash flow–weighted negative cash flow portfolio—the alphas are negative and statistically significant.

[Insert Table 8 about here]

The results from both the conditional and unconditional performance analyses yield little evidence of a smart money effect in the Australian superannuation industry. One plausible reason for this is the inability of Australian employees to choose where their superannuation funds were invested prior to July 2005. Prior to July 2005, employees' superannuation contributions were made by their employer into his/her nominated superannuation fund.[18]

4.3 Analysis of Fund Size

In order to determine whether fund size plays any role in the smart money effect, we partitioned our sample into small and large funds. Then, we estimated the unconditional and conditional models[19] using data from each subsample. The results of the unconditional measures are reported in Table 9. Overall, there is no indication of a smart money effect for either the small or large fund portfolios. Further, it is evident that the negative alphas observed for the cash flow–weighted positive cash

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[18] We thank an anonymous referee for pointing out this issue.

[19] The conditional models suggest considerable robustness and are not reported here in order to conserve space. The results are available on request from the authors.

flow portfolio in Table 7 are largely attributable to small funds. This is not surprising, as the average return on the relevant small fund portfolio was −0.96 percent (Table 5). The most striking difference between the subsample and the full sample analysis is that the alphas on the cash flow–weighted negative cash flow portfolio, although negative, are not significant. Thus, we down-weight our inference of a smart money effect in the cash flow–weighted negative cash flow portfolio.

[Insert Table 9 about here]

4.4 Determinants of Funds Flows

To determine the factors that could potentially drive cash flow in (out) to (from) superannuation funds, we perform a cross-sectional regression analysis using the variables described in Section 3.4. The results are presented in Table 10, which reports the time-series average of the estimated coefficients from 63 quarterly cross-sectional regressions.

[Insert Table 10 about here]

Our findings indicate that fund size and prior fund flows are the strongest determinants of fund flows. Models C through F indicate that there is a negative relationship between fund size and fund flow. Models D through F suggest that fund flows are persistent, as evidenced by the significant positive coefficients on NNCF in the prior quarter. The insignificant coefficients on the momentum factor loadings suggest that investors are not targeting funds that employ momentum trading strategies. Further, in most cases the expense variables are insignificant,[20] indicating that expenses are not a determinant of fund flows. It is interesting to note that the coefficients on prior quarter returns are almost all insignificant.[21] This suggests that investors are not (dis)investing in funds that have performed well (poorly) in the past.

[20] The coefficient on MER is significant in Model E but becomes insignificant when entry and exit fees are included in Model F.

[21] For Model B, the coefficient for prior quarter returns is significant at the 10% level.

In summary, our findings indicate that investors in superannuation funds are not smart, as they tend not to invest in funds that subsequently perform well nor do they invest in funds whose prior performance has been good.

In addition, the negative relationship between fund size and flows (Table 10) and the significant negative coefficients on the cash flow–weighted positive cash flow portfolio for small funds (Table 9) suggest that investors are directing their money to smaller funds whose subsequent performance tends to be poor. Furthermore, our finding regarding the persistency of fund flows is consistent with Fry, Heaney and McKeown (2007) who document that Australians tend to stay with their current fund even though they have the ability to switch to other funds. This could be one of the reasons for our failure to document the existence of a smart money effect in the Australian superannuation industry.

5. Conclusion

This study investigates the ability of Australian investors to successfully select 'winning' superannuation funds for their retirement fund investments. Prior studies (Gruber (1996), Zheng (1999) and GMV (2007)) suggest that investors do have the ability to select managed funds that subsequently perform well (i.e., that a smart money effect exists). Overall, our study fails to uncover supporting evidence for a smart money effect in the Australian superannuation fund industry. Our findings contradict GMV (2007), which finds that Australian investors are smart when investing in domestic equity funds. However, we do find some evidence that investors are able to identify funds whose future performance is poor and disinvest accordingly. Further, we find that fund flows are persistent and that they are targeted toward smaller funds whose subsequent performance tends to be weak. Our findings have serious policy implications, as we show that investors are not sophisticated enough to choose high performing superannuation funds.

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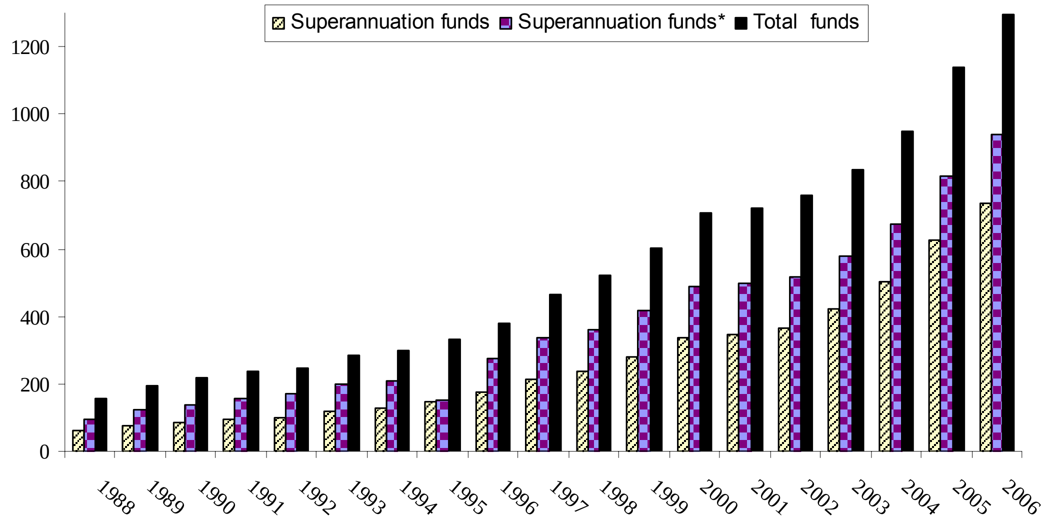
Figure 1

Superannuation Funds Relative to Total Australian Investment Funds (A$ Billion)



Source: Australian Bureau of Statistics, Category 5655.0, Managed Funds, Australia September Quarter 2006.

*Includes superannuation funds held in the statutory funds of life insurance offices.

Table 1

Total Funds under Management (A$ Million)

Year	Total	Superannuation Funds	Life Insurance[a]	Public Unit	Other
Sep-1988	156,613	59,555	60,833	21,233	14,992
Sep-1993	284,209	119,775	114,193	30,639	19,602
Sep-1998	524,067	238,730	160,993	85,560	38,784
Sep-2003	833,839	420,506	198,045	170,228	45,060
Sep-2006	1,294,928	736,534	238,926	263,962	55,506
% of Total Funds under Management - 2006	100.0%	56.9%	18.5%	20.4%	4.3%
Compound Growth p.a.	12.5%	15.0%	7.9%	15.0%	7.5%

Source: Australian Bureau of Statistics, Category 5655.0, Managed Funds, Australia, September Quarter 2006.

[a] Figures include superannuation funds held in the statutory funds for life insurance offices.

Table 2

Superannuation Funds – Asset Allocation

This table reports the asset allocation of superannuation funds. The sample period is 1995–2006.

Asset Class Australian Assets	Dec-1995 A$ Billion	% of Total	Dec-2003 A$ Billion	% of Total	Sep-2006 A$ Billion	% of Total
Cash, Deposits, Loans and Placements	27.8	11.3	67.9	12.0	73.2	9.9
Interest Bearing Securities	61.1	24.7	89.2	15.8	88.0	12.0
Equities and Units in Trust	97.9	39.6	261.0	46.1	363.8	49.4
Land and Buildings	16.4	6.6	31.5	5.6	35.9	4.9
Other Assets	9.7	3.9	17.0	3.0	10.8	1.5
Assets Overseas	34.3	13.9	99.4	17.6	164.8	22.4
TOTAL	247.2	100.0	565.9	100.0	736.5	100.0

Source: Australian Bureau of Statistics, Category 5655.0, Managed Funds, Australia September Quarter 2006.

Table 3

Number of Superannuation Funds

This table reports the maximum, minimum and average number of superannuation funds in each year of the sample period. The sample period is 1990–2005.

Year	Maximum	Minimum	Average
1990	52	0	45.8
1991	59	51	55.1
1992	63	58	60.6
1993	68	62	63.2
1994	85	68	77.2
1995	131	85	118.6
1996	143	130	137.0
1997	165	137	151.8
1998	195	165	177.9
1999	233	197	216.7
2000	247	233	239.3
2001	279	243	255.6
2002	345	272	310.3
2003	442	337	386.6
2004	455	439	443.6
2005	433	409	416.1

Table 4

Descriptive Statistics – Fund Characteristics

This table reports the summary statistics for our sample of 510 funds. Quarterly net cash flow ($NCF_{i,t}$) for fund i is defined as $NCF_{i,t} = TNA_{i,t} - TNA_{i,t-1} * (1 + r_{i,t})$, where $TNA_{i,t}$ - $TNA_{i,t-1}$ is total net assets under management for fund i at the end of quarter t and t-1, respectively and $r_{i,t}$ is the return on fund i in quarter t. The normalised quarterly net cash flow ($NNCF_{i,t}$) for fund i in quarter t is the quarterly net cash flow in quarter t divided by TNA at the beginning of the quarter. The management expense ratio (MER) is defined as the percentage of the investment that the fund charges as an ongoing management fee. The entry fee is the initial cost of investment and the exit fee is the cost of disinvesting from a fund. Cross-sectional averages are first computed quarterly. The values reported are derived from the time series of the quarterly cross-sectional averages. The sample period is 1990–2005.

	Mean	Median	Standard Deviation
TNA (A$ million)	20.80	20.03	8.78
Quarterly net cash flow (A$ million)	0.83	0.72	1.92
Quarterly normalised net cash flow (NNCF) (%)	27.08	19.70	26.76
Expense ratio (MER) (% p.a.)	1.69	1.93	0.60
Entry fee (% p.a.)	3.00	4.00	2.01
Exit fee (% p.a.)	0.40	0.00	1.10

Table 5

Descriptive Statistics – Portfolio Returns

This table reports the descriptive statistics for the equal-weighted positive cash flow portfolio, equal-weighted negative cash flow portfolio, cash flow–weighted positive cash flow portfolio, cash flow–weighted negative cash flow portfolio, monthly risk-free rate, and the overall market factor (expressed in percent per month). Panel A reports portfolio returns for all funds. Panel B reports portfolio returns for small funds and panel C reports portfolio returns for large funds. A fund is classified as small (large) if its total net asset (TNA) value is smaller (larger) than the median TNA. At the beginning of each quarter, we sort all funds into positive and negative net cash flow portfolios based on the sign of the fund's net cash flow during the previous quarter. Portfolios are rebalanced quarterly and returns are calculated using both equal and cash flow weighting. The sample period is 1990–2005.

Panel A: All Funds	Mean	Median	Standard Deviation
Equal-weighted positive cash flow portfolio	0.85	1.14	3.00
Equal-weighted negative cash flow portfolio	0.99	1.12	3.02
Cash flow–weighted positive cash flow portfolio	0.29	1.00	4.03
Cash flow–weighted negative cash flow portfolio	-0.07	-0.16	0.20
Monthly risk-free rate (R_f)	0.51	0.44	0.19
Excess market return (RMRF)	0.38	0.80	3.34

Panel B: Small Funds	Mean	Median	Standard Deviation
Equal-weighted positive cash flow portfolio	0.87	1.09	2.94
Equal-weighted negative cash flow portfolio	0.95	1.16	2.99
Cash flow–weighted positive cash flow portfolio	-0.96	0.40	6.36
Cash flow–weighted negative cash flow portfolio	0.35	0.90	4.45

Panel C: Large Funds	Mean	Median	Standard Deviation
Equal-weighted positive cash flow portfolio	0.93	1.31	3.01
Equal-weighted negative cash flow portfolio	1.03	1.28	3.11
Cash flow–weighted positive cash flow portfolio	0.40	1.07	4.12
Cash flow–weighted negative cash flow portfolio	0.72	0.89	3.41

Table 6

Summary Statistics - Terminated Funds

In this table we report summary statistics for terminated funds. The table reports terminated funds for the entire sample and in five year periods (i.e. 1990-2005). The sample is split into columns based on the year in which they terminated.

	All years	1990–1994	1994–1999	2000–2005
Total number of terminated funds	128	4	20	104
Mean quarterly net cash flow (A$ millions)	-0.55	0.72	-17.78	2.75
Excess mean monthly return (% pm)	-1.39	-2.47	-1.70	-1.22
Excess median monthly return (% pm)	-0.21	-2.46	-0.49	-0.20
Standard deviation of the excess monthly returns	5.37	1.62	4.11	4.26

Table 7

Performance of New-Money Portfolios – Unconditional Measures

In this table we report the results of the regressions of new money portfolio returns on three unconditional measures. Panel A reports the alpha and the coefficients for new-money portfolios formed using equal weighting while panel B reports the alpha and the coefficients using cash flow weighting. T-statistics are based on the Newey-West covariance matrix and are reported in parentheses. In this table the performance of the portfolios is assessed using the estimated portfolio alpha. The Jensen alpha is derived from the Jensen model, which excludes the zero cost portfolios on size, book-to-market and momentum. The Fama-French alpha is computed from the Fama-French model, which excludes the momentum factor, and the Carhart alpha is the intercept from the monthly time series regression of portfolio excess returns on the market portfolio, and the factors related to size, book-to-market and momentum. The sample period is 1990–2005.

Panel A: Equal-Weighted Portfolios

	Jensen		Fama-French		Carhart	
	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio
Alpha	-0.0001	0.0014	-0.0001	0.0014	-0.0001	0.0015
	(-0.11)	(1.85)*	(-0.22)	(1.70)*	(-0.10)	(1.74)*
RMRF	0.8873	0.8739	0.8869	0.8738	0.8860	0.8733
	(49.02)***	(27.97)***	(48.15)***	(27.54)***	(49.03)***	(27.61)***
SMB			0.0019	0.0007	0.0016	0.0005
			(0.30)	(0.07)	(0.26)	(0.06)
HML			0.0008	-0.0087	-0.0002	-0.0093
			(0.06)	(-0.55)	(-0.01)	(-0.56)
UMD					-0.0057	-0.0036
					(-0.68)	(-0.43)
Adj. R^2	0.948	0.905	0.947	0.904	0.947	0.903

Panel B: Cash flow-Weighted Portfolios

	Jensen		Fama-French		Carhart	
	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio
Alpha	-0.0057	-0.0902	-0.0055	-0.1009	-0.0051	-0.0927
	(-2.21)**	(-3.00)***	(-1.43)	(-3.01)***	(-1.42)	(-3.04)***
RMRF	0.8742	1.2272	0.8728	1.1420	0.8679	1.0394
	(17.06)***	(2.55)**	(14.91)***	(2.45)**	(14.22)***	(2.23)**
SMB			0.0081	0.4021	0.0067	0.3745
			(0.16)	(2.03)**	(0.13)	(2.20)**
HML			-0.0494	-0.3069	-0.0550	-0.4231
			(-0.75)	(-1.48)	(-0.80)	(-1.61)
UMD					-0.0326	-0.6768
					(-1.06)	(-2.64)***
Adj. R^2	0.508	0.026	0.507	0.036	0.506	0.056

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 8

Performance of New-Money Portfolios – Conditional Measures

In this table we report the results of the regressions of new money portfolio returns on three conditional measures. Panel A reports the alpha for new-money portfolios formed using equal weighting while Panel B reports the alpha using cash flow weighting. T-statistics are based on the Newey-West covariance matrix and are reported in parentheses. In this table performance of the portfolios is assessed using estimated conditional alpha. The Jensen conditional alpha is derived from the Jensen model, which excludes the zero cost portfolios on size, book-to-market, momentum and their interaction terms. The Fama-French conditional alpha is computed from the Fama-French model, which excludes the momentum factor and its interaction term. The Carhart conditional alpha is the intercept from the monthly time series regression of portfolio excess returns on the market portfolio, and the factors related to size, book-to-market, momentum and the interaction terms. The sample period is 1990–2005.

Panel A: Equal-Weighted Portfolios						
	Jensen		Fama-French		Carhart	
	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio
Alpha	-0.0003	0.0009	-0.0002	0.0011	-0.0002	0.0012
	(-0.49)	(1.24)	(-0.41)	(1.38)	(-0.35)	(1.25)
Adj. R^2	0.948	0.913	0.949	0.913	0.948	0.912

Panel B: Cash Flow–Weighted Portfolios						
	Jensen		Fama-French		Carhart	
	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio	Positive Cash Flow Portfolio	Negative Cash Flow Portfolio
Alpha	-0.0063	-0.0930	-0.0055	-0.0892	-0.0062	-0.0752
	(-2.13)**	(-3.07)***	(-1.53)	(-2.93)***	(-1.41)	(-2.85)***
Adj. R^2	0.504	0.021	0.531	0.022	0.532	0.028

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 9

Performance of Small and Large Funds

In this table we report the performance of small and large funds. A fund is classified as small (large) if its total net asset (TNA) value is smaller (larger) than the median TNA. This table reports the unconditional alpha for all three performance measurement models, where $Alpha_1$ is the Jensen alpha, $Alpha_3$ is the Fama-French alpha and $Alpha_4$ is the Carhart alpha. T-statistics are based on the Newey-West covariance matrix and are reported in parentheses. EW refers to equal-weighted and CW refers to cash flow-weighted calculation of portfolio fund returns. The sample period is 1990–2005.

	Small Funds			Large Funds		
Portfolios	$Alpha_1$	$Alpha_3$	$Alpha_4$	$Alpha_1$	$Alpha_3$	$Alpha_4$
Positive cash flow (EW)	-0.0001	-0.0004	-0.0003	0.0005	0.0006	0.0008
	(-0.16)	(-0.60)	(-0.47)	(0.70)	(0.78)	(0.97)
Negative cash flow (EW)	0.0010	0.0010	0.0010	0.0014	0.0016	0.0015
	(1.21)	(0.99)	(1.00)	(1.76)*	(1.80)*	(1.70)*
Positive cash flow (CW)	-0.0182	-0.0145	-0.0135	-0.0045	-0.0049	-0.0045
	(-4.16)***	(-3.04)***	(-2.97)***	(-1.66)*	(-1.16)	(-1.15)
Negative cash flow (CW)	-0.0046	-0.0046	-0.0046	-0.0014	-0.0014	-0.0015
	(-1.42)	(-1.28)	(-1.30)	(-0.90)	(-0.80)	(-0.78)

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 10

Fund Flow Determinants

This table presents the results of the quarterly cross-sectional regression analysis on determinants of fund flows. The coefficients are derived from regressions of the realised quarterly NCF for a fund on the fund's previous quarter return, fund momentum loading, logarithm of the previous quarter's TNA, normalised NCF for the previous quarter, MER for the fund, entry and exit fees. The normalised quarterly NCF for a fund is the quarterly cash flow for that fund divided by the fund's TNA at the beginning of the quarter. The MER is the ongoing operating fee paid by an investor, entry fees are payable at the time of purchase, and exit fees are charged when disinvesting from a fund. The values reported are the time series average of the quarterly regression coefficients. T-statistics are based on the Newey-West covariance matrix and are reported in parentheses. The sample period is 1990–2005.

	Model					
Explanatory Variables	A	B	C	D	E	F
Intercept	0.5324 (3.84)***	0.6687 (3.50)***	1.2140 (2.83)***	0.3511 (2.85)***	0.2186 (1.88)*	0.0441 (0.06)
Previous quarter's return	4.6784 (1.35)	7.5101 (1.79)*	1.3113 (0.57)	-0.6445 (-0.27)	-0.0540 (-0.02)	1.5322 (0.29)
UMD loading		0.7548 (1.07)	0.9798 (1.58)	0.3161 (0.88)	0.6353 (1.25)	1.9539 (0.96)
Logarithm of TNA for previous quarter			-0.3233 (-2.38)**	-0.0708 (-2.54)**	-0.0773 (-2.66)***	-0.0905 (-2.25)**
Normalised NCF for previous quarter				0.3261 (5.85)***	0.2961 (5.17)***	0.2583 (1.87)*
MER					0.0849 (3.24)***	0.0679 (0.98)
Entry fee						0.1054 (0.64)
Exit fee						0.0930 (0.57)
Average R^2	0.050	0.059	0.214	0.361	0.355	0.376

*** significant at 1%; ** significant at 5%; * significant at 10%.