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The impact of superannuation fund choice legislation and the global financial crisis on Australian retail fund flows

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Abstract

We examine the extent to which cash flows into the Australian superannuation funds are affected by the past performance of the fund, the riskiness of the fund, the choice of superannuation fund legislation, and the global financial crisis. Both retail and wholesale investors base their investment decisions on the past performance of the funds. There is little evidence that the riskiness of the fund returns has any significance effect on the flow of funds. Legislation has resulted in more inflows into managed funds. There is more inflow into managed funds and equity funds since the period of the global financial crisis. © 2015 Academy of Financial Services. All rights reserved.

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1. Introduction

The Australian managed funds industry is one of the largest in the world. A main driver of the growth of this sector of the Australian economy is the compulsory superannuation retirement scheme. In the quarter ending March 2013, the total assets managed by the industry were AU$2,094 billion, out of which AU$1,526 billion was comprised of superannuation funds.[1] The superannuation scheme was introduced in the 1980s and today it covers more than 90% of the Australian workforce. Currently workers invest 9.5% of their annual salary into a superannuation fund, which will progressively increase to 12% by

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2019–2020. The objective of superannuation is to provide self-funded retirement for the public, thereby to move away from reliance on publicly funded retirement.

Superannuation funds are broadly divided into four categories. First, corporate funds that are set up for the employees of a specific corporation, and only employees of a particular corporation, are members of this type of fund. Second, industry funds cater to those employees in a specific industry, for example, the retail employees superannuation trust (REST superannuation) specifically caters to employees within the retail industry. Third, there are public sector employee funds such as the public sector superannuation scheme (that existed before June 30, 2005) and the public sector superannuation accumulation plan for new members that began operation after July 1, 2005. Finally, there are retail funds for all other investors that are typically developed by financial institutions and insurance companies.

The retail fund sector is the largest of all Australian managed funds, with assets over AU$1,129 billion as of March 2013. These funds are set up by banks, insurance companies and investment firms. This sector can be further subdivided into wholesale and retail segments. Wholesale funds, which include other funds, cater to large investors. Retail funds cover a variety of investments, including superannuation funds, retirement investment funds, and discretionary investment funds. At the end of March, 2013,[2] the total investment in the wholesale segment was AU$529 billion and in the retail segment was AU$574 billion. A significant change in the superannuation investment environment was brought about by the Choice of Superannuation Fund Legislation of 2005 (known as choice legislation), which gave employees more freedom to move their superannuation savings from one fund to another. The other significant economic event was the global financial crisis (GFC) of 2008–2009. In this article we look at the impact of these two events on the net fund flows into the retail funds sector.

During the initial days of the superannuation scheme, the investment choices available to employees and their ability to switch from one fund to another was limited. Choice of investment class and the freedom to switch between asset classes were available to members of the superannuation funds at varying levels (most funds allowed one or two switches in a year free of cost and charged fees for any additional switch). To increase flexibility for members, the government introduced choice of superannuation fund legislation which allowed members to choose their superannuation fund provider, with effect from July 1, 2005. We extend the study by Gupta and Jithendranathan (2012) by testing whether there was a significant change in asset allocation across asset classes after the introduction of choice legislation.[3]

Studies into the impact of the introduction of choice legislation on Australian managed funds are scant. A recent study by Gupta and Jithendranathan (2012) did not look at the impact of choice legislation, whereas the study by Gerrans (2012) looks at the relationship between different type of members and their switching behavior in a sample of superannuation funds. Our study aims to look at the changes at aggregate levels and see the impact of legislation on the asset allocation behavior of members after the introduction of the legislation. The findings of the study will be of importance for investors and fund managers who seek to maximize their risk-adjusted returns. The results indicate that investors use past returns in making investment choices and this can lead to risky investments with the potential

for significant losses. An understanding of the asset allocation behavior of fund members will be of importance for policy makers, as the primary objective of having superannuation savings is to move people away from publicly funded retirement to self-funded retirement. A shortfall in the superannuation fund accounts of individuals will mean that the government will have a responsibility to provide for the retirement of these people.

Before the choice legislation, members were restricted to one superannuation fund[4] that they joined at the commencement of their employment, with the default option being a balanced fund. However, members could choose to make a proportional allocation into available asset classes within the fund. They were also allowed to make periodical reallocations of the asset classes. After the introduction of the choice legislation, members had the freedom to allocate their balance across funds. The government's rhetoric explaining the introduction of the legislation was that it now provided choices to individuals in terms of their investment. There was a significant amount of media attention and because of this, individuals may have become more aware of their ability to make investment choices. We hypothesize that if this contributed to investors making more conscious decisions in their asset allocation, there will be a move away from balanced funds to other investment classes. Our research found a significant shift away from balanced funds after the introduction of the legislation. Another significant economic event that occurred during the study period was the GFC that originated in the United States in 2008–2009 and quickly spread to other markets around the world. Throughout the world, stock markets declined and investors suffered substantial losses. It is the common perception that during financial crises investors may move away from risky assets such as stocks, into safer assets like fixed income and cash. We also study the impact of the GFC in fund members' asset allocation preferences. We find that the superannuation fund members moved away from risky assets to less risky assets in the period immediately after the crisis.

Retail funds are a suitable class of managed funds to investigate to study the effect of choice legislation and the global financial crisis. We have chosen the retail managed funds for the study for two reasons. First, it is the largest managed funds category and second, the retail fund provides more freedom to its members compared with other categories. Membership of the corporate funds, public sector funds and industry funds are restricted because of the way in which these funds are created. Currently there are more than 14,000[5] active retail individual funds offering a multitude of asset classes to superannuation, retirement income, discretionary and wholesale investors. Superannuation investors are required by law to invest part of their salaries and hence their choice of funds will be based on the perceived return and risk they are taking. Discretionary[6] investors may have less money to invest during financial crises and may choose to move their money away from risky assets to less risky ones. Decisions by wholesale investors may be partially driven by the contributions of their constituents as well as by decisions taken by fund managers. Investors base their investment decisions on their perceptions of expected returns and risk of each asset category, and in turn, this will be reflected in the net funds flow into each asset class.

This study will use a panel regression model to analyze the relationships between the funds flows with past return and risk of the funds, the impact of the choice legislation, and the global financial crisis. The results of our analysis show a significant difference in the allocation of assets between investors of retail and wholesale funds. Retail investors have a

preference for less risky investments compared with the wholesale investors, and are biased in favor of domestic investments. A similar study by Gupta and Jithendranathan (2012) found a significant relationship between fund flow and past performance that could not be explained by risk. This current study overcomes the limitations of the previous study, which did not incorporate the impact of choice legislation because of limited data. The other weakness of the previous study was in ignoring the impact of the GFC in its analysis. This study overcomes both of these limitations. It is a common perception that during periods of crises investors tend to move away from more risky assets to less risky assets. This study, by incorporating the impact of the introduction of the choice legislation and the GFC, will provide a better understanding of the risk perceptions of Australian investors. The findings of the study will contribute to theory by shedding light on the risk tolerance of Australian superannuation fund members. Because the primary objective of the superannuation fund is to provide a self-funded retirement for superannuation fund members, these findings have important implications for policy makers who seek to develop policies to achieve the objective of a self-funded retirement for most people. If fund members make poor investment choices, they may not have accumulated enough wealth to provide a sufficient retirement income. Our findings also have implications for investors who seek to maximize their net wealth for retirement.

The rest of the article is organized as follows. Section 2 covers the literature review, Section 3 describes the data, and Section 4 outlines the methodology used in this article. Section 5 analyzes the results and Section 6 concludes the article.

2. Literature review

Investors commonly use the past performance of the managed fund (or superannuation funds) in making their investment decisions. As such, superannuation funds with superior past performance will attract an inflow of funds while funds with poor performance may experience outflows. Advertisers frequently use the past performance of the funds to attract inflows, suggesting that past performance will continue in the future. Several studies examine the relationship between the fund flows and the performance of the U.S. mutual fund industry. The relationship between the performance and fund flows was studied by Ippolito (1992) for the U.S. mutual fund industry for the period of 1965 to 1984. This study found a clear underlying movement of investments from recent poor performing managed funds toward recent good performers.

Sirri and Tufano (1998) studied the inflows to the good performing funds and outflows from the poorly performing funds and found that consumers based their investment decisions on information about the prior performance of the funds. However, investors do this asymmetrically by investing significantly more in funds that performed well during the prior period(s). Goetzmann and Peles (1996) found a similar, significant relationship between past performance and flows. Lynch and Musto (2003) provided a theoretical framework to analyze this asymmetry between the flows of funds among funds. Intuitively one would assume that market and management would address poor performance by either changing the

advisors and/or strategies that result in poor performance. This intuition helps to explain the asymmetry between the flow of funds among poor and superior performing funds.

For investors, an understanding of the relationship between flow and performance is important from the investment decision standpoint, and this has been researched in number of empirical studies. For example, Sawicki (2001) studied the flow-performance relationship of wholesale balanced pooled Australian superannuation funds and found a positive, statistically significant relationship between recent performance and flow of funds, but did not find the convexity observed in the U.S. markets. Drew, Stanford, and Veeraraghavan (2002) found that the raw risk adjusted returns showed mean reversions, and that previous period performance was not associated with future performance. Bilson, Frino, and Heaney (2005) tested performance persistence using a sample of managed growth and managed stable Australian retail funds. The performance persistence was tested using five different matrices and it was found that the inadequate adjustment of risk may cause spurious persistence in excess fund returns. Frino, Heaney, and Service (2005), using a sample of 398 Australian managed-growth and managed-stable funds, found a positive relationship between current net cash flows and past performance. The asset allocation strategies within the Australian equities, fixed interest and listed property class of funds was tested by Benson, Gallagher, and Teodorowski (2007) who found evidence of momentum investing by fund managers. Gharghori, Sujoto, and Veeraraghavan (2008) found little evidence that Australian investors are able to identify high performing superannuation funds.

A similar study by Del Guercio and Tkac (2002) compared the difference in cash flows between the U.S. mutual funds and pension funds. The results of the study indicated that there is significant difference between the behaviors of the two groups of investors. Pension fund investors tend to move money away from poorly performing funds but they do not reward better performing funds by disproportionately investing into past years good performers. They also use risk measures, such as Jensen's α and tracking error to evaluate the performance of the funds. Evidence from thenon-retirement mutual funds is different. These investors tend to move into newly acclaimed high performers with no consideration of risk adjusted performance measures. Agnew and Balduzzi (2010) use daily net aggregate fund transfers of the voluntary retirement contribution funds (401K plans) in the United States and find that, in response to market movements, these investors shift funds between equities, cash, and bonds. More recent studies find that defined contribution plans are more sensitive to past performance as compared with the rest of the mutual funds (Sialm, Starks, and Zhang, 2012).

Investors (or members) of managed funds may view ratings by agencies such as Morningstar as important sources of information, base their investments decisions on the ratings and move in and out of different funds based on announcements of rating changes. This effect was studied by Del Guercio and Tkac (2008). They use a sample of Morningstar's rating changes from 1996 to 1999, and find that the changes in ratings have an impact on investment allocation decisions by retail mutual fund investors. Gerrans (2004) reported that three quarter of investors base their investment decisions on rating changes. Faff, Parwada, and Poh (2007) find similar evidence of Australian retail investors moving money away from recently downgraded funds to recently upgraded funds. Watson, Wickramanayke, and

Premachandra's (2012) evaluation of Australian equity funds using efficient portfolio models finds that efficient funds are likely to receive an upgrade in the medium to long term.[7]

Behavioral finance literature argues that investment decisions may be influenced by behavioral biases in the decision making process. Researchers have looked at different aspects of human behavior, for example, prospect theory argues that investors look at perceived gains and losses rather than relying on perceived outcomes. Various studies have investigated the overconfidence hypothesis, wherein it is argued that investors who are overconfident overrate signal precision and overreact to these signals and miss-price economic factors (Daniel, Hirshleifer, and Subrahanmanyam, 2001). Bailey, Kumar, and Ng (2011) study investors from the U.S. discount brokerage firms to gain an understanding of the disposition and narrow framing effects. Using proxies for the two behavioral biases—disposition effect and narrow framing—they find that investors may choose investments based on individual factors rather than based on the impact on the individual's overall portfolio. Gender bias is an important issue in behavioral finance literature and Speelman, Clark-Murphy, and Gerrans (2007) investigate this in the different groups of Australian retirement funds. The results show that female investors are more risk averse than male investors, and young female investors exhibit the highest level of risk aversion. As investors age, there is an indication that they become return-chasers. A survey of Australian investors by Fry, Heaney, and McKeown (2007) found that only a few investors showed interest in changing their superannuation; thus, supporting the behavioral theory of investor inertia. Phillips (2011) looked at the relative risk aversion coefficient that characterizes representative self-managed superannuation fund investors and finds that these investors may be too risk averse to maximize their expected growth rate of wealth share accumulation.

The effect of choice legislation on investor behavior was studied by Fear and Pace (2009). The results of this study indicated that superannuation investors are mostly apathetic about their pension savings, and the study did not find any strong evidence of fund switching behavior after the introduction of the choice legislation. A possible reason for lack of fund switching can be attributed to the cost of switching. A study by Sy (2011) found that the choice legislation had the opposite effect on superannuation investors, as the rate of superannuation members making an active choice about their investments fell after the introduction of the legislation, and more members chose the default strategy for asset allocation. A recent Australian study by Gerrans (2012) looks at the changes in the investment strategies after the GFC and found that members did not make any changes to their investment strategies in the period following the crisis. The findings of these studies are contrary to common perception that investors when given greater choice ought to exercise these choices to enhance their risk adjusted returns for maximizing net wealth for retirement. A series of crises results in investors exercising more caution, moving funds into less risky investments. The results of the studies by Sy (2011) and Gerrans (2012) may have been limited by data.[8]

There are a few studies that have investigated investor behavior during the recent global financial crisis. Gerrans (2012) studied the behavior of Australian retirement savings investors during the crisis using a sample of 3.6 million investors from five superannuation funds, with assets totaling over AU$74 billion. The results indicated that an overwhelming number of investors did not change their investment strategy in response to the crisis. Gerrnas, Faff, and Hartnett (2012) tested the individual financial risk tolerance during the crisis using a risk

tolerance survey. The results indicated that risk-taking behavior was impacted by the crisis, but the researchers could not conclude whether or not it had any significant effect on the actual asset allocations. Related studies of Australian managed funds are as follows; Holmes and Faff (2007) who look at the style drift and fund performance over time. Stout (2008) examines the relationship between withdrawals and portfolio asset allocations and Brooks and Porter (2012) examine the performance of mutual funds for the period of 1994 to 2005 using an attribution model. Taking a global perspective, Guercio and Reuter (2014) examine the performance of the U.S. mutual funds for the period 1992 to 2004, and Fang, Kemf, and Trapp (2014) examine the manner in which fund managers are allocated within the fund family, based on the market efficiency of each asset class.

If investors rely purely on the past performance of funds in reallocating their investment portfolios they may be misallocating their investments. Our literature survey found that the issue of impact of choice legislation and the GFC has not been sufficiently studied in relation to Australian superannuation funds. These two events have been significant in their impact on the Australian investment environment. Gaining an understanding the impact these events have had may help investors and policy makers in more appropriately managing the future course of the superannuation environment. This research aims to fill this gap by answering three inter-related questions. The first question is, is there a significant relationship between past performance of the asset classes and the future allocation into asset classes that is not explained by risk of the individual asset class? The second question we attempt to answer is, is there a significantly increased reallocation of assets after the introduction of the choice legislation?[9] Finally, we test the impact of the GFC on investors' reallocation of assets.

3. Data

Data for this study was obtained from Plan for Life (QDS retail and wholesale platform), Plan for Life is a firm of actuaries and researchers. The data covers the period from 1991 to 2013 and contains quarterly information about the funds under management, net cash flows, cash inflows, cash outflows, and investment earnings. According to the data vendor, the information is consistent with the Investment and Financial Services definitions. Because data predating September 1998 is sparse, and significant growth in the managed funds has occurred since that date, this current study uses fund data for the period from September 1998 to March 2013 only. The number of funds included in the study is 27,965, out of which 14,188 were active as of March 2013, whereas 5,873 were terminated and 7,904 were transferred to other funds. There were more than 150 fund families that offered these products. A summary of assets under management for different types of funds (superannuation and retirement), non-superannuation and wholesale funds is given in Table 1. It shows a growth of 20% innon-superannuation, 23% in superannuation and retirement funds, and 24% in the wholesale category.

The asset allocation trends among various types of retail funds are given in Figs. 1 through 4. Fig. 1 shows asset allocation trends among wholesale funds. In 1998, the largest asset category was managed balanced funds (20.03%), which reduced to a mere 3.03% by March 2013. The asset category that had the highest growth rate during this period is overseas equity

Table 1 Total investments in retail and wholesale products (in million Australian dollars)

Category	Average funds under management	Funds under management on September 1998	Funds under management on March 2013	Annual growth rate
Superannuation and retirement	255,882.39	97,526.86	429,802.34	23.62%
Non-superannuation	140,988.45	66,707.47	144,666.00	20.65%
Wholesale	224,569.49	58,514.45	529,469.32	24.32%
Total	645,986.87	222,748.78	1,103,937.66	25.69%

investments, which went up from 11.12% in 1998 to 20.45% in 2013. Cash as percentage of total assets remained fairly stable, between 10.97% in 1998 to 9.73% in 2013. Australian equities started at 13.97% in 1998, went up to 25.87% in June 2005 and came down to 18.18% in 2013. The other asset category that had significant change is mixed portfolios, which went up from less than 1% in 1998 to 24.7% in 2013. Part of the reason for the increase in this category may be because of reclassification of some of the other categories to a mixed category.

Asset allocation trends in retail funds are given in Fig. 2. In 1998, the single largest category of retail funds was capital guaranteed (18.31%), which dropped to only 4.6% in 2013. As is the case with wholesale funds, the category with the highest growth was mixed portfolios, which increased from 9.13% in 1998 to 41.22% in 2013. Unlike wholesale funds, overseas equity is not a significant part of the allocation of the retail funds. In 1998, overseas equity was 4.14% of total assets in this category, and it was little changed at 3.68% in 2013. The share of Australian equity also remained fairly stable; 8.87% in 1998 and 9.5% in 2013. The share of cash saw a decrease of more than 3% between 1998 and 2013.

Within retail funds the asset trends in allocation of superannuation funds is given in Fig. 3. In 1998, the single largest class of asset was capital guaranteed (24.06%), followed by

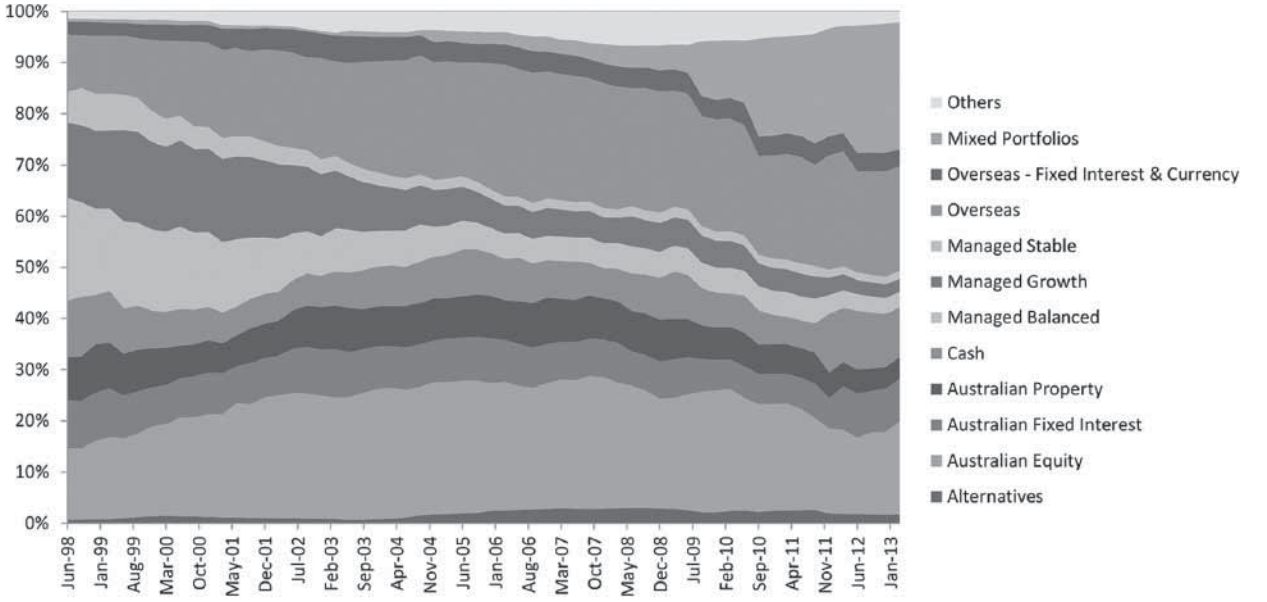

Fig. 1. Asset allocation trends in wholesale funds.

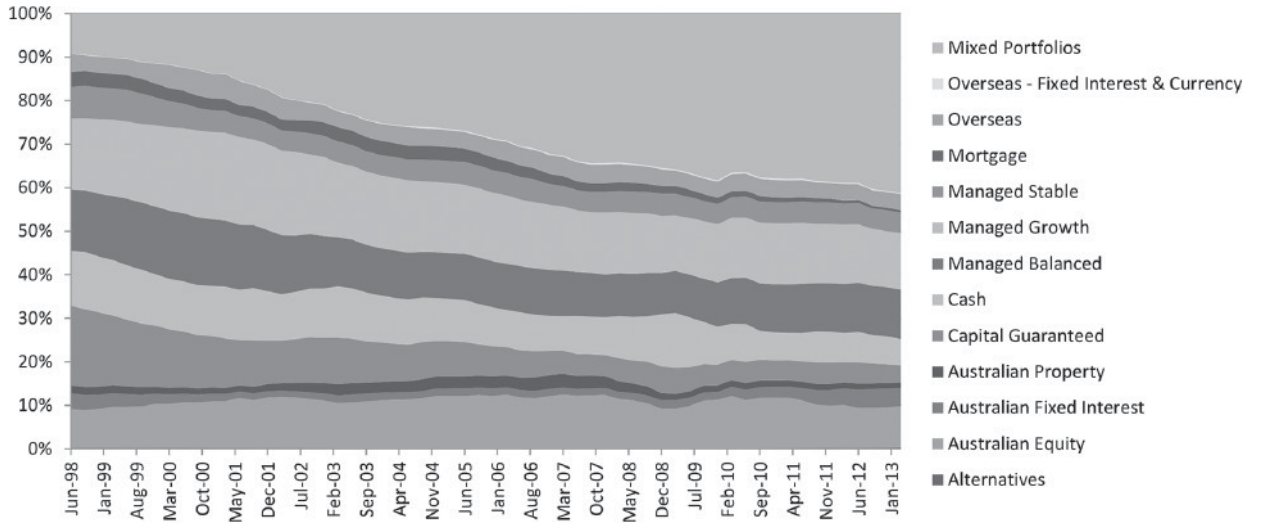

Fig. 2. Asset allocation trends in retail funds.

managed balanced (19.51%) and managed growth (19.19%). In 2013, the share of capital guaranteed fell to 4.87%, while the share of managed balanced (14.32%) and managed growth (15.65%) fell slightly. The category with the highest growth rate is mixed portfolios, which increased from 11.25% in 1998 to 37.95% in 2013. The share of Australian equity also saw significant increase from 3.9% in 1998 to 7.92% in 2013. The overall trends in asset allocation indicate that retirement investors are fairly stable with their asset allocation choices.

Asset allocation trends innon-superannuation retail funds (discretionary investors) are given in Fig. 4. Compared with other categories of investors, discretionary investors have more investment in cash. In 1998 their allocation in cash was 21.48%, which came down to

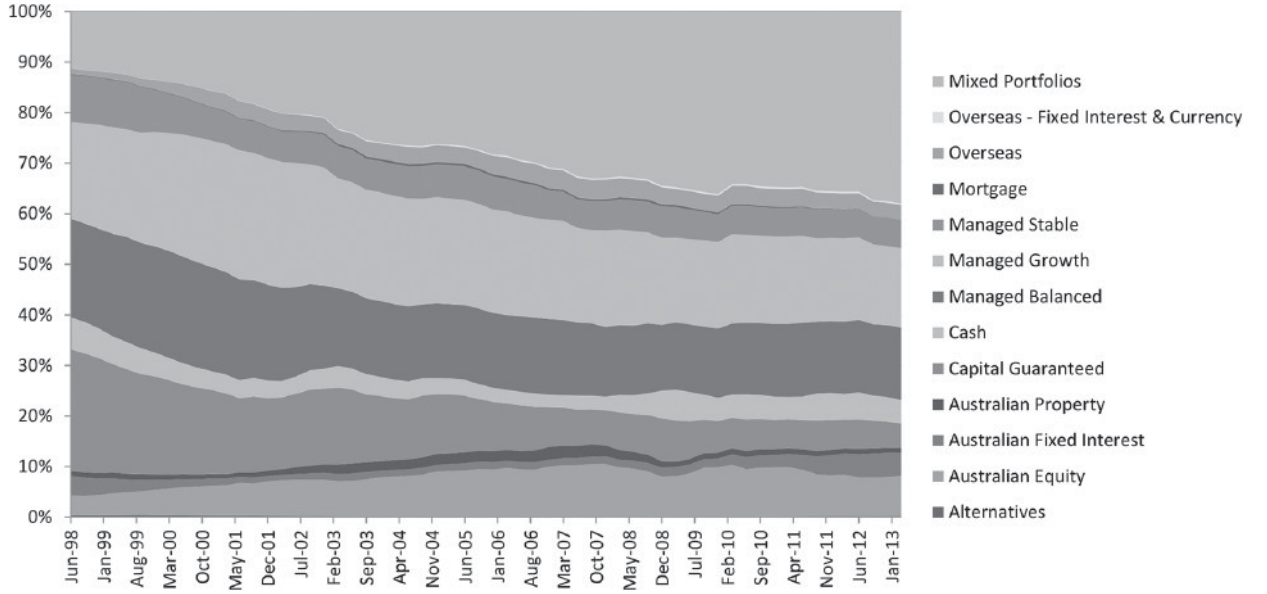

Fig. 3. Asset allocation trends in superannuation funds.

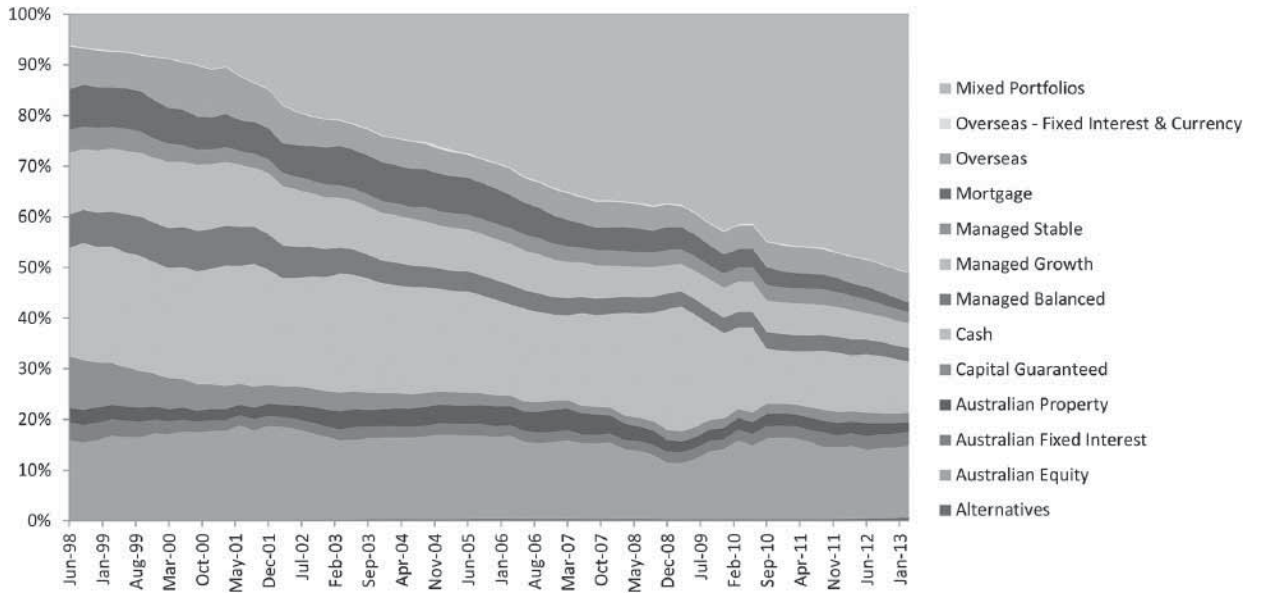

Fig. 4. Assets allocation trends innon-superannuation retail funds.

10.2% in 2013. As in the case of superannuation and retirement investment funds, the highest growth is in mixed portfolios, which increased from 6.14% in 1998 to 50.92% in 2013. Unlike superannuation fund investors, discretionary investors have less money in managed funds and more investments in Australian equities. The share of asset allocation into Australian equities for this category of investors remained fairly stable. One interesting aspect of asset allocation of discretionary investors is the flight to safety during the global financial crisis. The share of Australian equity started at 15.85% in 1998 and fell to its lowest in December 2008 (11.11%) and then increased to 21.4% by March 2013.

4. Empirical methodology

Superannuation fund-level rates of return (ror) are calculated as follows:

$$ROR_{i,t} = \frac{Net\ earnings\ after\ tax_{i,t}}{Size_{i,t-1} + \frac{1}{2} NF_{i,t}} \tag{1}$$

where, $Size_{i,t-1}$ is the funds under management for the i^{th} fund for the quarter *t-1* and $NF_{i,t}$ is the net fund flows for the i^{th} fund for the quarter *t*. To calculate the average returns for each category of investment, a value weighted index of individual fund returns is created. The average returns and standard deviations of these individual indices are given in Table 2. Among various investment categories, Australian small company equity funds had the highest quarterly returns of 3.18% followed by Australian equity funds (2.22%) and Asia Pacific equity funds (2.17%). The mixed portfolio funds had the lowest average quarterly returns at 1%, followed by cash with 1.01% average quarterly returns. Managed funds also are at the lower end of returns with a range of 1.07% to 1.20%.

Table 2 Summary statistics of quarterly returns (September 1998–March 2013)

Investment category name	Mean	Standard deviation	Minimum	Maximum
Alternatives	1.20%	3.04%	−7.77%	7.81%
Cash	1.01%	0.16%	0.70%	1.44%
Diversified fixed interest	1.01%	2.07%	−8.37%	8.27%
Australian equity	2.22%	6.79%	−15.06%	20.73%
Australian equity small companies	3.18%	8.54%	−22.19%	22.81%
Australian fixed interest	1.19%	0.91%	−0.71%	2.82%
Managed balanced	1.17%	3.78%	−10.70%	10.05%
Managed growth	1.17%	4.19%	−11.45%	11.32%
Mortgage	1.20%	0.25%	0.42%	1.60%
Managed stable	1.07%	1.76%	−5.02%	5.95%
Overseas - Asia Pacific	2.17%	9.96%	−18.18%	32.29%
Overseas - Fixed interest and currency	1.34%	1.39%	−2.21%	4.33%
Overseas - Global	0.50%	7.02%	−14.71%	20.06%
Overseas - Property	1.13%	9.60%	−36.22%	25.07%
Australian Property	1.64%	2.27%	−7.59%	6.64%
Australian Property securities	1.49%	8.47%	−30.06%	27.47%
Mixed portfolios	1.00%	3.89%	−10.62%	11.42%

Risk, as measured by the standard deviation of the quarterly returns, are the highest at 9.6% for overseas property funds, followed by Australian small company equity funds (8.54%) and Australian property security funds (8.47%). Managed funds and mixed portfolio funds in general had low return standard deviations in the range of 1.76% to 4.19%. The lowest return standard deviations were observed for cash (0.16%) and mortgage funds (0.25%).

For regression analysis purposes, a panel data are created for each individual investment category. To avoid the survivorship bias, funds that were terminated or transferred are included in the dataset, provided each fund had at least 24 continuous quarterly data points, of which at least 12 quarters occurred post June 2005 to incorporate the effects of choice of superannuation fund legislation and the global financial crisis. One of the issues that arose in the analysis was the sudden increase or decrease in net flows during a quarter. To eliminate the outliers in the net flows, the data for a quarter where the net flow is greater than 0.75 of the funds under management at the beginning of the quarter, is dropped. This eliminates sudden increases in cash flows that may be because of interfund transfers.

A typical mutual fund investment decision involves two steps—first the choice of an asset category and then the selection of a fund within that asset category. The choice of asset category depends on the investors' risk preferences, and the choice of the fund may depend on its past performance. Thus, individual investors are concerned about the returns and risks involved in investing. There are various agencies which report the performance of the funds, and also individual fund managers advertise their performance measures. If investors follow the performance of funds carefully, they will tend to invest more into the funds that perform well in a particular category and to withdraw funds from the poorly performing funds.

The most commonly used measure of fund performance is to compare the fund return with that of a benchmark. In the case of U.S. markets, Sensoy (2009) pointed out that more than one third of the benchmarks used in the performance analysis are incorrect indicators of the funds' true style. To avoid this problem, we use a value weighted index of fund returns for

each of the fund categories. The quarterly return of each fund and the index are calculated using Eq. (1) and the active returns are calculated as:

$$r_{i,t} = ROR_{i,t} - ROR_{Index,t} \tag{2}$$

The next important factor is to find an appropriate measure for risk. The most commonly used measures of risk in empirical analysis are Jensen's α, the Sharpe ratio, and tracking error. The Australian Bureau of Statistics and the Australian Prudential Regulation Authority report the return of assets and the standard deviation of the returns as a measure of risk. The key questions are how many investors are aware of the investment style of the fund, and how do they evaluate the risk of the fund they are investing in? A survey of U.S. mutual fund investors by Capon, Fitzsimons, and Prince (1996) showed that only 25% of mutual fund investors knew the investment style of the fund, and that only 26.7% of those surveyed compared the fund return with the benchmark. This survey also found that 14% of the respondents used standard deviation as the measure of risk and only 4% used either the α or the Sharpe measure to identify the risk. In this study we use tracking error as the measure of risk.[10]

An important factor that can influence the performance of a fund is its size. Chen, Hong, Huang, and Kubik (2004) showed that the performance of the funds decreases with size, and therefore, to control for the size effect, we use the lagged log size of the fund as a control variable. To adjust for the momentum effect of net flows, the lagged value of the net flows is included as an independent variable. To control for the unusual flows because of transfers, and so forth, the following control variable is used.

$$EIN_t = \frac{NF_{i,t}}{size_{t-1}} - \frac{MarketNetflows_t}{MarketSize_{t-1}} \tag{3}$$

In time series regressions it is important to check whether the series are stationary. Regressing non-stationary time series can lead to spurious regressions. On the other hand if the time series variables that are non-stationary are co-integrated, then they have a long-term, or equilibrium relationship between them. In this study we test the long-term relationship between the variables using the Pedroni (1999, 2004) heterogeneous panel cointegration test. This test involves regressing the variables along with cross-section specific intercepts, and examining whether the residuals are integrated in the order of one. The Pedroni test calculates two sets of statistics: (1) panel co-integration test statistics and (2) group mean panel co-integration statistics. For the first test, four test statistics are calculated: panel v-statistic, panel ρ-statistic, panel PP-statistic, and panel ADF-statistic. For the second test three statistics are calculated: group r-statistic, group PP-statistic, and group ADF-statistic. Because panel and group PP-and ADF-statistics have the best small sample properties, we report these in the article.[11]

The results of co-integration tests are given in Table 3. The results strongly reject the null-hypothesis that the variables are not co-integrated. Because the variables are co-integrated, the long-term relationship between the variables is tested using the dynamic ordinary least square (DOLS) estimator proposed by McCoskey and Kao (1999) and Kao and Chiang (2000). The DOLS is an expanded ordinary least square estimation including not

Table 3 Pedroni panel co-integration test for the regression variables

Investment category name	Panel-PP	Panel-ADF	Group-PP	Group-ADF
Alternatives	−10.0981***	−8.3714***	−10.4713***	−7.0531***
Cash	−46.2852***	−33.6419***	−51.0968***	−34.9540***
Diversified fixed interest	−34.2109***	−24.7624***	−41.3084***	−28.7055***
Australian equity	−41.1697***	−26.1176***	−46.0305***	−28.6325***
Australian equity small companies	−16.0264***	−11.3203***	−19.1526***	−13.0535***
Australian fixed interest	−32.9618***	−24.6268***	−38.0533***	−27.9730***
Managed balanced	−33.6623***	−19.6978***	−38.7136***	−20.9555***
Managed growth	−49.0109***	−30.0976***	−61.1529***	−36.1550***
Mortgage	−9.1042***	−3.8491***	−12.2357***	−5.9000***
Managed stable	−33.0024***	−19.1801***	−39.9762***	−22.2885***
Overseas - Asia Pacific	−4.8391***	−3.4357***	−4.4818***	−2.8588***
Overseas - Fixed interest and currency	−17.9625***	−14.3272***	−19.4624***	−15.8561***
Overseas - Global	−37.0328***	−25.3996***	−45.6936***	−33.1615***
Overseas - Property	−6.9439***	−6.4980***	−9.0963***	−8.4064***
Australian property	−21.8242***	−15.6943***	−23.5065***	−16.1208***
Australian property securities	−28.2284***	−19.4943***	−34.9844***	−23.0703***
Mixed portfolios	−25.6963***	−17.2480***	−32.1449***	−21.4459***

*** Significant at 1%.

only the explanatory variables, but also the leads and lags of the first difference terms to control endogeneity and to calculate the standard deviations using covariance matrix of errors that is robust to serial correlation. The regression model used is:

$$NF_{i,t} = b_j r_{ji,t} + c\sigma_{i,t-1} + dSize_{i,t-1} + eNF_{i,t-1} + fNF_{i,t-2} + gEIN_{i,t} + hCh_t + jGFC_t + \sum_{j=-1}^{1} k_{i,j}\Delta x_{i,t} + \varepsilon_t \quad (4)$$

where $NF_{i,t}$ are the net flow in to the fund, r_{ji}, is the trailing excess returns for either 1, 2, or 3 quarters, $\sigma_{i,t}$ is the tracking error, $Size_{i,t}$, is the log of the fund size, Ch_t is the choice dummy, which has a value of 0, until the third quarter of 2005 and 1 for rest of the time period, GFC_t is the crisis dummy, which has a value of 0, until the third quarter of 2008 and 1 for the rest of the time period, EIN_t is a variable to capture the overall flow into the market, and $FE_{i,t}$ is the fixed effect of i^{th} fund. We estimated three separate regressions with the variable $r_{ji,t}$ being 1, 2, or 3 quarter excess returns. Δx_i are the first difference terms of the regression variables and we use one lead and lag in the model. The choice of three quarters excess return is to see if investors look at the most recent or past returns. We do not find significance beyond three quarters.[12]

5. Results

The regression results for various categories of funds are given in Tables 4 through 7. Table 4 gives the results for the total retail fund net flows for various categories of assets. If investors exhibit return chasing behavior, then the past excess returns should have a

Table 4 Fixed effects panel regression of retail managed fund net flows with past excess returns and risk

Regression equation: $NF_{i,t} = b_j r_{jt,t} + c\sigma_{i,t-1} + dSize_{i,t-1} + eNF_{i,t-1} + fNF_{i,t-2} + gEIN_{i,t} + hCh_t + jGFC_t + \sum_{j=-1}^{1} k_{i,j}\Delta x_{i,t} + \varepsilon_t$

where $NF_{i,t}$ are the net flow in to the fund, r_{ji}, is the trailing excess returns for either 1, 2, or 3 quarters, $\sigma_{i,t}$ is the tracking error, $Size_{i,t}$, is the log of the fund size, Ch_t is the choice dummy, which has a value of 0, until third quarter of 2005 and 1 for rest of the time period, GFC_t is the crisis dummy, which has a value of 0, until third quarter of 2008 and 1 for the rest of the time period, EIN_t is a variable to capture the overall flow in to the market, and $FE_{i,t}$ is the fixed effect of i^{th} fund. Δx_i are the first difference terms of the regression variables. We estimated three separate regressions with the variable $r_{ji,t}$ being 1, 2, or 3 quarter excess returns.

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2(F-stat)
Alternatives									
One quarter	−3.1677	8.8691	−0.6156	0.2972	0.1428	21.7416	−2.8920	−0.4126	0.4708
	(−0.7059)	(1.3544)	(−1.5225)	(4.7329)***	(1.9554)*	(4.5886)***	(−3.0426)***	(−0.6580)	(11.4650)***
Two quarters	−3.2381	9.1817	−0.6168	0.2965	0.1431	21.8813	−2.8920	−0.4329	0.4708
	(−0.9952)	(1.3330)	(−1.5258)	(4.7116)***	(1.9591)*	(4.7690)***	(−3.0495)***	(−0.7023)	(11.4662)***
Three quarters	−2.6597	8.2383	−0.6554	0.2875	0.1398	22.3910	−2.8891	−0.4809	0.4696
	(−0.8000)	(1.2098)	(−1.6226)	(4.5520)***	(1.9116)*	(4.8562)***	(−3.0411)***	(−0.7773)	(11.4123)***
Cash									
One quarter	−5.5627	1.5511	−0.7231	0.1511	−0.1205	49.5783	−0.0513	−1.0585	0.6924
	(−0.1501)	(0.3112)	(−2.5538)**	(9.2267)***	(−6.5065)***	(14.8195)***	(−0.1202)	(−2.8245)***	(64.7703)***
Two quarters	−8.9039	1.5560	−0.7208	0.1511	−0.1205	49.5617	−0.0513	−1.0581	0.6924
	(−0.2411)	(0.3122)	(−2.5402)**	(9.2267)***	(−6.5062)***	(14.8225)***	(−0.1202)	(−2.8235)***	(64.7700)***
Three quarters	−2.1748	1.7017	−0.7269	0.1510	−0.1205	49.5451	−0.0528	−1.0578	0.6924
	(−0.0769)	(0.2538)	(−2.5693)**	(9.2247)***	(−6.5091)***	(14.8194)***	(−0.1237)	(−2.8227)***	(64.7680)***
Diversified fixed interest									
One quarter	−0.9172	−0.6061	−0.2042	0.5717	0.1594	6.1105	−0.1238	0.0419	0.7597
	(−0.6755)	(−0.3470)	(−2.7707)***	(22.3198)***	(6.5778)***	(7.6968)***	(−0.6757)	(0.4394)	(73.8993)
Two quarters	0.2402	−0.9656	−0.2006	0.5723	0.1601	6.1640	−0.1271	0.0372	0.7596
	(0.1883)	(−0.5345)	(−2.7256)***	(22.3443)***	(6.6057)***	(7.7876)***	(−0.6937)	(0.3896)	(73.8639)
Three quarters	1.0742	−1.1579	−0.2020	0.5724	0.1604	6.1397	−0.1246	0.0394	0.7597
	(0.8140)	(−0.6648)	(−2.7455)***	(22.3515)***	(6.6208)***	(7.7530)***	(−0.6804)	(0.4135)	(73.8995)
Australian equity									
One quarter	3.0022	−0.3447	−0.2241	0.5427	0.2412	11.9918	−0.1333	0.1588	0.7375
	(3.6185)***	(−0.3236)	(−5.2068)***	(87.5397)***	(39.6334)***	(19.8863)***	(−2.0475)**	(3.0352)***	(96.0184)***
Two quarters	2.9321	−0.3066	−0.2250	0.5425	0.2413	11.9286	−0.1335	0.1611	0.7375
	(3.5654)***	(−0.2879)	(−5.2262)***	(87.5099)***	(39.6381)***	(19.8409)***	(−2.0498)**	(3.0810)***	(96.0173)***
Three quarters	2.1756	−0.4125	−0.2191	0.5432	0.2408	11.9874	−0.1301	0.1623	0.7373***
	(2.1564)**	(−0.3872)	(−5.0877)***	(87.6077)***	(39.5535)***	(19.9239)***	(−1.9974)**	(3.1027)***	(95.9377)
Australian small company									
One quarter	1.1427	0.3633	−0.3328	0.9428	−0.0844	5.7141	0.0868	0.0305	0.8364
	(0.6623)	(0.1377)	(−2.6156)***	(50.2363)***	(−4.6779)***	(3.8886)***	(0.4699)	(0.2303)	(135.110)***
Two quarters	1.6418	0.4053	−0.3339	0.9425	−0.0843	5.6964	0.0805	0.0332	0.8364
	(0.9972)	(0.1539)	(−2.6257)***	(50.2133)***	(−4.6746)***	(3.8744)***	(0.4355)	(0.2504)	(135.117)***
Three quarters	1.4084	0.3986	−0.3404	0.9428	−0.0848	5.6835	0.0824	0.0333	0.8364
	(0.8626)	(0.1513)	(−2.6702)***	(50.2340)***	(−4.7006)***	(3.8590)***	(0.4458)	(0.2515)	(135.095)***

Table 4 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Australian fixed interest									
One quarter	−5.1275	−6.4445	−0.1178	0.3674	0.0994	12.6235	−0.3849	0.4995	0.3992
	(−1.1930)	(−1.1241)	(−1.2551)	(25.8155)***	(6.1733)***	(10.8821)***	(−2.5006)**	(3.8126)***	(20.8996)***
Two quarters	−9.9928	−6.5438	−0.1150	0.3669	0.1001	12.7193	−0.3885	0.5051	0.3994
	(−2.3519)**	(−1.1435)	(−1.2255)	(25.7720)***	(6.2115)***	(10.9365)***	(−2.5236)**	(3.8526)***	(20.9116)***
Three quarters	−12.5717	−6.6061	−0.1171	0.3667	0.1003	12.6244	−0.3917	0.5043	0.3994
	(−2.4474)**	(−1.1532)	(−1.2473)	(25.7412)***	(6.2220)***	(10.8631)***	(−2.5437)**	(3.8455)***	(20.9153)***
Managed balanced									
One quarter	−3.7436	−0.4696	−0.5494	0.4793	0.1720	43.0503	0.4071	0.2901	0.5970
	(−0.7026)	(−0.9347)	(−3.6171)***	(54.9300)***	(18.6948)***	(17.1583)***	(1.9576)**	(1.5151)	(57.0699)***
Two quarters	−2.4237	−0.4697	−0.5481	0.4793	0.1720	43.1319	0.4112	0.2887	0.5970
	(−0.4525)	(−0.9349)	(−3.6089)***	(54.9263)***	(18.6948)***	(17.1854)***	(1.9774)**	(1.5081)	(57.0680)***
Three quarters	−0.8049	−0.5006	−0.5474	0.4793	0.1720	43.0949	0.4112	0.2884	0.5970
	(−0.2070)	(−0.9538)	(−3.6042)***	(54.9219)***	(18.6926)***	(17.1809)***	(1.9773)**	(1.5062)	(57.0667)***
Managed growth									
One quarter	1.2472	0.2970	−0.1321	0.4938	0.1593	30.4400	0.1441	0.2795	0.6206
	(1.2521)	(0.5407)	(−1.6177)	(76.4715)***	(23.8897)***	(22.6817)***	(1.3619)	(2.7845)***	(64.6534)***
Two quarters	1.3892	0.2458	−0.1327	0.4938	0.1593	30.4150	0.1441	0.2794	0.6206
	(1.3496)	(0.4288)	(−1.6261)	(76.4698)***	(23.8908)***	(22.7610)***	(1.3624)	(2.7841)***	(64.6537)***
Three quarters	0.2807	0.3780	−0.1315	0.4939	0.1592	30.4391	0.1421	0.2806	0.6206
	(0.3360)	(0.6037)	(−1.6111)	(76.4746)***	(23.8803)***	(22.7791)***	(1.3434)	(2.7959)***	(64.6424)***
Mortgage									
One quarter	37.3478	−17.8644	−0.8962	0.6501	0.1023	34.2959	−2.5374	−0.8681	0.6496
	(1.1981)	(−0.3199)	(−1.8307)*	(30.3624)***	(4.8813)***	(5.1845)***	(−3.3742)***	(−1.1964)	(57.5991)***
Two quarters	47.7898	−21.7104	−0.9280	0.6498	0.1024	34.2307	−2.5715	−0.8468	0.6497
	(1.5435)	(−0.3872)	(−1.8885)*	(30.3474)***	(4.8867)***	(5.1793)***	(−3.4168)***	(−1.1666)	(57.6215)***
Three quarters	59.5574	−17.4466	−0.8980	0.6499	0.1019	34.3758	−2.5782	−0.8461	0.6498
	(1.6681)	(−0.3106)	(−1.8323)*	(30.3444)***	(4.8625)***	(5.1979)***	(−3.4163)***	(−1.1654)	(57.6376)***
Managed stable									
One quarter	13.6790	−0.7942	−0.2576	0.2623	0.2732	32.6050	−0.1300	0.1157	0.4438
	(2.8648)***	(−0.2984)	(−2.7376)***	(28.2792)***	(24.0644)***	(22.7113)***	(−0.9227)	(0.9462)	(29.3219)***
Two quarters	5.0098	−1.4533	−0.2575	0.2627	0.2729	32.5655	−0.1307	0.1211	0.4436
	(1.2365)	(−0.5107)	(−2.7352)***	(28.3187)***	(24.0360)***	(22.6762)***	(−0.9273)	(0.9893)	(29.2914)***
Three quarters	−1.1801	−1.3541	−0.2534	0.2631	0.2729	32.6006	−0.1291	0.1230	0.4434
	(−0.4234)	(−0.4725)	(−2.6929)***	(28.3685)***	(24.0345)***	(22.6942)***	(−0.9160)	(1.0051)	(29.2750)***
Overseas: Asia Pacific									
One quarter	−3.8890	−4.2244	−1.4271	0.6527	−0.1516	3.3262	2.0471	0.0331	0.7798
	(−0.8178)	(−0.6570)	(−3.9138)***	(12.8345)***	(−3.0298)***	(1.1013)	(3.9446)***	(0.1048)	(48.5003)***
Two quarters	−5.8809	−4.6905	−1.4421	0.6516	−0.1491	3.2933	2.0380	0.0022	0.7805
	(−1.2834)	(−0.7291)	(−3.9646)***	(12.8430)***	(−2.9787)***	(1.0922)	(3.9338)***	(0.0071)	(48.6973)***
Three quarters	−6.2028	−4.8490	−1.4808	0.6500	−0.1468	3.3901	1.9726	0.0555	0.7807
	(−1.3638)	(−0.7535)	(−4.0721)***	(12.8252)***	(−2.9328)***	(1.1253)	(3.7889)***	(0.1779)	(48.7431)***

Table 4 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Overseas: Fixed income									
One quarter	2.0428	−0.1812	−0.2997	0.5242	0.2373	5.3593	0.3682	−0.2087	0.5945
	(0.6986)	(−0.2362)	(−2.5866)***	(14.5940)***	(6.6721)***	(4.1764)***	(1.8200)	(−1.3046)	(33.7813)***
Two quarters	−3.4301	−0.0639	−0.2791	0.5228	0.2395	5.0174	0.3489	−0.1823	0.5955
	(−1.3931)	(−0.0838)	(−2.4175)**	(14.5851)***	(6.7357)***	(3.9567)***	(1.7252)	(−1.1539)	(33.9171)***
Three quarters	−4.5869	0.4802	−0.2812	0.5223	0.2393	5.0309	0.3525	−0.1997	0.5959
	(−1.8488)	(0.4752)	(−2.4415)**	(14.5752)***	(6.7353)***	(3.9898)***	(1.7452)	(−1.2567)	(33.9640)***
Overseas: Global									
One quarter	1.4604	1.9714	−0.1854	0.6870	0.0886	10.2690	−0.0232	−0.0179	0.6335
	(1.2133)	(1.1275)	(−3.1607)***	(76.8457)***	(9.8791)***	(11.3003)***	(−0.2206)	(−0.2042)	(55.7548)***
Two quarters	0.4156	2.0120	−0.1893	0.6871	0.0885	10.1669	−0.0216	−0.0172	0.6334
	(0.3620)	(1.1501)	(−3.2283)***	(76.8459)***	(9.8694)***	(11.1670)***	(−0.2052)	(−0.1960)	(55.7379)***
Three quarters	−0.4474	2.0342	−0.1903	0.6871	0.0888	10.2323	−0.0203	−0.0178	0.6334
	(−0.3986)	(1.1635)	(−3.2452)***	(76.8824)***	(9.8911)***	(11.2276)***	(−0.1931)	(−0.2029)	(55.7455)***
Overseas: Property									
One quarter	−2.5199	−1.1138	−0.5309	−0.0133	0.2961	1.8200	−0.5678	0.0417	0.3097
	(−0.3044)	(−0.1828)	(−0.7308)	(−0.2542)	(6.1818)***	(0.9391)	(−0.1755)	(0.0399)	(6.5255)***
Two quarters	−1.3522	−1.4020	−0.5465	−0.0132	0.2961	1.8103	−0.4809	0.0236	0.3096
	(−0.1813)	(−0.2285)	(−0.7549)	(−0.2527)	(6.1814)***	(0.9340)	(−0.1494)	(0.0226)	(6.5223)***
Three quarters	−1.1357	−1.4329	−0.5444	−0.0132	0.2961	1.8078	−0.4117	0.0214	0.3096
	(−0.1546)	(−0.2307)	(−0.7506)	(−0.2534)	(6.1818)***	(0.9327)	(−0.1290)	(0.0205)	(6.5219)***
Australian property									
One quarter	1.9391	0.8223	−0.2623	0.6885	0.1272	12.8371	−0.7976	0.2764	0.7420
	(0.8836)	(0.2987)	(−1.3519)	(33.2326)***	(6.4671)***	(5.4459)***	(−3.1589)***	(1.1763)	(82.4668)***
Two quarters	2.4850	0.0473	−0.2763	0.6877	0.1273	12.5810	−0.8153	0.3584	0.7423
	(1.3562)	(0.0170)	(−1.4237)	(33.2496)***	(6.4746)***	(5.3600)***	(−3.2395)***	(1.5511)	(82.6019)***
Three quarters	0.9711	−0.2394	−0.2716	0.6887	0.1268	12.4876	−0.7927	0.3287	0.7426
	(0.5269)	(−0.0866)	(−1.4042)	(33.2934)***	(6.4532)***	(5.3234)***	(−3.1530)***	(1.4233)	(82.7067)***
Mixed portfolios									
One quarter	−0.4614	−0.6224	−4.7430	0.2196	0.1123	439.4862	15.0890	−15.1518	0.5068
	(0.4856)	(−0.5600)	(−2.0163)***	(13.2522)***	(5.8386)***	(12.9349)***	(4.4491)***	(−5.6643)***	(32.3435)***
Two quarters	−0.4672	−0.4256	−4.7213	0.2195	0.1122	440.9821	15.2292	−15.2738	0.5067
	(−0.2590)	(−0.3161)	(−2.0075)***	(13.2491)***	(5.8341)***	(13.0268)***	(4.5064)***	(−5.7333)***	(32.3404)***
Three quarters	−0.3231	−0.4370	−4.7219	0.2195	0.1122	441.0013	15.2169	−15.2627	0.5067
	(−0.1857)	(−0.2793)	(−2.0077)***	(13.2485)***	(5.8344)***	(13.0256)***	(4.5033)***	(−5.7306)***	(32.3399)***

*** Significant at 1%, ** significant at 5%.

Table 5 Fixed effects panel regression of superannuation fund net flows with past excess returns and risk

Regression equation: $NF_{i,t} = b_j r_{jt,t} + c\sigma_{i,t-1} + dSize_{i,t-1} + eNF_{i,t-1} + fNF_{i,t-2} + gEIN_{i,t} + hCh_t + jGFC_t + \sum_{j=-1}^{1} k_{i,j}\Delta x_{i,t} + \varepsilon_t$

where $NF_{i,t}$ are the net flow in to the fund, r_{ji}, is the trailing excess returns for either 1, 2, or 3 quarters, $\sigma_{i,t}$ is the tracking error, $Size_{i,t}$, is the log of the fund size, Ch_t is the choice dummy, which has a value of 0, until third quarter of 2005 and 1 for rest of the time period, GFC_t is the crisis dummy, which has a value of 0, until third quarter of 2008 and 1 for the rest of the time period, EIN_t is a variable to capture the overall flow in to the market, and $FE_{i,t}$ is the fixed effect of i^{th} fund. Δx_i are the first difference terms of the regression variables. We estimated three separate regressions with the variable $r_{ji,t}$ being 1, 2, or 3 quarter excess returns.

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Alternatives									
One quarter	−0.0638	0.1225	0.0543	0.5711	−0.0908	4.6821	−0.1648	0.1479	0.8504
	(−0.1218)	(0.1614)	(0.7567)	(7.9650)***	(−1.8310)*	(5.9349)***	(−0.2238)	(1.8923)	(46.2019)***
Two quarters	0.0305	0.3353	0.0575	0.5765	−0.0885	4.7192	−0.1325	0.1349	0.8504
	(0.0842)	(0.4211)	(0.8075)	(8.0964)***	(−1.7846)*	(5.9670)***	(−0.2242)	(1.7877)	(46.2019)***
Three quarters	−0.2349	0.5022	0.0591	0.5756	−0.0868	4.7755	−0.1349	0.1334	0.8504
	(−0.6614)	(0.6451)	(0.8327)	(8.0778)***	(−1.7460)*	(5.9697)***	(−0.2214)	(1.7657)	(46.2019)***
Cash									
One quarter	0.3059	−32.4333	−0.7940	0.2500	−0.0415	45.0978	0.4138	−1.2966	0.4181
	(0.0069)	(−0.8677)	(−3.1251)***	(14.0647)***	(−2.2070)**	(14.7357)***	(1.0854)	(−3.8051)***	(21.7692)***
Two quarters	−9.9631	−30.8359	−0.7881	0.2502	−0.0416	44.9222	0.4116	−1.2943	0.4180
	(−0.2259)	(−0.8274)	(−3.0919)***	(14.0711)***	(−2.2132)**	(14.7052)***	(1.0793)	(−3.7982)***	(21.7639)***
Three quarters	5.5624	−30.8710	−0.8027	0.2500	−0.0417	44.9143	0.4062	−1.2923	0.4179
	(0.1415)	(−0.7799)	(−3.1502)***	(14.0623)***	(−2.2179)**	(14.7012)***	(1.0654)	(−3.7909)***	(21.7578)***
Diversified fixed interest									
One quarter	−1.0230	−0.6372	−0.2332	0.5539	0.1707	6.1538	0.1511	−0.0203	0.7822
	(−0.6661)	(−0.3343)	(−2.6726)***	(18.1282)***	(5.9620)***	(6.6096)***	(0.7239)	(−0.1793)	(78.4831)***
Two quarters	0.3744	−1.0059	−0.2246	0.5555	0.1706	6.2755	0.1409	−0.0327	0.7820
	(0.2666)	(−0.5093)	(−2.5847)***	(18.1977)***	(5.9527)***	(6.7899)***	(0.6756)	(−0.2897)	(78.4020)***
Three quarters	0.6578	−1.0118	−0.2241	0.5555	0.1706	6.2657	0.1399	−0.0325	0.7821
	(0.4533)	(−0.5326)	(−2.5792)***	(18.1999)***	(5.9550)***	(6.7783)***	(0.6707)	(−0.2878)	(78.4125)***
Australian equity									
One quarter	0.6972	0.6864	−0.1377	0.5529	0.2238	9.7599	−0.1567	0.0696	0.7124
	(1.2116)	(0.8968)	(−5.3766)***	(73.9076)***	(30.1320)***	(24.2154)***	(−3.6482)***	(2.1010)**	(83.4268)***
Two quarters	0.9754	0.6587	−0.1383	0.5528	0.2239	9.7483	−0.1572	0.0702	0.7124
	(1.7250)	(0.8605)	(−5.3995)***	(73.8832)***	(30.1465)***	(24.2687)***	(−3.6603)***	(2.1227)**	(83.4323)***
Three quarters	0.1517	0.7584	−0.1367	0.5531	0.2235	9.7610	−0.1562	0.0700	0.7124
	(0.2770)	(0.9920)	(−5.3387)***	(73.9436)***	(30.1058)***	(24.2883)***	(−3.6369)***	(2.1160)**	(83.4154)***
Australian small company									
One quarter	−0.8676	−0.1943	−0.1145	0.4906	0.1717	4.9787	−0.0645	−0.0236	0.5926
	(−1.2087)	(−0.1820)	(−2.3032)**	(18.0649)***	(6.7995)***	(7.7805)***	(−0.7959)	(−0.4528)	(32.4486)***
Two quarters	0.2889	−0.0294	−0.1152	0.4938	0.1708	4.9307	−0.0745	−0.0171	0.5915
	(0.4224)	(−0.0276)	(−2.3068)**	(18.1917)***	(6.7543)***	(7.6937)***	(−0.9176)	(−0.3253)	(32.3049)***
Three quarters	−0.1951	−0.0504	−0.1107	0.4936	0.1705	4.9912	−0.0721	−0.0191	0.5917
	(−0.2916)	(−0.0473)	(−2.2087)**	(18.1892)***	(6.7478)***	(7.7746)***	(−0.8875)	(−0.3638)	(32.3265)***

Table 5 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2(F-stat)
Australian fixed interest									
One quarter	0.7935	0.1810	−0.0977	0.5590	0.2071	5.3545	−0.2411	0.2352	0.8091
	(0.3846)	(0.0722)	(−2.2098)***	(30.7441)***	(11.2629)***	(9.7548)***	(−3.2006)***	(3.7637)***	(112.715)***
Two quarters	−0.1443	0.1321	−0.0986	0.5589	0.2071	5.3666	−0.2411	0.2377	0.8020
	(−0.0703)	(0.0526)	(−2.2394)***	(30.7392)***	(11.2627)***	(9.7537)***	(−3.2006)***	(3.7934)***	(112.717)***
Three quarters	−1.5524	0.3780	−0.0994	0.5587	0.2074	5.3805	−0.2415	0.2386	0.8020
	(−0.8149)	(0.1495)	(−2.2570)***	(30.7271)***	(11.2791)***	(9.7891)***	(−3.2071)***	(3.8116)***	(112.755)***
Managed balanced									
One quarter	−4.9483	−0.5091	−0.4570	0.4651	0.1679	45.1142	0.4648	0.2653	0.5877
	(−0.7485)	(−0.9144)	(−2.5697)**	(46.4481)***	(15.6911)***	(14.9174)***	(1.7879)*	(1.1301)	(53.8938)***
Two quarters	−3.1190	−0.5100	−0.4551	0.4650	0.1680	45.2518	0.4708	0.2625	0.5877
	(−0.4680)	(−0.9161)	(−2.5594)**	(46.4409)***	(15.6953)***	(14.9640)***	(1.8098)*	(1.1182)	(53.8902)***
Three quarters	−1.4746	−0.5506	−0.4543	0.4650	0.1680	45.2150	0.4697	0.2625	0.5877
	(−0.3078)	(−0.9449)	(−2.5546)**	(46.4374)***	(15.6900)***	(14.9616)***	(1.8057)*	(1.1184)	(53.8894)***
Managed growth									
One quarter	0.9126	0.5074	−0.0546	0.4484	0.1789	31.9334	0.1664	0.3237	0.6121
	(0.3102)	(0.7022)	(−0.5758)	(58.4996)***	(22.3074)***	(19.2004)***	(1.2321)	(2.5898)***	(61.4025)***
Two quarters	0.1650	0.5035	−0.0539	0.4484	0.1789	32.0182	0.1692	0.3226	0.6121
	(0.0546)	(0.6968)	(−0.5688)	(58.5001)***	(22.3068)***	(19.2769)***	(1.2525)	(2.5815)***	(61.4053)***
Three quarters	−1.7137	0.3767	−0.0533	0.4484	0.1788	32.0644	0.1698	0.3244	0.6121
	(−0.7773)	(0.4713)	(−0.5623)	(58.5048)***	(22.2943)***	(19.3127)***	(1.2565)	(2.5956)***	(61.4006)***
Mortgage									
One quarter	9.0219	25.5928	−0.0381	0.5090	0.1132	11.3564	−0.5691	−0.4611	0.7649
	(1.0366)	(1.4299)	(−0.5822)	(15.3129)***	(4.2370)***	(10.4923)***	(−4.4588)***	(−4.3528)***	(74.5899)***
Two quarters	6.0371	23.9352	−0.0309	0.5118	0.1125	11.2994	−0.5528	−0.4478	0.7785
	(0.6649)	(1.3508)	(−0.4701)	(15.3704)***	(4.2178)***	(10.4413)***	(−4.3116)***	(−4.2291)***	(74.7167)***
Three quarters	−6.0239	21.5537	−0.0003	0.5174	0.1114	10.9970	−0.4818	−0.4396	0.7636
	(−0.6442)	(1.2011)	(−0.0043)	(15.4945)***	(4.1615)***	(10.1340)***	(−3.7295)***	(−4.0997)***	(74.0560)***
Managed stable									
One quarter	10.2886	−1.0500	−0.0679	0.2265	0.2760	34.6219	0.0094	0.0709	0.4100
	(1.5497)	(−0.2115)	(−0.5992)	(20.7951)***	(19.4327)***	(18.5508)***	(0.0518)	(0.4522)	(25.1989)***
Two quarters	0.4235	−1.2792	−0.0673	0.2267	0.2762	34.6187	0.0159	0.0726	0.4099
	(0.0632)	(−0.2579)	(−0.5934)	(20.8191)***	(19.4405)***	(18.5463)***	(0.0872)	(0.4628)	(25.1883)***
Three quarters	−3.6848	−1.0325	−0.0651	0.2269	0.2763	34.6458	0.0191	0.0725	0.4098
	(−0.6368)	(−0.1816)	(−0.5738)	(20.8348)***	(19.4426)***	(18.5624)***	(0.1052)	(0.4615)	(25.1833)***

Table 5 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Overseas: Fixed income									
One quarter	5.0056	−0.2939	−0.4672	0.5040	0.2817	4.8537	0.7542	−0.4025	0.6520
	(1.0039)	(−0.3472)	(−2.8976)***	(11.2639)***	(6.3126)***	(2.4814)**	(2.5181)**	(−1.8447)	(35.8054)***
Two quarters	−3.4750	−0.1431	−0.4460	0.5034	0.2849	4.0535	0.7246	−0.3689	0.6522
	(−0.8250)	(−0.1705)	(−2.7745)***	(11.2569)***	(6.3827)***	(2.1418)**	(2.4199)**	(−1.7057)	(35.8318)***
Three quarters	−4.5791	0.5252	−0.4479	0.5033	0.2846	3.9846	0.7298	−0.3890	0.6527
	(−1.4583)	(0.4610)	(−2.7936)***	(11.2764)***	(6.3827)***	(2.1482)**	(2.4425)**	(−1.7894)	(35.9062)***
Overseas: Global									
One quarter	1.0029	1.5252	−0.0891	0.6720	0.0966	7.6598	−0.0621	0.0017	0.7304
	(1.8260)	(1.6489)	(−3.3522)***	(64.1493)***	(9.8981)***	(17.4363)***	(−1.2644)	(0.0439)	(84.7390)***
Two quarters	0.2448	1.6383	−0.0900	0.6721	0.0965	7.6586	−0.0607	0.0002	0.7304
	(0.4643)	(1.7700)	(−3.3882)***	(64.1454)***	(9.8841)***	(17.4246)***	(−1.2370)	(0.0058)	(84.7342)***
Three quarters	0.1579	1.6597	−0.0896	0.6727	0.0957	7.6493	−0.0617	0.0009	0.7304
	(0.3044)	(1.7938)	(−3.3754)***	(64.2207)***	(9.8033)***	(17.3891)***	(−1.2567)	(0.0225)	(84.7262)***
Overseas: Property									
One quarter	0.2892	0.8596	−0.1289	0.3407	0.2011	3.1907	0.0231	−0.4524	0.5953
	(0.4471)	(1.7941)	(−1.3617)	(4.7972)***	(3.0655)***	(3.5505)***	(0.1148)	(−4.5403)***	(19.3084)***
Two quarters	1.0060	0.9787	−0.1254	0.3335	0.2053	3.3043	0.0122	−0.4726	0.6460
	(1.7453)	(2.0234)**	(−1.3303)	(4.7051)***	(3.1402)***	(3.6782)***	(0.0171)	(−4.7496)***	(19.5677)***
Three quarters	0.6662	0.9721	−0.1264	0.3277	0.2103	3.2750	0.0255	−0.4690	0.6432
	(1.1389)	(1.9590)	(−1.3315)	(4.5871)***	(3.1913)***	(3.6321)***	(0.1579)	(−4.6667)***	(19.3405)***
Australian property									
One quarter	0.7709	1.5820	−0.0858	0.5656	0.1139	7.7038	−0.0281	−0.1770	0.6895
	(1.1917)	(1.7511)	(−1.4686)	(18.6173)***	(4.2346)***	(9.5817)***	(−0.3793)	(−2.5582)**	(56.3378)***
Two quarters	0.5231	1.4553	−0.0898	0.5645	0.1128	7.6938	−0.0336	−0.1506	0.7029
	(0.9580)	(1.5909)	(−1.5393)	(18.5927)***	(4.1918)***	(9.5676)***	(−0.4538)	(−2.2121)**	(56.3059)***
Three quarters	−0.1761	1.3209	−0.0910	0.5615	0.1144	7.6752	−0.0229	−0.1615	0.6904
	(−0.3126)	(1.4557)	(−1.5636)	(18.4923)***	(4.2572)***	(9.5600)***	(−0.3100)	(−2.3710)**	(56.5515)***
Australian property securities									
One quarter	−1.7522	−0.0003	−0.2480	0.6068	0.0293	11.3418	−0.3441	−0.1150	0.5945
	(−1.0307)	(−0.0162)	(−4.4098)***	(39.5003)***	(1.9717)**	(13.5866)***	(−4.0557)***	(−1.4711)	(47.5862)***
Two quarters	0.6824	−0.0005	−0.2523	0.6069	0.0298	11.3933	−0.3466	−0.1163	0.5944
	(0.4020)	(−0.0224)	(−4.4896)***	(39.5033)***	(2.0037)**	(13.6696)***	(−4.0865)***	(−1.4876)	(47.5658)***
Three quarters	0.7905	0.0054	−0.2529	0.6069	0.0298	11.3890	−0.3461	−0.1174	0.5944
	(0.7121)	(0.1801)	(−4.5131)***	(39.5102)***	(2.0106)**	(13.6772)***	(−4.0819)***	(−1.5053)	(47.5673)***
Mixed portfolios									
One quarter	−74.4347	−264.1774	−2.3457	0.2421	0.0830	376.5076	10.8893	−9.7848	0.5794
	(−0.6754)	(−2.1044)**	(−1.1941)	(11.7524)***	(3.8199)***	(12.5672)***	(3.6609)***	(−4.2154)***	(40.3196)***
Two quarters	−117.0723	−268.8299	−2.3409	0.2420	0.0836	377.5546	10.9902	−9.6839	0.5795
	(−1.0725)	(−2.1505)**	(−1.1921)	(11.7490)***	(3.8474)***	(12.6211)***	(3.7027)***	(−4.2029)***	(40.3381)***
Three quarters	−52.2446	−265.2539	−2.3697	0.2419	0.0834	375.3131	10.7746	−9.6144	0.5794
	(−0.5250)	(−2.1043)**	(−1.2068)	(11.7440)***	(3.8352)***	(12.5483)***	(3.6357)***	(−4.1759)***	(40.3274)***

*** Significant at 1%, ** significant at 5%.

Table 6 Fixed effects panel regression of non-superannuation fund net flows with past excess returns and risk

Regression equation: $NF_{i,t} = b_j r_{jt,t} + c\sigma_{i,t-1} + dSize_{i,t-1} + eNF_{i,t-1} + fNF_{i,t-2} + gEIN_{i,t} + hCh_t + jGFC_t + \sum_{j=-1}^{1} k_{i,j}\Delta x_{i,t} + \varepsilon_t$

where $NF_{i,t}$ are the net flow in to the fund, r_{ji}, is the trailing excess returns for either 1, 2, or 3 quarters, $\sigma_{i,t}$ is the tracking error, $Size_{i,t}$, is the log of the fund size, Ch_t is the choice dummy, which has a value of 0, until third quarter of 2005 and 1 for rest of the time period, GFC_t is the crisis dummy, which has a value of 0, until third quarter of 2008 and 1 for the rest of the time period, EIN_t is a variable to capture the overall flow in to the market, and $FE_{i,t}$ is the fixed effect of i^{th} fund. Δx_i are the first difference terms of the regression variables. We estimated three separate regressions with the variable $r_{ji,t}$ being 1, 2, or 3 quarter excess returns.

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Alternatives									
One quarter	−7.2778	20.6850	−1.0254	0.3106	0.1103	27.2164	−2.2473	−1.0871	0.5191
	(−0.8232)	(1.5731)	(−1.5183)	(3.4203)***	(1.0823)	(3.2123)***	(−1.6888)	(−0.9486)	(10.0184)***
Two quarters	−3.7602	19.1688	−1.0353	0.3134	0.1081	27.5594	−2.2890	−1.0468	0.5198
	(−0.5719)	(1.4290)	(−1.5422)	(3.4512)***	(1.0605)	(3.4646)***	(−1.7321)	(−0.9197)	(10.0448)***
Three quarters	−1.2670	17.0467	−1.0609	0.3040	0.1034	27.6898	−2.3215	−1.1194	0.5151
	(−0.1772)	(1.2767)	(−1.5734)	(3.3220)***	(1.0093)	(3.4639)***	(−1.7477)	(−0.9748)	(9.8746)***
Cash									
One quarter	−9.0959	2.0452	−0.3290	−0.0667	−0.3998	50.2838	−3.7677	1.2922	0.8111
	(−0.1233)	(0.2802)	(−0.3439)	(−1.7676)	(−8.3908)***	(4.7028)***	(−2.6051)***	(1.0956)	(81.6039)***
Two quarters	−3.8280	1.9996	−0.3257	−0.0666	−0.3998	50.4056	−3.7589	1.2870	0.8111
	(−0.0523)	(0.2740)	(−0.3402)	(−1.7668)	(−8.3903)***	(4.7117)***	(−2.5994)***	(1.0908)	(81.5963)***
Three quarters	−8.8860	2.1010	−0.3222	−0.0667	−0.3998	50.4742	−3.7631	1.2880	0.8111
	(−0.1483)	(0.2129)	(−0.3367)	(−1.7677)	(−8.3897)***	(4.7232)***	(−2.6030)***	(1.0916)	(81.5945)***
Diversified fixed interest									
One quarter	−1.6785	−0.1225	−0.1368	0.6127	0.1455	5.2615	−1.1414	0.2608	0.6390
	(−0.5396)	(−0.0278)	(−0.8530)	(12.7381)***	(3.0820)***	(3.3195)***	(−2.8931)***	(1.2848)	(29.4549)***
Two quarters	0.0639	−0.8401	−0.1422	0.6132	0.1469	5.1883	−1.1321	0.2659	0.6391
	(0.0209)	(−0.1854)	(−0.8846)	(12.7454)***	(3.1228)***	(3.2619)***	(−2.8679)***	(1.3068)	(29.4685)***
Three quarters	2.6973	−1.7162	−0.1622	0.6140	0.1483	5.0380	−1.1029	0.2706	0.6394
	(0.8454)	(−0.3872)	(−1.0038)	(12.7686)***	(3.1524)***	(3.1664)***	(−2.7871)***	(1.3317)	(29.5102)***
Australian equity									
One quarter	5.8384	−0.5159	−0.4661	0.5469	0.2405	15.7017	−0.1571	0.2315	0.7457
	(2.9352)***	(−0.2069)	(−3.0710)***	(50.7877)***	(22.8664)***	(9.8157)***	(−0.9202)	(1.5251)	(98.3378)***
Two quarters	4.9930	−0.4240	−0.4688	0.5467	0.2406	15.5608	−0.1593	0.2360	0.7456
	(2.4917)**	(−0.1693)	(−3.0885)***	(50.7648)***	(22.8720)***	(9.7453)***	(−0.9328)	(1.5551)	(98.3225)***
Three quarters	−0.9141	−1.4405	−0.4618	0.5476	0.2402	15.6940	−0.1570	0.2396	0.7454
	(−0.4605)	(−0.5765)	(−3.0415)***	(50.8305)***	(22.8212)***	(9.8188)***	(−0.9192)	(1.5784)	(98.1926)***
Australian small company									
One quarter	2.1842	1.4455	−0.5812	0.9655	−0.1058	10.0737	−0.0283	−0.0664	0.8481
	(0.6838)	(0.2741)	(−2.1618)**	(35.9651)***	(−4.1405)***	(3.5488)***	(−0.0811)	(−0.2421)	(144.029)***
Two quarters	2.3331	1.5274	−0.5880	0.9653	−0.1060	10.0044	−0.0308	−0.0623	0.8481

Table 6 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
	(0.7686)	(0.2892)	(−2.1923)**	(35.9558)***	(−4.1515)***	(3.5236)***	(−0.0886)	(−0.2273)	(144.040)***
Three quarters	2.9415	1.7870	−0.6016	0.9654	−0.1067	9.9264	−0.0359	−0.0610	0.8481
	(0.9683)	(0.3375)	(−2.2412)**	(35.9694)***	(−4.1775)***	(3.4940)***	(−0.1031)	(−0.2225)	(144.102)***
Australian fixed interest									
One quarter	−11.5886	−9.8798	−0.0964	0.3381	0.0465	22.2048	−0.7901	0.8175	0.3064
	(−1.1411)	(−0.6219)	(−0.3983)	(14.9570)***	(1.8020)*	(7.7632)***	(−2.1858)**	(2.5503)**	(13.4247)***
Two quarters	−21.3827	−8.1348	−0.0885	0.3372	0.0476	22.4008	−0.7862	0.7944	0.3065
	(−2.1608)	(−0.5159)	(−0.3648)	(14.8949)***	(1.8388)*	(7.8012)***	(−2.1755)**	(2.4862)**	(13.4288)***
Three quarters	−14.1095	−12.8552	−0.0968	0.3361	0.0476	22.0646	−0.8013	0.8323	0.3053
	(−1.4132)	(−0.8157)	(−0.3982)	(14.8239)***	(1.8373)v*	(7.6904)***	(−2.2146)**	(2.6056)**	(13.3592)***
Managed balanced									
One quarter	2.0480	−0.1866	−1.0040	0.5957	0.1598	29.2986	0.1559	0.1068	0.6749
	(0.2673)	(−0.1022)	(−3.5123)***	(32.4761)***	(8.9349)***	(7.2914)***	(0.5342)	(0.3465)	(72.3690)***
Two quarters	−0.9872	−0.2078	−1.0104	0.5953	0.1602	29.1267	0.1403	0.1091	0.6748
	(−0.1296)	(−0.1138)	(−3.5362)***	(32.4665)***	(8.9607)***	(7.2383)***	(0.4818)	(0.3540)	(72.3490)***
Three quarters	−0.9822	−0.2036	−1.0100	0.5951	0.1604	29.1707	0.1435	0.1073	0.6748
	(−0.1294)	(−0.1115)	(−3.5348)***	(32.4649)***	(8.9759)***	(7.2366)***	(0.4935)	(0.3483)	(72.3490)***
Managed growth									
One quarter	0.8616	0.0902	−0.6175	0.6781	0.0503	21.1801	0.0599	−0.1063	0.6674
	(0.8038)	(0.1153)	(−3.3659)***	(54.2023)***	(4.0691)***	(9.4306)***	(0.3486)	(−0.5762)	(75.7457)***
Two quarters	1.9457	−0.3190	−0.6087	0.6779	0.0505	21.3452	0.0649	−0.1018	0.6674
	(1.6609)	(−0.3455)	(−3.3368)***	(54.1813)***	(4.0824)***	(9.6617)***	(0.3782)	(−0.5521)	(75.7545)***
Three quarters	0.0275	0.4557	−0.6069	0.6784	0.0503	21.3211	0.0571	−0.1039	0.6673
	(0.0240)	(0.4296)	(−3.3259)***	(54.2142)***	(4.0689)***	(9.6486)***	(0.3331)	(−0.5634)	(75.7052)***
Mortgage									
One quarter	14.5868	12.7189	−2.2315	0.6378	0.0922	53.6784	−4.6394	−2.0535	0.6599
	(0.3456)	(0.1727)	(−2.5030)**	(22.9358)***	(3.4816)***	(4.7633)***	(−3.8266)***	(−1.6699)*	(56.5142)***
Two quarters	30.5213	10.0030	−2.2557	0.6379	0.0923	53.5617	−4.6585	−2.0296	0.6599
	(0.7339)	(0.1352)	(−2.5252)**	(22.9435)***	(3.4857)***	(4.7508)***	(−3.8407)***	(−1.6480)*	(56.5219)***
Three quarters	26.9532	12.9826	−2.2427	0.6377	0.0920	53.8537	−4.6866	−2.0223	0.6599
	(0.6581)	(0.1754)	(−2.5126)**	(22.9353)***	(3.4758)***	(4.7811)***	(−3.8592)***	(−1.6412)	(56.5149)***
Managed stable									
One quarter	16.9709	−0.6171	−0.9577	0.5585	0.1279	22.0169	−0.6052	0.0682	0.6557
	(3.3580)***	(−0.2989)	(−6.1349)***	(31.5169)***	(7.6632)***	(11.8857)***	(−3.3885)***	(0.4177)	(62.7063)***
Two quarters	6.7024	−1.1474	−0.9587	0.5596	0.1261	21.5435	−0.6300	0.0879	0.6547
	(1.6723)	(−0.4812)	(−6.1333)***	(31.5401)***	(7.5532)***	(11.6623)***	(−3.5263)***	(0.5374)	(62.4548)***
Three quarters	−0.6499	−1.0155	−0.9455	0.5617	0.1251	21.4619	−0.6406	0.0997	0.6543
	(−0.2278)	(−0.3437)	(−6.0501)***	(31.6994)***	(7.4921)***	(11.6123)***	(−3.5844)***	(0.6089)	(62.3332)***

Table 6 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Overseas: Fixed income									
One quarter	−1.5983	4.5786	−0.0063	0.4333	−0.0358	8.3865	0.1356	0.0358	0.3441
	(−0.4909)	(1.1921)	(−0.0360)	(6.3368)***	(−0.5609)	(5.1663)***	(0.5254)	(0.1573)	(8.6451)***
Two quarters	−2.6695	5.2143	0.0086	0.4401	−0.0239	8.4539	0.1254	0.0093	0.3473
	(−1.0259)	(1.3482)	(0.0492)	(6.5506)***	(−0.3762)	(5.2388)***	(0.4870)	(0.0416)	(8.7565)***
Three quarters	−2.1722	5.0998	0.0050	0.4413	−0.0246	8.4457	0.1268	0.0098	0.3474
	(−0.8354)	(1.3294)	(0.0287)	(6.5737)***	(−0.3876)	(5.2358)***	(0.4921)	(0.0437)	(8.7574)***
Overseas: Global									
One quarter	2.0094	2.8251	−0.3870	0.6905	0.0851	13.8626	−0.0775	−0.1489	0.6248
	(0.5596)	(0.6586)	(−2.0571)**	(42.5120)***	(5.2010)***	(5.2177)***	(−0.2474)	(−0.5153)	(51.3349)***
Two quarters	0.6110	2.7278	−0.3925	0.6907	0.0849	13.7072	−0.0780	−0.1431	0.6247
	(0.1808)	(0.6359)	(−2.0862)**	(42.5218)***	(5.1833)***	(5.1434)***	(−0.2491)	(−0.4952)	(51.3197)***
Three quarters	−2.5328	2.5614	−0.4097	0.6906	0.0858	14.0505	−0.0835	−0.1489	0.6250
	(−0.7747)	(0.5973)	(−2.1753)**	(42.5541)***	(5.2357)***	(5.2662)***	(−0.2669)	(−0.5153)	(51.3770)***
Overseas: Property									
One quarter	−6.4412	−5.1092	−0.6217	−0.0150	0.3012	1.7360	−0.7040	0.6047	0.2474
	(−0.2681)	(−0.2942)	(−0.3823)	(−0.1766)	(3.8285)***	(0.5483)	(−0.1284)	(0.2226)	(3.6147)***
Two quarters	−2.0478	−5.5621	−0.6857	−0.0141	0.3014	1.7116	−0.4099	0.5311	0.2471
	(−0.1210)	(−0.3194)	(−0.4246)	(−0.1663)	(3.8296)***	(0.5407)	(−0.0762)	(0.1961)	(3.6104)***
Three quarters	−0.5792	−5.6866	−0.7687	−0.0141	0.3017	1.7128	−0.2193	0.4568	0.3784
	(−0.0488)	(−0.3276)	(−0.4735)	(−0.1664)	(3.8342)***	(0.5413)	(−0.0408)	(0.1689)	(3.6157)***
Australian property									
One quarter	2.6963	0.0366	−0.4723	0.6958	0.1205	20.6932	−1.5878	0.7825	0.7554
	(0.5052)	(0.0068)	(−1.1262)	(22.1195)***	(4.0938)***	(4.0290)***	(−2.7608)***	(1.5106)	(71.5921)***
Two quarters	3.5949	−1.2713	−0.5022	0.6947	0.1204	19.5832	−1.6031	0.9144	0.7560
	(0.9358)	(−0.2329)	(−1.1973)	(22.1581)***	(4.1005)***	(3.9564)***	(−2.8007)***	(1.8104)	(71.8113)***
Three quarters	1.3717	−1.3361	−0.4826	0.6961	0.1199	19.4651	−1.5642	0.8408	0.7560
	(0.2806)	(−0.2450)	(−1.1475)	(22.1833)***	(4.0822)***	(3.9314)***	(−2.7382)***	(1.6758)	(71.8379)***
Australian property securities									
One quarter	−3.8447	−0.9594	−0.1724	0.4839	0.0375	20.8623	−1.1217	0.0022	0.3989
	(−1.1146)	(−0.2032)	(−0.7225)	(21.5438)***	(1.5858)	(7.9903)***	(−4.5007)***	(0.0064)	(21.6098)***
Two quarters	−0.7147	−0.9424	−0.1855	0.4849	0.0366	20.8958	−1.1158	−0.0170	0.3992
	(−0.2147)	(−0.1997)	(−0.7767)	(21.5766)***	(1.5489)	(8.0100)***	(−4.4774)***	(−0.0484)	(21.6364)***
Three quarters	−2.7784	−1.3359	−0.1722	0.4846	0.0381	20.5733	−1.1068	−0.0089	0.3990
	(−0.6650)	(−0.2829)	(−0.7179)	(21.5614)***	(1.6135)	(7.8996)***	(−4.4433)***	(−0.0254)	(21.6166)***
Mixed portfolios									
One quarter	7.6036	−1.3428	−22.5619	0.2177	0.0949	495.0457	31.8194	−35.0125	0.4776
	(1.1164)	(−0.7752)	(−2.9130)***	(6.6792)***	(2.3697)**	(4.8744)***	(3.0003)***	(−4.1259)***	(22.2540)***
Two quarters	−0.6722	−0.9943	−22.6671	0.2169	0.0928	505.0739	31.9750	−35.4038	0.4769
	(−0.2408)	(−0.4748)	(−2.9248)***	(6.6528)***	(2.3176)**	(4.9883)***	(3.0132)***	(−4.1723)***	(22.1950)***
Three quarters	−1.0480	−0.7320	−22.6769	0.2169	0.0928	505.5384	31.9475	−35.3936	0.4769
	(−0.2363)	(−0.2499)	(−2.9259)***	(6.6532)***	(2.3179)**	(4.9902)***	(3.0123)***	(−4.1731)***	(22.1954)***

*** Significant at 1%, ** significant at 5%.

Table 7 Fixed effects panel regression of wholesale managed fund net flows with past excess returns and risk

Regression equation: $NF_{i,t} = b_j r_{jt,t} + c\sigma_{i,t-1} + dSize_{i,t-1} + eNF_{i,t-1} + fNF_{i,t-2} + gEIN_{i,t} + hCh_t + jGFC_t + \sum_{j=-1}^{1} k_{i,j}\Delta x_{i,t} + \varepsilon_t$

where $NF_{i,t}$ are the net flow in to the fund, r_{ji}, is the trailing excess returns for either 1, 2, or 3 quarters, $\sigma_{i,t}$ is the tracking error, $Size_{i,t}$, is the log of the fund size, Ch_t is the choice dummy, which has a value of 0, until third quarter of 2005 and 1 for rest of the time period, GFC_t is the crisis dummy, which has a value of 0, until third quarter of 2008 and 1 for the rest of the time period, EIN_t is a variable to capture the overall flow in to the market, and $FE_{i,t}$ is the fixed effect of i^{th} fund. Δx_i are the first difference terms of the regression variables. We estimated three separate regressions with the variable $r_{ji,t}$ being 1, 2, or 3 quarter excess returns.

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Alternatives									
One quarter	35.7291	23.8420	−3.9746	0.2438	0.2351	153.8883	−1.9964	1.6150	0.5220
	(1.1982)	(0.4293)	(−2.1016)**	(4.5519)***	(4.7258)***	(5.7064)***	(−0.4093)	(0.4250)	(13.8959)***
Two quarters	24.8607	25.6084	−3.9704	0.2460	0.2332	148.0443	−1.7689	1.4299	0.5211
	(0.9036)	(0.4591)	(−2.0900)**	(4.5968)***	(4.6896)***	(5.6372)***	(−0.3632)	(0.3768)	(13.8518)***
Three quarters	9.6859	29.8056	−3.8677	0.2482	0.2322	146.9991	−1.6830	1.3826	0.5207
	(0.2832)	(0.5354)	(−2.0324)**	(4.6445)***	(4.6673)***	(5.6144)***	(−0.3453)	(0.3643)	(13.8320)***
Cash									
One quarter	−17.8620	−11.5230	−3.6736	0.1171	0.0294	190.8162	−3.6277	0.9782	0.5487
	(−0.3798)	(−0.1856)	(−3.5409)***	(3.0796)***	(0.8165)	(9.1467)***	(−1.2604)	(0.3871)	(16.2555)***
Two quarters	2.6941	−9.5399	−3.6396	0.1183	0.0295	190.9948	−3.4811	0.8692	0.5484
	(0.0598)	(−0.1530)	(−3.5114)***	(3.1161)***	(0.8190)	(9.1510)***	(−1.2121)	(0.3431)	(16.2369)***
Three quarters	−2.8512	−9.3748	−3.6408	0.1183	0.0296	191.0699	−3.4870	0.8589	0.5484
	(−0.0514)	(−0.1503)	(−3.5122)***	(3.1143)***	(0.8202)	(9.1518)***	(−1.2148)	(0.3386)	(16.2371)***
Diversified fixed interest									
One quarter	6.5607	−11.5432	0.2155	0.7321	−0.0753	37.5583	−2.5349	1.5263	0.6086
	(0.1866)	(−0.2977)	(0.1844)	(15.7303)***	(−1.6806)	(2.2415)**	(−0.9040)	(0.6399)	(23.4155)***
Two quarters	10.0920	−11.9782	0.1983	0.7322	−0.0767	37.7852	−2.5238	1.4616	0.6087
	(0.2991)	(−0.3089)	(0.1697)	(15.7434)***	(−1.7180)	(2.2606)**	(−0.9002)	(0.6119)	(23.4283)***
Three quarters	19.4461	−15.3910	0.1774	0.7319	−0.0766	37.5335	−2.5172	1.4767	0.6087
	(0.4727)	(−0.3767)	(0.1520)	(15.7319)***	(−1.7166)	(2.2491)**	(−0.8979)	(0.6183)	(23.4305)***
Australian equity									
One quarter	−0.1917	56.5799	−0.8682	0.3273	0.2013	219.0345	−2.9302	0.6803	0.4094
	(−0.0067)	(1.5615)	(−1.1025)	(20.6011)***	(11.9967)***	(15.2449)***	(−1.6568)	(0.4378)	(20.9317)***
Two quarters	50.7290	55.7858	−0.8098	0.3272	0.2028	221.1555	−3.0462	0.8239)	0.4092
	(1.8417)*	(1.5395)	(−1.0283)	(20.5830)***	(12.0797)***	(15.4791)***	(−1.7225)	(0.5301	(20.9151)***
Three quarters	53.3199	54.2182	−0.8160	0.3270	0.2025	220.8892	−3.0698	0.8345)	0.4091
	(1.6458)*	(1.4871)	(−1.0362)	(20.5708)***	(12.0638)***	(15.4476)***	(−1.7354)*	(0.5365)	(20.9082)***
Australian small company									
One quarter	−7.7248	0.4460	−2.0207	0.3158	0.0986	72.5264	−0.2908	1.8779	0.5073
	(−0.8832)	(0.2763)	(−3.2341)***	(9.3489)***	(3.0750)***	(9.2493)***	(−0.2535)	(1.9716)**	(22.5734)***
Two quarters	−0.1091	0.4187	−1.9787	0.3176	0.0978	73.1950	−0.4053	1.9340	0.5068
	(−0.0441)	(0.2161)	(−3.1747)***	(9.4112)***	(3.0486)***	(9.3734)***	(−0.3553)	(2.0341)**	(22.5339)***
Three quarters	0.9919	0.9926	−1.9759	0.3177	0.0979	73.1018	−0.4142	1.9399	0.5068
	(0.2602)	(0.3782)	(−3.1732)***	(9.4153)***	(3.0516)***	(9.3590)***	(−0.3630)	(2.0423)**	(22.5381)***

Table 7 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Australian fixed interest									
One quarter	0.6542	−2.4526	−0.4916	0.2326	0.0369	171.1305	−3.6020	2.9601	0.4441
	(0.2635)	(−1.3039)	(−0.5660)	(8.4471)***	(1.2588)	(11.8645)***	(−1.7311)*	(1.6160)	(17.8545)***
Two quarters	1.4048	−1.7653	−0.4854	0.2329	0.0368	170.9260	−3.6081	2.9436	0.4442
	(0.4696)	(−0.7804)	(−0.5591)	(8.4582)***	(1.2558)	(11.8597)***	(−1.7354)*	(1.6072)	(17.8604)***
Three quarters	0.1711	−2.4077	−0.4829	0.2330	0.0368	170.8635	−3.6249	2.9739	0.4442
	(0.0361)	(−0.7662)	(−0.5562)	(8.4628)***	(1.2572)	(11.8564)***	(−1.7430)*	(1.6208)	(17.8626)***
Managed balanced									
One quarter	17.4951	−102.6328	−1.8178	0.3945	0.1785	121.5846	1.9240	1.8081	0.5261
	(0.4935)	(−1.9966)**	(−2.3513)**	(16.9050)***	(8.0774)***	(9.5453)***	(1.4291)	(1.4581)	(33.6633)***
Two quarters	62.8748	−109.2706	−1.8672	0.3941	0.1783	121.0353	1.8442	1.8712	0.5273
	(1.7639)	(−2.1300)**	(−2.4173)**	(16.9223)***	(8.0874)***	(9.5274)***	(1.3712)	(1.5107)	(33.8220)***
Three quarters	67.9142	−108.5175	−1.8655	0.3938	0.1787	121.0523	1.8500	1.8645	0.5272
	(1.5583)	(−2.1157)**	(−2.4136)**	(16.8935)***	(8.1033)***	(9.5267)***	(1.3745)	(1.5049)	(33.8080)***
Managed growth									
One quarter	21.5702	−9.3167	−0.1630	0.2808	0.2421	109.5969	3.1036	2.7771	0.5780
	(1.0912)	(−0.4288)	(−0.3185)	(14.0478)***	(12.5332)***	(10.8635)***	(2.8593)***	(2.8396)***	(41.6622)***
Two quarters	29.7467	−4.5059	−0.1648	0.2806	0.2419	109.4650	3.0966	2.7955	0.5782
	(1.6703)	(−0.2016)	(−0.3223)	(14.0410)***	(12.5312)***	(10.8512)***	(2.8549)***	(2.8589)***	(41.6876)***
Three quarters	19.5854	−1.9188	−0.1682	0.2807	0.2417	109.6567	3.0913	2.7602	0.5781
	(0.9099)	(−0.0847)	(−0.3288)	(14.0399)***	(12.5210)***	(10.8598)***	(2.8496)***	(2.8223)***	(41.6631)***
Mortgage									
One quarter	15.0031	−165.3449	−2.7810	0.5564	−0.0075	115.0136	−2.9112	−12.6533	0.6378
	(0.0610)	(−0.5649)	(−1.7877)	(11.3360)***	(−0.1886)	(4.9636)***	(−1.1183)	(−4.7818)***	(30.9483)***
Two quarters	−186.9821	−155.5166	−2.8565	0.5552	−0.0076	114.7343	−3.0539	−12.5717	0.6390
	(−0.7644)	(−0.5354)	(−1.8444)	(11.3304)***	(−0.1937)	(4.9613)***	(−1.1756)	(−4.7619)***	(31.0962)***
Three quarters	−183.9794	−155.0141	−2.8218	0.5568	−0.0082	114.4535	−3.0224	−12.6035	0.6387
	(−0.6608)	(−0.5162)	(−1.8165)	(11.3601)***	(−0.2088)	(4.9481)***	(−1.1632)	(−4.7707)***	(31.0571)
Managed stable									
One quarter	36.1695	−9.9624	0.1200	0.3645	0.2064	44.1690	0.0999	0.8455	0.5228
	(2.2710)**	(−0.4250)	(0.6044)	(15.5571)***	(8.9002)***	(11.8384)***	(0.2408)	(2.1648)**	(31.2614)***
Two quarters	51.4637	−0.7534	0.1416	0.3605	0.2078	44.1570	0.0974	0.8312	0.5242
	(3.2729)***	(−0.0319)	(0.7134)	(15.3809)***	(8.9757)***	(11.8532)***	(0.2350)	(2.1311)**	(31.4290)***
Three quarters	47.7310	−0.5824	0.1415	0.3599	0.2079	44.2001	0.0943	0.8326	0.5240
	(2.4972)**	(−0.0244)	(0.7120)	(15.3450)***	(8.9781)***	(11.8635)***	(0.2275)	(2.1339)**	(31.4054)***
Overseas: Asia Pacific									
One quarter	4.0034	−0.0316	−3.4421	0.7154	−0.2031	49.8574	3.3268	−3.2115	0.4356
	(0.1167)	(−0.0008)	(−1.5303)	(13.0842)***	(−3.7646)***	(2.0531)**	(0.7712)	(−0.9805)	(12.4342)***
Two quarters	−10.2668	−10.5140	−3.4806	0.7170	−0.2040	52.4624	3.3014	−3.2193	0.4368
	(−0.3743)	(−0.2537)	(−1.5531)	(13.1369)***	(−3.7839)***	(2.1993)**	(0.7679)	(−0.9873)	(12.4934)***
Three quarters	−15.6325	−8.4892	−3.5347	0.7178	−0.2055	51.4156	3.2963	−3.2434	0.4360
	(−0.4493)	(−0.1989)	(−1.5761)	(13.1316)***	(−3.8080)***	(2.1543)**	(0.7658)	(−0.9935)	(12.4538)***

Table 7 (Continued)

Fund category	b_j (t-stat)	c (t-stat)	d (t-stat)	e (t-stat)	f (t-stat)	g (t-stat)	h (t-stat)	j (t-stat)	Adj. R^2 (F-stat)
Overseas: Fixed income									
One quarter	−173.3913	46.4374	1.0461	0.4832	−0.2008	138.0340	−6.1560	7.4897	0.3450
	(−2.1262)***	(0.4264)	(0.5448)	(12.6543)***	(−5.3815)***	(5.1590)***	(−1.3458)	(1.9100)	(10.5215)***
Two quarters	−114.1542	52.3965	1.0571	0.4863	−0.2012	139.9870	−6.2227	7.4056	0.3449
	(−1.4076)	(0.4760)	(0.5502)	(12.7612)***	(−5.3909)***	(5.2723)***	(−1.3612)	(1.8847)	(10.5163)***
Three quarters	−51.9156	52.2689	0.6686	0.4875	−0.2003	141.7957	−6.7035	7.4278	0.3399
	(−0.5227)	(0.4678)	(0.3480)	(12.7450)***	(−5.3340)***	(5.3228)***	(−1.4621)	(1.8780)	(10.3102)***
Overseas: Global									
One quarter	−0.8366	0.0360	−0.9987	0.4471	0.2074	194.3697	−2.7264	−1.3775	0.4911
	(−0.1879)	(0.0596)	(−0.9589)	(25.3902)***	(11.1576)***	(11.3213)***	(−1.0697)	(−0.6343)	(25.1054)***
Two quarters	0.1611	0.1095	−0.9988	0.4471	0.2074	194.6364	−2.7388	−1.3700	0.4911
	(0.1712)	(0.1522)	(−0.9591)	(25.3925)***	(11.1573)***	(11.3684)***	(−1.0747)	(−0.6310)	(25.1053)***
Three quarters	0.1332	0.0992	−0.9991	0.4471	0.2074	194.6373	−2.7366	−1.3706	0.4911
	(0.0922)	(0.1030)	(−0.9592)	(25.3921)***	(11.1573)***	(11.3685)***	(−1.0740)	(−0.6312)	(25.1053)***
Overseas: Property									
One quarter	23.3797	33.1718	−5.0260	0.1915	0.2144	77.4303	−11.3356	−7.4589	0.3144
	(1.0291)	(0.7255)	(−1.6248)	(2.8065)***	(3.0978)***	(3.5021)***	(−0.6810)	(−1.8618)	(5.0931)***
Two quarters	15.6963	30.0710	−5.1585	0.1883	0.2144	77.3477	−10.7996	−7.6721	0.3127
	(0.7013)	(0.6349)	(−1.6531)	(2.7559)***	(3.0925)***	(3.4585)***	(−0.6485)	(−1.9053)	(5.0615)***
Three quarters	3.4941	22.6558	−4.9197	0.1887	0.2166	76.5739	−10.6832	−7.5177	0.3127
	(0.1190)	(0.4790)	(−1.5559)	(2.7615)***	(3.1179)***	(3.4173)***	(−0.6416)	(−1.8604)	(5.0601)***
Australian property									
One quarter	−64.7034	89.0706	−0.2367	0.1708	0.1007	206.0742	1.4658	−10.1796	0.2566
	(−1.0168)	(1.1207)	(−0.1541)	(3.9684)***	(1.9099)*	(4.5558)***	(0.3368)	(−2.2685)**	(7.9631)***
Two quarters	−51.1639	93.4832)	−0.1554	0.1716	0.1036	218.4337	1.6170	−11.2836	0.2567
	(−1.0926)	(1.1714	(−0.1009)	(3.9929)***	(1.9713)**	(5.2294)***	(0.3721)	(−2.5967)***	(7.9691)***
Three quarters	−62.8823	94.2788	−0.1065	0.1704	0.1035	218.8933	1.6802	−11.4691	0.2568
	(−1.0505)	(1.1808)	(−0.0689)	(3.9592)***	(1.9712)**	(5.2498)***	(0.3867)	(−2.6408)***	(7.9737)***
Australian property securities									
One quarter	0.6309	0.9180	−2.4494	0.1274	0.1753	147.5532	−7.0656	−2.3495	0.3170
	(0.0314)	(0.5441)	(−2.1720)**	(4.4436)***	(5.2492)***	(10.8112)***	(−3.8447)***	(−1.1554)	(12.3989)***
Two quarters	−0.6242	(0.8994	−2.4525	0.1274	0.1753	147.5800	−7.0615	−2.3586	0.3170
	(−0.1088)	0.5123)	(−2.1770)**	(4.4429)***	(5.2505)***	(10.8147)***	(−3.8446)***	(−1.1624)	(12.3988)***
Three quarters	−0.1667	1.0097	−2.4493	0.1274	0.1754	147.6351	−7.0681	−2.3483	0.3170
	(−0.0364)	(0.4297)	(−2.1747)**	(4.4425)***	(5.2510)***	(10.8206)***	(−3.8485)***	(−1.1582)	(12.3982)***

*** Significant at 1%, ** significant at 5%.

positive effect on net inflows into those funds, with high excess returns over the index. For retail funds, there is evidence of such return chasing behavior for Australian equity funds and managed stable funds. It is also possible that investors may try to move away from funds that are successful, on the assumption that such recent high performance is an aberration, and that the law of averages will eventually catch up. Under this assumption, investors may actually withdraw funds and the sign for past excess returns will be negative. There is some evidence of this in the case of Australian fixed interest funds, and Australian property security funds.

Risk is another factor in investment decisions that ordinary investors are not fully capable of estimating. If risk is a factor in investment decisions then tracking error should have a negative effect on net investment flows. There is no evidence of this in the case of retail funds in all categories of assets as this variable is not significant. The average retail investor seems to be more influenced by the past performance of the fund rather than by the variability of the returns measured by the tracking error. A possible explanation can be found in the way the investors choose their funds using the fund ratings. Unlike the U.S. mutual fund rating methodology, which until recently was completely based on quantitative assessment, the two major rating agencies in Australia (Morningstar and Standard & Poor's) use a mixture of quantitative and qualitative factors (Faff, Parwada, and Poh, 2007). Because risk is one of the quantitative variables, its relative weight within the Australian mutual fund rating system may be lower than in the United States.

Size had a negative effect on many of the asset categories. The momentum of past net flows, as measured by the lagged net flows, shows a statistically significant positive effect. As noted by Frino, Heaney, and Service (2005), this relationship between the past net flows and current quarter net flows is rather difficult to explain. A possible explanation is that the positive relationship between the past net flows and the current period net flows can be because of the general growth in the particular asset class. Gruber (1996) explained that this relationship may be because of the fact that investors are locked into a particular fund because of restricted choices allowed by their superannuation accounts, and this variable may also capture the effect of marketing and the reputation of the fund.

The effect of choice of superannuation fund legislation on net fund flows gives an interesting perspective on how investors switched their asset allocation when they were given the freedom to do so. A significant part of the retail managed fund industry is comprised of superannuation funds, and thus, choice of fund legislation can have some impact on fund flows to different asset classes. The choice variable has a negative effect on alternative investments, Australian equity, Australian fixed interest, mortgage, and Australian property. The asset categories with positive signs for this variable are managed balanced and mixed funds. These results are an indication that given the choice to determine their asset allocation by the choice of fund legislation, investors might have chosen to reduce their exposure to more risky assets and move their funds into managed funds.

The effect of crisis variable is also equally interesting for the retail funds. The conventional wisdom is that during the crisis, investors will move their investments into safe assets and reduce exposure to risky assets, such as equities. Of interest to the authors, the results are the just the opposite in the case of retail managed funds. The only two categories of funds with negative signs for the crisis variable are the low risk asset class of cash and mortgages. Australian equity,

managed funds, and various overseas funds all had positive signs for the crisis variable. A possible explanation is that the dramatic drop in stock prices during the crisis gave an opportunity for investors to hunt for bargains as well as to seek the shelter that managed funds provide.

The regression results for superannuation funds are given in Table 5. The excess return variable has a positive sign for Australian equities, mortgages, managed stable, overseas fixed interest, and currencies as well as for global equity funds. These results indicate that, in general, superannuation fund investors are similarly prone to return chasing compared with retail investors. The sign for tracking error is positive for overseas property funds and negative for mixed portfolio funds. None of these results indicate any strong relationship between the risk and funds flows. The size of the fund has a negative effect on the net fund flows of cash, diversified fixed interest, Australian equity, Australian small companies, managed balanced, overseas fixed income, and Australian property securities. This is an indication that investors in these categories prefer larger funds.

Choice of fund legislation has a significant effect on almost all categories of superannuation funds. Managed balanced, managed growth, managed stable, overseas fixed interest and currency, and mixed portfolio funds all had a positive effect for this variable. On the other hand, this legislation had a negative effect on equity funds—both domestic and overseas. Choice of fund legislation has resulted in superannuation investors moving more of their investments into managed assets.

The crisis variable has a positive effect on Australian equities, Australian fixed interest, and managed growth funds. As discussed earlier, this may be because of investors finding bargains in equities after the crisis, as well as moving more towards managed funds to take care of the asset allocations. The categories of assets on which the crisis variable has a negative effect are cash, mortgages, overseas property funds, Australian property, and mixed portfolios. The link between the housing crisis and the global financial crisis can be a possible explanation for investors reducing their investments in the property sector.

Regression results for non-superannuation discretionary investment funds are given in Table 6. Active returns have a positive effect on fund flows only for Australian equity and managed stable funds. Tracking error had no significant effect on any of the fund categories, whereas size has a negative effect on most of the categories.

Because these are discretionary investments, it can be assumed that choice of fund legislation should not have much influence on the discretionary investment fund flows. Contrary to this assumption, the net fund flows of a significant number of fund categories are affected by the choice variable. Mixed portfolio funds are positively affected by the choice legislation, whereas most of the other fund categories are negatively affected by the choice variable. The signs of choice variable are similar for both superannuation and discretionary investments. This may be because of the fact that many superannuation investors have discretionary investments, and their investment choices are similar for both types of investments.

The variable of the global financial crisis has a negative effect only on mortgage and mixed portfolio funds. Other categories are not affected by the crisis. The significant difference between the superannuation funds and discretionary funds is that both Australian property and property security fund net fund flows are positively affected by the crisis, which is opposite to what is observed for superannuation funds.

The investor profiles of wholesale investors are significantly different from that of retail fund investors. Many of the investors in this category are other funds including superannuation funds, high net worth individuals; do-it-yourself superannuation investors (self-managed superannuation funds). The regression results for wholesale funds are given in Table 7. Unlike retail funds, there is less evidence of return chasing among the wholesale fund investors. Only managed balanced and managed stable fund net flows are positively affected by past returns. The net fund flows of overseas fixed income funds are negatively affected by the excess return variable. The tracking error is significant only for managed balanced funds. Size has a negative effect on most of the fund categories.

Because some of the wholesale funds are superannuation funds, it can be assumed that the choice of fund legislation will have some effect on the net fund flows in this category. The choice variable has a positive effect on the net fund flows of managed growth funds and is negative for Australian property securities. There are some previous studies that indicate that many superannuation investors choose a default strategy when it comes to choosing the asset categories for their superannuation investments. In many instances the default strategy is a managed fund. With choice of fund legislation, one might expect more movement among asset categories, but as prior research has indicated, investors did not make significant asset reallocation after the choice of superannuation fund legislation was passed. Australian fixed income, mortgage, and overseas fixed income funds, overseas global equity, and property security fund net fund flows are negatively affected by choice variable.

There is some similarity in the way the global financial crisis affected the fund flows into wholesale and retail funds. The crisis variable has a positive effect on the equity funds net fund flows, and a negative effect on property and mortgage funds. The fluctuation in the housing market that led the financial crisis has dissuaded investors from moving into real estate related assets, whereas bargain hunting has moved them into equity markets.

6. Conclusions

The Australian managed fund industry has grown considerably in the past two decades. The compulsory superannuation scheme can be considered to be one of the primary drivers behind this growth. This article looks at the various segments of the managed funds market to see whether there is any significant difference in the way the assets are allocated into various asset categories and whether investors base their investment decisions only on the past performance of the funds, in light of the choice of fund legislation and the recent global financial crisis. The results show that there is significant difference in asset allocation between the retail and wholesale segments. Retail investors prefer less risky investments compared with wholesale investors and have lower preference for overseas investments. There are also differences in the way the superannuation, retirement income, and discretionary funds are invested. Discretionary investors preferred cash as the most preferred asset category, whereas the superannuation investors preferred the managed investment category. The results of our study are similar to the evidence which has emerged from the United States managed funds industry. Choice of fund legislation has had an interesting impact on the market, and in general, investors have increased their allocation into managed funds from

other equity based categories. Conversely, the impact of the GFC varies from the common perception and investors generally moved their investments into shares. This provides an interesting contradiction in the sense that, as a result of choice, they have moved their investments into managed funds, realizing their lack of understanding of the market. However, after the global financial crisis, investors moved back into equity, attempting to exploit lower prices in the market place. This is consistent with the return chasing, where the temptation of past returns results in cash inflows in better performing funds.

There is clear evidence that investors base their decisions primarily on the past performance of funds, with the retail segment showing a higher level of reallocation of investments based on past performance compared with the wholesale segment. The return-chasing behavior was more pronounced in the preferred asset category of each of these groups. For example, discretionary investors preferred assets over other classes of investments and showed strong return chasing behavior in this category. There is relatively less evidence of reaction to risk among the managed fund investors. Part of the problem may be the difficulty in defining the risk as it may be seen by the investors. The Australian managed funds industry is dominated by superannuation investments. Superannuation is the primary source of retirement savings for most Australians who wish to rely on self-funded retirement. The Australian federal government by its policies has been pushing to cut individuals' reliance on public pensions and has encouraged self-funded retirement objectives. Evidence of investments based on past performance only in the Australian managed funds industry may be of concern to policy makers, as misallocation of investments by uniformed investors may erode their retirement savings, thereby leaving the public sector with a pension liability that was not provided for in the government's budget. Choice of fund legislation has made it easier for investors to move money across funds, and evidence suggests that investors have actually moved money into managed funds after the introduction of choice of superannuation fund legislation. This study makes an important contribution to an understanding of investor behavior in the Australian managed funds industry. This may be of value to fund managers who seek to inform investors of their performance, and who use performance information for marketing purposes. Investors in managed funds will also benefit from gaining an understanding of how this industry works. Finally, the findings of this study have importance for policy makers in understanding investor behavior when developing policies, especially in light of recent policy changes that are aimed at providing investors with more choices and ease of movement of their investments across funds.

Notes

1 Managed Funds, Australia, March 2013, Australian Bureau of Statistics.
2 Market Overview by Plan For Life Actuaries & Researchers, June 19, 2013.
3 This research does not test whether investors switch across funds within the same asset class after the introduction of the choice of superannuation fund legislation.
4 In the Australian superannuation industry, a fund refers to the portfolio of investment classes where a member can nominate a proportion of his or her savings to be allocated across different asset classes that are available within the fund. Typically each fund

will provide options such as balanced, cash, Australian shares, international shares, fixed income securities, etc.

5 These are the active funds as of March 31, 2013.

6 Members can choose to contribute more than that required by superannuation guarantee contributions (currently 9.5%) and these can be contributed as pre-tax or post-tax contributions.

7 Watson, Wickramanayke, and Premachandra (2012) find that the rating agencies are unable to distinguish between highly performing and moderately performing superannuation funds.

8 The studies by Sy (2011 and Gerrans (2012) are based on only four years' data. Our study aims to use a much longer data series and more sophisticated empirical models for analysis.

9 Choice legislation was to allow choice of superannuation fund for investors. The choice across investment within the same fund was available to most investors before the introduction of the choice legislation in 2005. We are testing for a relationship between past performance and movement across asset classes without differentiating whether this movement is within the same fund or across funds. By using a choice dummy we hypothesize that if there is a significant difference after the introduction of choice legislation, it is likely to be either across funds or because of increased awareness after the introduction of the legislation.

10 Tracking error is measured as the annualized standard deviation of the differences between the portfolio return and the benchmark return. Benchmark return in this case is the mean return of the industry. We have also tried using the Australian stock market index in the model, but found that this creates multi-collinearity problems.

11 We thank the anonymous referee for this suggestion.

12 For brevity we report results for only one quarter and omit for two and three quarters.

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