Smart or Dumb? Asset Allocation Ability of Mutual Fund Investors and the Role of Broker Advice

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February 2010

Abstract

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Keywords: mutual funds, asset allocation, investor sentiment, brokers

JEL Classification Code: G1, G2, G11, G12, G24

* Email: fang@bwl.uni-mannheim.de. Tel. ++49-(0)621-1811619. I would like to thank the Investment Company Institute (ICI) for providing the mutual fund data. I thank Knut Griese, Alexandra Niessen, Stefan Ruenzi, Avi Wohl and seminar participants at the University of Mannheim for helpful and valuable comments.

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Abstract

In this paper, I investigate the asset allocation ability of mutual fund investors. Specifically, I examine differences among non-proprietary brokers, proprietary brokers and direct channels regarding their asset allocation ability. In aggregate, mutual fund investors do not seem to have superior asset allocation ability. However, I do find that money flows through non-proprietary brokers show significantly higher asset allocation performance than money flows through proprietary brokers. This is consistent with the view that non-proprietary agents are more likely to act on behalf of their customers as opposed to proprietary agents who represent their affiliated companies.

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1. Introduction

Asset allocation policy is a dominant contributor to long-term portfolio performance.[1] Previous studies find that asset allocation policy explains about 90% of the variability of mutual fund returns across time and about 40% of the variation of returns among funds. Furthermore, on average about 100% of the return level is explained by asset allocation policy. Therefore, it is very important for investors to allocate their investments correctly among different asset classes. This study attempts to address the following two questions in terms of the asset allocation ability:

1. Do mutual fund investors, as a whole, have asset allocation ability among their mutual fund investments?
2. Are there differences in asset allocation ability among different mutual fund sales channels, especially between non-proprietary and proprietary brokers?

The data of the Investment Company Institute (ICI) shows that on average only 1% of overall mutual fund assets in the U.S. are invested in mutual funds with professional asset allocation decisions made by mutual fund managers.[2] This indicates that mutual fund investors prefer to make asset allocation decisions by themselves and not to delegate them to investment professionals. Therefore, in the first question I examine whether mutual fund investors show any asset allocation ability among their mutual fund investments in aggregate. However, the first question ignores differences in diverse mutual fund sales channels: non-proprietary brokers, proprietary brokers and direct channels. Investors who buy mutual funds through non-proprietary brokers and proprietary brokers may get advice on their asset allocation from brokers. Depending on the type of brokers there should be also differences in the quality of their advice. On the one hand, we can expect that non-proprietary brokers provide investors with more benefits than proprietary brokers, because they are not dependent on a parent company and can more easily provide their professional advice to investors without considering the interests of their parent company. On the other hand, proprietary brokers know funds provided by their affiliated fund families better than non-proprietary brokers. They can better leverage the resource embedded in the parent company and have an information advantage over non-proprietary brokers. Therefore, they could also provide more benefits than non-proprietary brokers. Answers to the second question can improve our

[1] There are many studies which show the importance of asset allocation decisions, e.g. Brinson, Singer and Beebower (1986), Brinson, Singer and Beebower (1991) and Ibbotson and Kaplan (2000).

[2] Funds with ICI investment objective "Flexible Portfolio" invest in stocks, bonds and money market securities. The portfolio can flexibly change its asset allocation weights depending on market conditions.

understanding of differences in service quality in terms of asset allocation ability between proprietary and non-proprietary brokers. Additionally, I compare these two types of brokers with direct channels where investors buy mutual funds and make their asset allocation decisions without any intermediaries.

This study provides two main results: First, there is no evidence of superior asset allocation ability of mutual fund investors as a whole. They are not able to achieve a better performance by allocating their mutual fund investments among different asset classes as compared to investing in a passive benchmark portfolio. Second, I do find evidence of a better asset allocation performance of money flows through non-proprietary brokers compared to money flows through proprietary brokers. This result is consistent with the evidence in studies on the insurance industry which show that non-proprietary agents are more effective in representing the interests of their clients and provide a higher quality of service than proprietary agents.[3]

This study is related to three strands of research. First, it contributes to the general mutual fund investor ability literature. The previous research in this area primarily focuses on selection ability and timing ability of mutual fund investors. Gruber (1996) and Zheng (1999) find that mutual fund investors have selection ability, which is called smart money effect. They are able to choose funds with superior short-term performance. Sapp and Tiwari (2004), however, show that this smart money effect can be explained by stock momentum. Frazzini and Lamont (2008) reversely find a dumb money effect, which means that mutual fund investors reduce their wealth in the long-term by reallocating across different mutual funds. Friesen and Sapp (2007) focus on timing ability of mutual fund investors at the fund level and find evidence of poor timing decisions. Braverman, Kandel and Wohl (2005) and Nesbitt (1995) analyze the timing ability of mutual fund investors at the asset class level. Both studies find evidence of a poor timing ability. Unlike those prior studies my paper focuses on asset allocation ability of mutual fund investors. I examine whether mutual fund investors allocate their money across asset classes correctly in order to earn a high performance. Second, this study fits into the literature investigating asset allocation decisions of mutual fund investors. Chalmers, Kaul and Phillips (2009) examine how economic conditions influence mutual fund investors' asset allocation decisions. They find that an anticipated improvement in economic conditions leads to cash flows out of relatively safe money market funds into riskier equity funds, and vice versa. Instead of reviewing the performance of actual asset allocation

[3] For example, Berger, Cummins and Weiss (1995) and Barrese, Doerpinghaus and Nelson (1995) find evidence that independent agents provide a higher quality of service than exclusive agents.

decisions they evaluate the benefits of a constructed flight-to-quality strategy.[4] Kadiyala (2004) analyzes asset allocation decisions of mutual fund investors and finds that variables with predictive ability for stock returns predict flows into fund categories. Furthermore, he examines timing strategies in separate fund categories based on unanticipated flows.[5] The principal focus of these two studies is the analysis of factors which influence asset allocation decisions of mutual fund investors, but they do not provide an overall evaluation of the asset allocation ability of mutual fund investors. That is, do mutual fund investors benefit from their actual asset allocation among mutual funds? The primary purpose of this research is to fill this gap by examining the performance of asset allocation decisions. Third, this paper builds on the literature regarding the role of the brokerage industry. Several recent studies examine the role of brokers in the mutual fund industry. Bergstresser, Chalmers and Tufano (2009) look at the performance of mutual funds sold through brokers and compare it to the performance of mutual funds sold directly to investors. They find that brokers do not deliver benefits in terms of fund selection and asset allocation among mutual funds compared to funds sold through direct channels. They do not distinguish between non-proprietary brokers and proprietary brokers. Christofferson, Evans and Musto (2007) make additional comparisons between non-proprietary brokers and proprietary brokers. However, they focus on the impact of brokers' compensation and affiliation on equity fund flows and find evidence of differences between proprietary brokers and non-proprietary brokers regarding how they direct money flows to equity mutual funds. They do not analyze the difference in the asset allocation ability between non-proprietary and proprietary brokers. My paper is the first to investigate the difference in benefits delivered by these two types of brokers in terms of asset allocation among mutual funds.

The remainder of the paper is organized as follows. Section 2 describes the data and outlines the methodology. Section 3 presents the empirical results concerning asset allocation ability. Robustness checks are reported in Section 4. Section 5 concludes.

[4] Based on this flight-to-quality strategy investors allocate 100% of their wealth to equity funds (money market funds) if economic conditions are expected to improve (worsen).

[5] The timing strategy is a strategy of increasing flows in months when unanticipated flows are predicted to be higher, and deceasing flows in months when they are predicted to be lower. This timing strategy is profitable in the equity high-risk category, the equity low-risk category and the bond low risk category but not profitable in the bond high-risk category.

2. Data and methodology

2.1. Data

Monthly data of aggregate cash flows and total net assets from January 1996 to July 2009 are obtained from the ICI. The ICI is the national association of U.S. investment companies, including almost all mutual fund families as members. The data is divided into 33 categories according to the investment objectives of the funds, for example, aggressive growth, international equity, corporate-intermediate and taxable money market. Within each investment objective category, total net assets and cash flows are classified by methods of sales: "proprietary sales force", "non-proprietary sales force", "direct market", "variable annuity" and "institutional". In "proprietary sales force" sales fund shares are sold primarily through a network of active brokers affiliated with the fund company. "Non-proprietary sales force" includes active brokers who have licensing agreements with the fund company. In "direct market" sales fund shares are sold mainly by the fund company without intermediaries. Funds that are sold to the public exclusively through tax-deferred annuity wrap accounts are counted in the "variable annuity" sales. "Institutional" sales contain funds sold primarily to institutional investors or institutional accounts. I examine the overall asset allocation ability of mutual fund investors by using aggregate flows and total net assets through all sales channels und consider them as the overall mutual fund portfolio. To compare non-proprietary brokers and proprietary brokers, I analyze net flows and total net assets of non-proprietary and proprietary brokers separately and treat them as two separate portfolios, namely the non-proprietary broker portfolio and the proprietary broker portfolio.

Within each investment objective category and each method of sales, cash flows are further categorized as new sales, redemptions, exchange sales and exchange redemptions. New sales and redemptions are money flows into and flows out of a fund family. Exchange sales and exchange redemptions are shifts of money from one fund to another within a fund family. Like Warther (1995) and Fant (1999) I define net flows of mutual funds as the sum of four components: new sales plus exchange sales minus redemptions minus exchange redemptions. In order to analyze the asset allocation decisions among different asset classes I designate eight main asset classes and assign the investment objective categories to these asset classes. The eight asset classes are Domestic Equity, Foreign Equity, Hybrid, Taxable Domestic Bond, Foreign Bond, Municipal Bond, Taxable Money Market and Municipal Money Market. My focus is to examine the asset allocation among four main asset classes (Domestic Equity,

Foreign Equity, Taxable Domestic Bond and Taxable Money Market)[6] which account for 85 percent of the aggregate assets in the U.S. mutual fund industry. *Appendix A* presents the classification of the 33 investment objectives into eight asset classes.

I follow Bergstresser, Chalmers and Tufano (2009) and use index returns as benchmark to examine asset allocation ability instead of using aggregate fund returns. This allows me to exclude the potential selection ability of mutual fund investors. The indices for the Domestic Equity, Foreign Equity, Taxable Domestic Bond and Taxable Money Market asset classes are, respectively, the value-weighted CRSP index returns for the NYSE, AMEX, and NASDAQ stocks, the MSCI All Country World without U.S., the Barclays U.S. Aggregate Domestic Bond index[7], and the return on the 30-day Treasury bill.

2.2. Summary statistics

Panel A of Table 1 presents mutual fund net cash flows and total net assets by asset class. Over the period from January 1996 to July 2009, the Taxable Money Market asset class captured the highest average monthly net cash flows ($10.94 billion), followed by Domestic Equity ($6.53 billion), Taxable Domestic Bond ($3.50 billion) and Foreign Equity ($3.27 billion). Over the entire mutual fund industry net cash flows are on average positive over the sample period. The average monthly total net assets in the Domestic Equity asset class is $3,101.97 billion, accounting for 43% of total mutual fund assets, followed by Taxable Money Market ($1,676.88 billion, 23.13%), Taxable Domestic Bond ($736.76 billion, 10.61%) and Foreign Equity ($675.28 billion, 9.32%). Other asset classes only account for 14.62% of total mutual fund assets and will be excluded in the following analyses.

-- Please insert Table 1 approximately here –

Panel B of Table 1 shows mutual fund net cash flows and total net assets by sales channel classifications. The direct market channel, the non-proprietary broker channel, and the institutional channel account for 26.45%, 25.45%, and 25.39% of total mutual fund assets, respectively. The proprietary broker channel and the variable annuity channel are responsible for 12.36% and 10.35% of total mutual fund assets, respectively. While net cash flows are on average positive over the sample period, the proprietary broker channel, in contrast to other

[6] Hybrid funds already include funds' asset allocation decision. Therefore, I exclude this asset class. Municipal Bond and Municipal Money Market are often traded for tax reason, so I also exclude them. For Foreign Bond there is no appropriate return index, which is the reason why I exclude it.
[7] This index used to be called the Lehman Aggregate Domestic Bond index.

distribution channels, have negative net cash flows on average. *Figure 1* depicts the monthly proportion of total net assets by channel classification from January 1996 to July 2009. While the non-proprietary broker channel (the direct market channel) has a small decrease in proportion from 28.13% to 22.19% (28.02% to 22.70%), the proprietary broker channel experiences a strong decrease in proportion from 20.59% to 7.58%.

-- Please insert Figure 1 approximately here –

Table 2 presents the average asset allocation weights of overall mutual funds, funds sold through non-proprietary brokers, funds sold through proprietary brokers and funds sold through the direct market channel. We can observe that money market funds make up a much higher proportion of assets in proprietary-sold funds (48.28%) than in non-proprietary-sold funds (10.54%) and direct-sold funds (14.03%). The weight of Foreign Equity is higher in the non-proprietary channel than in other channels. The total equity weight (Domestic and Foreign) is similar in the non-proprietary channel and direct market channel. The same holds for the sum of Domestic Bond and the Money Market weights. This evidence suggests that the asset allocation of the proprietary broker channel has higher weights towards low-risk asset classes than the non-proprietary channel and the direct market channel. On the other hand, the non-proprietary channel and the direct channel show similar asset allocations among equity, bond and money market. The result regarding differences in asset allocation decisions between non-proprietary and proprietary brokers is consistent with the results of Venezia, Galai and Shapira (1999). They show that there are different clients for non-proprietary and proprietary agents. Riskier clients choose the more expensive non-proprietary agents while less risky clients prefer the cheaper proprietary agents.[8] One possible explanation is that riskier clients are more likely to need help of their agents due to their riskier behavior. Therefore, they are willing to pay more for a better quality of services provided by non-proprietary agents. As we can see from the asset allocation weights, the proprietary broker channel bears lower risks by holding higher weights of low-risk asset classes compared to the non-proprietary broker channel. Further evidence of the different risk level between non-proprietary and proprietary brokers is shown in *Section 4*.

-- Please insert Table 2 approximately here –

Having described the data, I now introduce measures used to examine asset allocation ability.

[8] Christoffersen, Evans and Musto (2009) find that the average loads received by non-proprietary brokers are higher than average loads received by proprietary brokers, which indicates that services provided by non-proprietary brokers are more expensive than those provided by proprietary brokers.

2.3. Measurement of asset allocation ability

To examine the asset allocation ability of mutual fund investors, I first look at the returns a hypothetical investor who invests the same fractions of his wealth as the aggregate of all mutual fund investors in different asset classes earns. These returns are calculated on the basis of total net assets. Next, I extensively examine returns that investors obtain on new cash flows which they move into and out of mutual fund asset classes. Like Gruber (1996) and Zheng (1999) who investigate the selection ability of mutual fund investors with new cash flows I also put my focus on measurement based on new cash flows, because total net assets probably include both past and new decisions of mutual fund investors, whereas new cash flows allow me to examine new investment decisions of investors.[9] Furthermore, asset allocation weights based on total net assets could also change solely due to market movements in case investors do not change them by themselves. This problem does not exist with the measurement based on new cash flows.

Measurement based on total net assets

Similar to Bergstresser, Chalmers and Tufano (2009) I calculate the cumulative value of $1 invested at the beginning of the sample period using monthly rebalanced asset allocation weights in overall mutual funds and in different sales channels. Asset allocation weights are aggregate portfolio weights based on the four asset classes included in my analysis (Domestic Equity, Foreign Equity, Taxable Domestic Bond and Taxable Money Market). Monthly aggregate portfolio weights are calculated under the assumption that these four asset classes constitute the entire investment universe for fund investors. I apply aggregate portfolio weights to index returns to calculate monthly portfolio returns and use these returns to calculate the cumulative value of a $1 investment.[10] Next, I compare the cumulative value of a $1 investment on the overall mutual fund portfolio with the cumulative value of a $1 investment on the TNA (Total Net Asset) benchmark portfolio to examine the asset allocation ability of mutual fund investors, as a whole. The TNA benchmark portfolio is a portfolio with constant weights in four asset classes. The asset allocation weights of the TNA benchmark are

[9] Take for example, an investor who thinks about how to invest his money in different mutual fund asset classes in January 2010. He probably does not consider his past investments made before January 2010.
[10] The portfolios are formed monthly and are based on the total net assets of different asset classes at the end of the previous month.

calculated as the average weights of these four asset classes over the entire sample period.[11] A higher cumulative value of the overall mutual fund portfolio compared to the TNA benchmark portfolio suggests that mutual fund investors, as a whole, have superior asset allocation ability. They are able to modify the allocation of their assets in fund asset classes correctly and earn higher returns on their actual portfolio than returns on the passive TNA benchmark portfolio. By comparing the cumulative value of a $1 investment in the non-proprietary broker portfolio with the cumulative value of a $1 investment in the proprietary broker portfolio I can examine whether non-proprietary brokers have a better asset allocation ability than proprietary brokers.

Measurement based on new cash flows

My main investigation of the asset allocation ability is based on returns that investors earn on monthly new cash flows. Due to lack of the exact holding period of mutual fund investors I assume six alternative holding periods: one month, six months, one year, two years, three years and four years (*h=1, 6, 12, 24, 36, 48*). The overall return on new cash flows (positive and negative) is calculated with two methods. Method 1 considers both the allocation across the entire time period (How do investors allocate their investments across the sample period? e.g. 1000$ in month 1, 5000$ in month 2….) and the allocation within each month (How do investors allocate their investments within each month? e.g. in month 1, 50% of 1000$ in Domestic Equity, 20% of 1000$ in Foreign Equity, 20% of 1000$ in Domestic Bond and 10% of 1000$ in Money Market). However, Nesbitt (1995) suggests that cash flows in one month may come from income earned in this month which is not available in other months. Hence, how investors allocate their investments over time may be dependent on their cash availability and income. To exclude the cash availability motivation and in order to focus on rebalance decisions, I also use method 2 which just considers the allocation within each month.

In method 1 I first estimate the dollar gains on all net cash flows over the entire. The net cash flows of an asset class in month *t* are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute net cash flows to all asset classes in all periods. This is the average return earned on $1 net cash flows over the entire sample period and is written as[12]:

[11] The asset allocation weights of the TNA benchmark are: 50.24% for Domestic Equity, 10.19% for Foreign Equity, 12.13% for Taxable Domestic Bond and 27.43% for Taxable Money Market.
[12] Method 1 is introduced in Gruber (1996). It can also be written as weighted average of returns on positive and negative cash flows, which is shown in Appendix B.

$$R^{overall} = \frac{\sum_i \sum_t NCF_{i,t-1} \cdot r_{i,t}^h}{\sum_i \sum_t \left| NCF_{i,t-1} \right|}.$$ [13] (1)

$NCF_{i,t-1}$ is net cash flows in asset class i in month $t-1$. $r_{i,t,}^{\ h}$ is the h-month return on asset class i in the subsequent h months.

Method 2 focuses on rebalance decisions within each month. I first estimate the return on net cash flows in month t. The dollars into any asset class in month t are multiplied by the h-month return on that asset class in a subsequent period. This is summed across all asset classes for month t and divided by the sum of absolute net cash flows to all asset classes in month t. This is the average return earned on net cash flows in month t and is written as[14]:

$$R_t = \frac{\sum_i NCF_{i,t-1} \cdot r_{i,t}^h}{\sum_i \left| NCF_{i,t-1} \right|}.$$ (2)

I calculate the return on net cash flows for each month and get a time series of cash flow portfolio returns. The overall return on net cash flows in method 2 is equal to the average of the return on net cash flows across the entire sample period. It is written as:

$$R^{overall} = \frac{\sum_t R_t}{T}.$$ (3)

T is the number of months. The average value across the entire sample period ignores the difference in total investments in different months.

As with total net assets, I construct a CF (Cash Flow) benchmark portfolio. The CF benchmark has constant asset allocation weights over the entire sample period. Unlike the TNA benchmark portfolio, the weights of the four asset classes in the CF benchmark portfolio are calculated as weights of total net cash flows into four asset classes over the entire time period (1996/01-2009/07).[15] The difference between the overall return of the overall mutual fund portfolio and those of the CF benchmark portfolio measures the asset allocation ability

[13] In order to carry out a significant test it is helpful to construct time series by rewriting (1): $R^{overall} = \frac{\sum_i \sum_t NCF_{i,t-1} \cdot r_{i,t}^h}{\sum_i \sum_t \left| NCF_{i,t-1} \right|} = \frac{\sum_t \left(\sum_i NCF_{i,t-1} \cdot r_{i,t}^h \right)}{\sum_i \sum_t \left| NCF_{i,t-1} \right|} = \sum_t \frac{\sum_i NCF_{i,t-1} \cdot r_{i,t}^h}{\sum_i \sum_t \left| NCF_{i,t-1} \right|}.$

[14] As with method 1, the return can also be written as weighted average of returns on positive and negative cash flows in month t, which is shown in Appendix B.

[15] The asset allocation weights of the CF benchmark are: 26.23% for Domestic Equity, 13.25% for Foreign Equity, 15.29% for Taxable Domestic Bond and 45.23% for Taxable Money Market.

of mutual fund investors as a whole. A positive difference indicates that mutual fund investors have asset allocation ability. They are able to earn a better performance based on their asset allocation decisions compared to a passive CF benchmark.

3. Empirical Results

In this section I report the empirical results based on total net assets and new cash flows. As mentioned above I focus on evidence from new cash flows which allows me to examine the actual investment decisions of mutual fund investors.

3.1. Asset allocation ability of overall mutual fund investors

3.1.1. Evidence from total net assets

I calculate the cumulative value of a $1 investment as described in *Section 2.3. Figure 2* depicts differences of the cumulative value between the overall mutual fund portfolio and the TNA benchmark portfolio.

-- Please insert Figure 2 approximately here –

There is no evidence of a superior asset allocation ability of overall mutual fund investors. The difference of the cumulative value is in most cases negative.

Cumulative values are just based on the raw return and ignore the risk aspect of different portfolios. Thus, I now calculate the standard deviation of portfolio returns and the risk adjusted performance, measured by the Sharpe ratio. The results are reported in *Table 3*.

-- Please insert Table 3 approximately here –

The average monthly excess returns of different portfolios suggest the same evidence demonstrated by the cumulative value of a 1$ investment. Mutual fund investors do not have superior asset allocation ability in comparison with the TNA benchmark. Average monthly excess returns of the passive TNA benchmark portfolio and the overall mutual fund portfolio are 0.14% and 0.12%, respectively. The difference is not statistically significant. The TNA benchmark and the overall mutual fund portfolio bear similar risk. The TNA benchmark portfolio has a higher Sharpe ratio (0.0469) than the overall mutual fund portfolio (0.0418) even though the difference is not statistically significant based on the test suggested by Jobson and Korkie (1981) with correction pointed out by Memmel (2003). Furthermore, I calculate

the risk and performance of a portfolio consisting of asset allocation funds where asset allocation decisions are made by professional mutual fund managers.[16] The monthly return of the asset allocation fund portfolio is calculated as equally weighted average of all asset allocation funds. Results in *Table 3* show that asset allocation funds have even a better performance and risk-adjusted performance than the TNA benchmark portfolio, although the difference is not statistically significant. This is consistent with the results of Comer (2006). He finds that asset allocation mutual funds show a significant market timing ability, which is able to result in a better performance as compared to the passive TNA benchmark portfolio without market timing ability.

3.1.2. Evidence from new cash flows

Using the two methods outlined in *Section 2.3*, I calculate the overall return on net new cash flows. Results based on method 1 are reported in *Panel A of Table 4*.[17]

-- Please insert Table 4 approximately here –

For the case of a holding period of 24 months the average dollar moved earns $0.0438 in the next 24 months. The difference between the 24-month return of overall mutual funds and the 24-month return of the CF benchmark is -0.0431 and is statistically significant in three significance tests. This negative difference indicates a poor asset allocation ability of mutual fund investors when they hold their allocation of net cash flows for 24 months. For the holding period of 6 and 12 months the difference is negative and only statistically significant by using the Wilcoxon signed-rank test. In the case of a holding period of more than 12 months, the difference is always negative and statistically significant. Considering results of all holding periods, mutual fund investors, as a whole, have poor asset allocation abilities compared to the passive CF benchmark. Furthermore, the longer the holding period, the stronger the evidence of poor asset allocation ability is. This is consistent with results of

[16] Asset allocation funds are global flexible portfolio funds based on Lipper objective codes in CRSP mutual fund database. Global flexible portfolio funds allocate investments across various asset classes, including domestic stocks, foreign stocks, bonds and money market instruments.

[17] Three significance tests are used for the mean of the performance measure and the mean of the performance differences: t-test, test with Bootstrap standard error and the nonparametric Wilcoxon signed rank test. There is one problem with h-month returns (e.g. 6-month return). For each month I get a subsequent 6-month return based on net cash flows in this month. Therefore, this time series consists of overlapping observations. The standard error of the normal t-test is then biased. The standard error provided by Hansen and Hodrick (1980) can correct this bias. However, this correction method does not perform well in samples with a small number of observations. Therefore, I use the Bootstrap standard error to correct the bias. The nonparametric test is also more appreciate if the distribution of returns is non-normal. Therefore, I also use the Wilcoxon signed-rank test. I also use the Newey-West covariance matrix to adjust the autocorrelation. The results are not reported but are consistent with those based on other tests.

Braverman, Kandel and Wohl (2005). They find a negative relationship between lagged flows and the return of fund categories. This negative relationship is significant when they look at long-term returns.

To examine whether investors' low overall returns are in part due to investors' cash availability, I use method 2 to calculate the overall return as an equally weighted average across the entire sample period. The results are presented in *Panel B* of *Table 4*. The evidence of underperformance becomes weaker and smaller. The performance difference between overall mutual funds and the CF benchmark is negative and significant in the case of a holding period with more than 12 months. For the holding period of 48 months the underperformance is 8%, compared with 10% when calculated by using method 1. In fact, we don't know the true level of investors' cash availability. If investments of mutual fund investors in different periods depend on their cash availability, the underperformance is 8% in the case of a holding period of 48 months. If it does not so depend, the underperformance is 10%. However, in either case poor asset allocation decisions are hurting investors' long-term wealth growth through mutual fund investments.

Panel C of Table 4 presents the risk adjusted performance, measured by the Sharpe ratio[18], of overall mutual funds and the CF benchmark. The results are consistent with the results from the raw return that overall mutual funds underperform the CF benchmark. The mean Sharpe ratio of the overall mutual fund portfolio is significantly lower than the mean Sharpe ratio of the CF benchmark portfolio for all holding periods.

One potential explanation for the poor asset allocation ability is investor sentiment. On the one hand, Chalmers, Kaul and Phillips (2009) find evidence for sentiment models of investing among investors' asset allocation decisions. High sentiment leads to an increase in equity flows. Baker and Wurgler (2007) also show the positive relation between investor sentiment and equity fund flows.[19] On the other hand, Brown and Cliff (2005) show that future

[18] I calculate Sharpe ratios of net cash flow portfolios based on method 2. For a holding period of one month there is only one Sharpe ratio for the time series of 1-month returns. In the case of a holding period of more than one month, for example 12 months, I calculate first asset allocation weights based on net cash flows in month t. Then I calculate monthly returns in the following 12 months (month t+1 to month t+12) based on asset allocation weights at the end of month t. Next, I calculate Sharpe ratio with these 12 monthly returns. I do that for each month and get a time series of Sharpe ratios. Based on the time series of Sharpe ratios I calculate the mean of Sharpe ratios.

[19] I also examine the influence of investor sentiment on the aggregate flows into different asset classes. I regress monthly net flows in $ and monthly normalized net flows of different asset classes on the Consumer Sentiment Index of the University of Michigan and find a significant positive influence of investor sentiment on equity flows.

aggregate stock returns over multiyear horizons are negatively related to investor sentiment. They argue that the current high sentiment leads to the market overvaluation, which is followed by low cumulative long-term returns as market prices drop back to their fundamental value. Schmeling (2009) confirms this common finding for the U.S. stock market and finds that this negative sentiment-return relationship also holds across countries. Frazzini and Lamont (2008) also find evidence that high sentiment predicts low future stock returns. Furthermore, Braverman, Kandel and Wohl (2005) find a negative relationship between lagged flows and long-term future performance in different mutual fund categories. They explain this negative relationship by investor sentiment and time-varying risk premiums.

Considering all the evidence mentioned above, the underperformance of overall mutual fund investors could be explained by investor sentiment. Investor sentiment influences asset allocation decisions of mutual fund investors. They invest in equity funds in the case of high sentiment and suffer lower subsequent returns. If mutual fund investors have low sentiment, they disinvest in equity funds and invest in bond funds. By doing this, they miss subsequent high equity returns. This "false" switching among asset classes leads to the long-term underperformance compared to the passive CF benchmark, which lacks sentiment-driven flows.

3.2. Asset allocation ability in different broker channels

3.2.1. Evidence from total net assets

Figure 3 depicts differences of the cumulative value of $1 invested between different sales channel portfolios and the TNA benchmark portfolio.

-- Please insert Figure 3 approximately here –

Non-proprietary brokers do not seem to be systematically worse than the TNA benchmark portfolio. Sometimes non-proprietary brokers show higher cumulative values than the TNA benchmark portfolio. In contrast to non-proprietary brokers, proprietary brokers show considerably lower cumulative value than the TNA benchmark portfolio. The comparison between non-proprietary and proprietary brokers suggests a better asset allocation ability of non-proprietary brokers compared to proprietary brokers. Investors who make asset allocation decisions depending on non-proprietary brokers achieve higher cumulative values than investors who make asset allocation decisions depending on proprietary brokers. Non-proprietary brokers seem to deliver more benefits to investors than proprietary-brokers in

terms of the asset allocation among mutual funds. The cumulative value of the two broker channels, non-proprietary and proprietary brokers, always stays below the cumulative value of the direct market channel. This is consistent with the results from Bergstresser, Chalmers and Tufano (2009), the direct market channel performs better than both broker channels.

The standard deviation of portfolio returns and the risk adjusted performance, measured by the Sharpe ratio are reported in *Table 3*.

-- Please insert Table 3 approximately here –

The difference of the average monthly excess return between non-proprietary brokers and proprietary brokers is positive (0.09%) indicating that non-proprietary brokers perform better than proprietary brokers even though the effect is not significant. The direct market channel has the highest average excess return (0.17%) but it is not significantly different from the TNA benchmark, overall mutual funds or the non-proprietary channel.

By comparing the standard deviation of the monthly excess returns we can find the same evidence as in *Table 2*. The asset allocation fund portfolio, the non-proprietary broker channel and the direct market channel have similar risk level and it is significantly higher than the risk of the TNA benchmark and overall mutual funds. Proprietary brokers bear the lowest risk, which is significantly lower than the risk of non-proprietary brokers. These results are partially consistent with the findings of Bergstresser, Chalmers and Tufano (2009). They find that the aggregate broker channel delivers lower returns and holds lower risk and lower return securities compared to the direct market channel. In this paper I examine the benefits of brokers by separating non-proprietary brokers from proprietary brokers. Proprietary brokers behave in the way that Bergstresser, Chalmers and Tufano (2009) find: lower return and lower risk. However, non-proprietary brokers are very different from proprietary brokers and bear significantly higher risk than proprietary brokers. As mentioned in *Section 2.2*, this difference could be explained by the self-selection of mutual fund investors. Riskier investors are willing to choose more expensive non-proprietary brokers for superior services offered by them, because they are due to their riskier behavior more likely to need good advice from brokers. In contrast, safer investors prefer cheaper proprietary brokers.[20]

Furthermore, results based on the Sharpe ratio also show that there are differences between non-proprietary brokers and proprietary brokers in terms of the benefits that they provide to

[20] This is consistent with findings of Venezia, Galai and Shapira (1999) in insurance literature.

investors. Funds sold through non-proprietary brokers earn a better risk-adjusted asset allocation performance than funds sold through proprietary brokers. However, both broker channels show a lower Sharpe ratio than the TNA benchmark. The differences are significant at the 10% level based on the Jobson/Korkie (1981) test with Memmel (2003) correction. Again, the asset allocation fund portfolio shows the best asset allocation performance. It seems that professional mutual fund managers have a superior asset allocation ability compared to different mutual fund sales channels.

3.2.2. Evidence from new cash flows

Table 5 reports results based on net cash flows for the non-proprietary broker channel, the proprietary broker channel and the direct market channel.

-- Please insert Table 5 approximately here –

The results are consistent with those based on total net assets. The non-proprietary broker channel shows significantly higher overall returns in alternative holding periods. In the case of a holding period of 12 months the average dollar moved into the non-proprietary broker channel earns \$0.0372 over the next 12 months, whereas the average dollar moved into the proprietary broker channel earns just \$0.0093 over the next 12 months. The difference is \$0.0279, which is statistically significant in all significance tests and also economically significant. Non-proprietary broker-sold funds earn annually 2.79% more due to asset allocation decisions than proprietary broker-sold funds. The raw returns calculated using method 2 in *Panel B* of *Table 5* show the same results that non-proprietary brokers have better asset allocation ability than proprietary brokers.

All channels do not show any superior asset allocation ability compared to the CF benchmark. In *Panel A* and *Panel B* of *Table 5* the overall return differences between the proprietary broker channel and the CF benchmark are always negative and statistically significant for different holding periods. The differences between the non-proprietary broker channel (direct market channel) and the benchmark are not statistically significant or significantly negative depending on the holding period. Overall, the longer the holding period, the stronger the evidence of poor asset allocation ability is.

The results of the Sharpe ratio analysis in *Panel C of Table 5* also show strong evidence of a better asset allocation ability of non-proprietary brokers compared to proprietary brokers. The Sharpe ratio differences between non-proprietary and proprietary brokers are always positive

and statistically significant for all holding periods. The Sharpe ratio differences between the non-proprietary channel (the proprietary channel, the direct market channel) and the CF benchmark is always negative and in most cases statistically significant, which indicates that different sales channels do not show any superior asset allocation ability compared to the CF benchmark.

4. Robustness check

4.1. Asset allocation ability with three asset classes

Bergstresser, Chalmers and Tufano (2009) mention that assets in money market funds may reflect transaction motives rather than active long-term portfolio choice decisions. Therefore, I look at the turnover ratio of each asset class. I calculate the turnover ratio as follows:

$$Turnover_t = \frac{\min\left(Inflow_t, Outflow_t\right)}{Average\ TNA_t}, \tag{4}$$

where $Inflow_t$ is calculated as new sales in month t plus exchange sales in month t. $Outflow_t$ is calculated as redemption in month t plus exchange redemption in month t. $Average\ TNA_t$ is calculated as the average of the *TNA* at the beginning of month t and the *TNA* at the end of month t. The average turnover ratio of each asset class is reported in *Table 6*. While the monthly turnover ratio of Domestic Equity, Foreign Equity and Taxable Domestic Bond are lower than 5%, the average turnover of Taxable Money Market in overall mutual funds is greater than 50%. The turnover ratio of Taxable Money Market in the non-proprietary broker channel, the proprietary broker channel or the direct market channel is also considerably larger than the turnover in other asset classes. This is evidence for transaction motives of assets in money market funds. Therefore, I reexamine asset allocation ability with only three asset classes. The results are reported in *Tables 7-10*. *Table 7* reports the average asset allocation weights of different channels.

-- Please insert Table 7 approximately here –

I rescale the aggregate portfolio weights under the assumption that these three asset classes represent the entire investment universe for these funds. Consistent with the results based on four asset classes, the proprietary broker channel has higher weights towards low-risk asset classes than the non-proprietary channel. It has the highest weight in Taxable Domestic Bonds. The results based on TNA are reported in *Table 8*.

-- Please insert Table 8 approximately here –

Sharpe ratios for different portfolios also show that mutual fund investors, as a whole, have poor asset allocation ability compared to the TNA benchmark. The Sharpe ratio of the overall mutual fund portfolio (0.0415) is smaller than the Sharpe ratio of the TNA benchmark (0.0468). The non-proprietary broker channel with a Sharpe ratio of 0.0407 is considerably better than the proprietary broker channel with a Sharpe ratio of 0.0269.

The results based on new cash flows are reported in *Table 9*.

-- Please insert Table 9 approximately here –

Consistent with previous results, there is no evidence of superior asset allocation ability of mutual fund investors in comparison with the CF Benchmark both in terms of raw returns and risk adjusted returns. *Table 10* also shows that non-proprietary brokers earn higher average raw returns and higher risk adjusted returns over all holding periods, which indicates that non-proprietary brokers have a better asset allocation ability than proprietary brokers.

-- Please insert Table 10 approximately here –

4.2. Asset allocation ability by using normalized net flows

Until now I use the money cash flows to form portfolios. In this robustness check I form portfolios with normalized flows. I normalize monthly net flows by fund assets at the end of the previous month and calculate the overall return based on two methods described in *Section 2.3*. I simply compared non-proprietary brokers and proprietary brokers. The results in *Table 11* suggest the same evidence that non-proprietary brokers have considerably better asset allocation ability than proprietary brokers over the alternative holding periods. The differences between overall returns of non-proprietary and proprietary brokers are always positive and in most cases statistically significant.

-- Please insert Table 11 approximately here –

4.3. Asset allocation ability by using unexpected flows

For a further robustness check I also examine asset allocation ability with unexpected flows. Warther (1995) shows that fund flows are highly autocorrelated. The large autocorrelations in

fund flows imply that they are highly predictable. Following Warther (1995) I separate net flows into expected and unexpected components in order to examine asset allocation ability of unexpected flows. Like Warther (1995) I identify time-series properties of net flows and time-series models to estimate the expected component of the flows in different channels. The unexpected components are calculated as regression residuals of net flows on their lags.

The CF benchmark portfolio does not have unexpected flows as flows are constant over time. Therefore, I simply compare non-proprietary brokers and proprietary brokers. *Table 12* reports overall returns of new cash flows in the non-proprietary broker channel and the proprietary broker channel based on method 1 and method 2.

-- Please insert Table 12 approximately here –

The difference of the overall return between non-proprietary brokers and proprietary brokers is always positive indicating that non-proprietary brokers perform better than proprietary brokers even though the effect is not significant in all holding periods and in all significance tests.

5. Conclusion

In this paper I find that mutual fund investors, as a whole, have poor asset allocation ability. Over the long-term they attain lower cumulative values, lower raw performance and lower risk adjusted performance through their allocation among mutual fund asset classes as compared to investing in a passive benchmark or in asset allocation funds. I look at returns on total net assets and net cash flows with alternative holding periods from 1 month to 48 months. The evidence of underperformance becomes stronger when the holding period becomes longer. One potential explanation for the bad performance of investors' asset allocation decisions is investor sentiment.

Furthermore, I find very strong evidence of a better asset allocation ability of non-proprietary brokers as compared to proprietary brokers. This is consistent with theoretical and empirical results of insurance studies. Non-proprietary brokers are independent of an individual fund management company. They are free from strict regulations of a parent company and have access to a larger fund universe. They are able to consult investors without consideration of their parent company. All of these advantages make it easier for non-proprietary brokers to act on behalf of investors as opposed to proprietary brokers who represent their affiliated fund companies. Thus they can provide a higher quality of service than proprietary brokers. It

seems that the disadvantage of proprietary brokers is already observed by mutual fund investors. Therefore, as shown in *Figure 1* there is a strong decease in fund assets sold through proprietary brokers.

Results of this paper have important implications for mutual fund investors in terms of their asset allocation. In order to earn a better asset allocation performance they should prefer a passive strategy rather than change their asset allocation frequently over time. Alternatively they can delegate their asset allocation decisions to professional mutual fund managers by investing in asset allocation funds.[21] Furthermore, there is a group of investors who buy and are going to buy mutual funds through brokers for some reasons. These investors can get better professional financial advice in terms of asset allocation from non-proprietary brokers than those from proprietary brokers.[22]

[21] Comer (2006) finds evidence of market timing ability of asset allocation funds, which results in a better performance as compared to a passive benchmark without timing ability.

[22] ICI research Fundamentals find that 60% of fund investors with ongoing advisory relationships get help from their advisors in terms of asset allocation. See ICI, Why Do Mutual Fund investors Use Professional Financial Advisers? (2007).

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Table 1 Summary statistics

Panel A: Mutual fund net cash flows and total net assets by asset class classification

This table reports average monthly net flows and average monthly total net assets of mutual funds by asset class classification from January 1996 to July 2009. ICI data includes four flow categories: new sales, redemptions, exchange sales and exchange redemptions. New sales and redemptions are actual cash flows that enter or exit the fund family. Exchange sales and exchange redemptions are transfers of existing cash flows between funds in the same fund family. Net flows are calculated as: (new sales - redemption) + (exchange in – exchange out). Assets are the end of period net assets. The funds are classified into eight asset classes: Domestic Equity, Foreign Equity, Hybrid, Domestic Bond, Foreign Bond, Municipal Bond, Taxable Money Market, Municipal Money Market. I examine only four major asset classes Domestic Equity, Foreign Equity, Domestic Bond and Taxable Money Market, which account for 85% of aggregate assets in the U.S. mutual fund industry.

	Domestic Equity	Foreign Equity	Taxable Bond	Domestic Taxable Money Market
Mean Net flows ($ billions)	6.53	3.27	3.50	10.94
Proportion of net flows	*24.08%*	*12.04%*	*12.91%*	*40.32%*
Mean Assets ($ billions)	3101.97	675.28	736.76	1676.88
Proportion of assets	*42.78%*	*9.32%*	*10.61%*	*23.13%*

Panel B: Mutual fund net cash flows and total net assets by channel classification

This table reports average monthly net flows and average monthly total net assets of mutual funds by channel classification from January 1996 to July 2009. ICI uses the following categorization of distribution channels: non-proprietary sales force, proprietary sales force, direct market, variable annuity and institutional.

	Non-Proprietary Sales force	Proprietary Sales force	Direct Market	Variable Annuity	Institutional
Mean Net flows($ billions)	4.19	-0.25	5.07	1.85	16.26
Proportion of net flows	*15.43%*	*-0.91%*	*18.70%*	*6.83%*	*59.94%*
Mean Assets($ billions)	1844.98	896.20	1917.71	750.47	1840.89
Proportion of assets	*25.45%*	*12.36%*	*26.45%*	*10.35%*	*25.39%*

Table 2: Average asset allocation weights of different portfolios

This table shows average asset allocation weights overall mutual funds, funds sold through non-proprietary brokers, funds sold through proprietary brokers, funds sold through the direct channel. I rescale aggregate portfolio weights under the assumption that these four asset classes represent the entire investment universe for these funds.

	Domestic Equity	Foreign Equity	Taxable Bond	Domestic Taxable Money Market
Overall	50.70%	10.28%	11.89%	27.13%
Non-Proprietary	58.94%	16.79%	13.73%	10.54%
Proprietary	34.51%	6.50%	10.72%	48.28%
Direct Market	65.94%	9.15%	10.88%	14.03%

Table 3: Sharpe ratio of different portfolios with four asset classes

This table presents average monthly return, average monthly excess return, standard deviation of monthly excess return and Sharpe ratio of different portfolios: the TNA benchmark portfolio, the overall mutual fund portfolio, the non-proprietary broker portfolio, the proprietary broker portfolio, the direct market portfolio and the asset allocation fund portfolio. Asset allocation weights are monthly rebalanced. The monthly return of the asset allocation fund portfolio is calculated as equally weighted average of all asset allocation funds.

	TNA benchmark portfolio	Overall mutual fund portfolio	Non-proprietary broker portfolio	Proprietary broker portfolio	Direct market portfolio	Asset allocation fund portfolio
Mean monthly return	0.42%	0.41%	0.42%	0.34%	0.45%	0.43%
Mean monthly excess return	0.14%	0.12%	0.14%	0.05%	0.17%	0.15%
Standard deviation of monthly return	2.96%	2.88%	3.70%	1.93%	3.61%	3.14%
Sharpe ratio	0.0469	0.0418	0.0373	0.0275	0.0463	0.0471

Table 4: Performance of net cash flow portfolios for overall mutual funds and the CF benchmark

This table presents overall returns based on monthly net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on new cash flows is calculated with method 1. To calculate the return on net flows, I first estimate the dollar gains on all net cash flows over the entire sample period. The net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period The portfolio return for month t is calculated as the sum of dollar gains across all asset classes for month t divided by the sum of absolute net cash flows to all asset classes in month t. Panel C presents Sharpe ratios of net cash flow portfolios based on method 2. For a holding period of one month there is only one Sharpe ratio. I use Jobson/Korkie (1981) test with Memmel (2003) correction to test the Sharpe ratio difference. In the case of a holding period of more than one month, for example 12 months, I calculate first asset allocation weights based on net cash flows in month t. Then I calculate monthly returns in the following 12 months (month t+1 to month t+12) based on asset allocation weights at the end of month t. Next, I calculate Sharpe ratio with these 12 monthly returns. I do that for each month and get a time series of Sharpe ratios. Based on the time series of Sharpe ratios I can test the significance of the Sharpe ratio difference. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0035	0.0188	0.0382	0.0869	0.1318	0.1672
Overall mutual funds	0.0036	0.0171	0.0283	0.0438	0.0502	0.0649
Dif (Overall-CF BM)	**0.0000**$^{0[***]}$	**-0.0017**$^{0[***]}$	**-0.0099**$^{0[***]}$	**-0.0431**$^{**(***)[***]}$	**-0.0815**$^{***(***)[***]}$	**-0.1023**$^{***(***)[***]}$

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0035	0.0188	0.0382	0.0869	0.1318	0.1672
Overall mutual funds	0.0035	0.0218	0.0398	0.0680	-0.0824	0.0872
Dif (Overall-CF BM)	**-0.0001**$^{0[]}$	**0.0030**$^{0[]}$	**0.0016**$^{0[]}$	**-0.0188**$^{**(**)[]}$	**-0.0493**$^{***(***)[***]}$	**-0.0800**$^{***(***)[***]}$

Panel C: Mean Sharpe ratio of net cash flow portfolios for overall mutual funds and the CF benchmark.

	Mean monthly return	Standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
	1 month			6 months			12 months		
CF Benchmark	0.0035	0.0194	0.0350	0.0031	0.0169	0.1519	0.0032	0.0170	0.1163
Overall mutual funds	0.0035	0.0198	0.0316	0.0036	0.0167	0.0543	0.0033	0.0169	0.0133
Dif (Overall-CF BM)			**-0.0034**			**-0.0975**$^{**(**)[]}$			**-0.1030**$^{***(***)[]}$
	24 months			36 months			48 months		
CF Benchmark	0.0036	0.0169	0.1041	0.0037	0.0169	0.0937	0.0035	0.0170	0.0774
Overall mutual funds	0.0028	0.0183	-0.0278	0.0023	0.0193	-0.0807	0.0017	0.0197	-0.1317
Dif (Overall-CF BM)			**-0.1318**$^{***(***)[***]}$			**-0.1743**$^{***(***)[***]}$			**-0.2091**$^{***(***)[***]}$

Table 5: Performance of net cash flow portfolios for different sales channels, especially non-proprietary vs. proprietary brokers

This table presents overall returns based on monthly net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on new cash flows is calculated with method 1. To calculate the return on net flows, I first estimate the dollar gains on all net cash flows over the entire sample period. The net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period The portfolio return for month t is calculated as the sum of dollar gains across all asset classes for month t divided by the sum of absolute net cash flows to all asset classes in month t. Panel C presents Sharpe ratios of net cash flow portfolios based on method 2. For a holding period of one month there is only one Sharpe ratio. I use Jobson/Korkie (1981) test with Memmel (2003) correction to test the Sharpe ratio difference. In the case of a holding period of more than one month, for example 12 months, I calculate first asset allocation weights based on net cash flows in month t. Then I calculate monthly returns in the following 12 months (month t+1 to month t+12) based on asset allocation weights at the end of month t. Next, I calculate Sharpe ratio with these 12 monthly returns. I do that for each month and get a time series of Sharpe ratios. Based on the time series of Sharpe ratios I can test the significance of the Sharpe ratio difference. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0035	0.0188	0.0382	0.0869	0.1318	0.1672
Nonproprietary brokers	0.0044	0.0232	0.0372	0.0436	0.0523	0.0790
Proprietary brokers	0.0007	0.0064	0.0093	0.0009	-0.0008	-0.0094
Direct Market	0.0065	0.0260	0.0408	0.0613	0.0663	0.0887
Dif (Non-Prop - Prop)	**0.0037**$^{()[]}$	**0.0168**$^{**(***)[***]}$	**0.0279**$^{***(***)[***]}$	**0.0427**$^{***(***)[***]}$	**0.0603**$^{***(**)[***]}$	**0.0885**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)	0.0009$^{()[]}$	0.0044$^{()[]}$	-0.0010$^{()[]}$	-0.0432$^{***(***)[**]}$	-0.0795$^{***(***)[***]}$	-0.0882$^{***(***)[***]}$
Dif (Prop – CF BM)	-0.0028$^{()[***]}$	-0.0124$^{**(**)[***]}$	-0.0289$^{***(***)[***]}$	-0.0859$^{***(***)[***]}$	-0.1397$^{***(***)[***]}$	-0.1767$^{***(***)[***]}$
Dif (Direct – CF BM)	0.0029$^{()[*]}$	0.0073$^{()[]}$	0.0025$^{()[]}$	-0.0255$^{*(*)[*]}$	-0.0655$^{***(***)[***]}$	-0.0786$^{***(***)[***]}$

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0035	0.0188	0.0382	0.0869	0.1318	0.1672
Nonproprietary brokers	0.0044	0.0273	0.0513	0.0681	0.0935	0.1007
Proprietary brokers	0.0009	0.0055	0.0094	0.0064	-0.0003	0.0067
Direct Market	0.0043	0.0251	0.0474	0.0792	0.0962	0.1014
Dif (Non-Prop - Prop)	**0.0035**$^{**(*)[**]}$	**0.0217**$^{***(***)[***]}$	**0.0419**$^{***(***)[***]}$	**0.0616**$^{***(***)[***]}$	**0.0939**$^{***(***)[***]}$	**0.0940**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)	0.0008$^{()[]}$	0.0085$^{()[]}$	0.0130$^{()[]}$	-0.0188$^{*(*)[]}$	-0.0382$^{**(**)[**]}$	-0.0665$^{***(***)[***]}$
Dif (Prop – CF BM)	-0.0026$^{()[***]}$	-0.0132$^{**(**)[***]}$	-0.0288$^{***(***)[***]}$	-0.0804$^{***(***)[***]}$	-0.1321$^{***(***)[***]}$	-0.1606$^{***(***)[***]}$
Dif (Direct – CF BM)	0.0008$^{()[]}$	0.0063$^{()[]}$	0.0091$^{()[**]}$	-0.0076$^{()[]}$	-0.0356$^{**(***)[**]}$	-0.0659$^{***(***)[***]}$

Panel C: Mean Sharpe ratio of net cash flow portfolios for different sales channels, especially non-proprietary vs. proprietary brokers

	1 month			6 months			12 months		
	Mean monthly return	Standard deviation of monthly return	Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
CF Benchmark	0.0035	0.0194	0.0350	0.0031	0.0169	0.1519	0.0032	0.0170	0.1163
Nonproprietary brokers	0.0044	0.0299	0.0509	0.0045	0.0248	0.0790	0.0043	0.0242	0.0398
Proprietary brokers	0.0009	0.0134	-0.1458	0.0009	0.0103	-0.4467	0.0008	0.0099	-0.4330
Direct market	0.0043	0.0283	0.0515	0.0042	0.0236	-0.0051	0.0039	0.0232	0.0286
Dif (Non-Prop – Prop)			**0.1967*****			**0.5257**$^{***(***)[***]}$			**0.4729**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)			0.0159			-0.0729$^{()[]}$			-0.0764$^{*(*)[]}$
Dif (Prop – CF BM)			-0.1808			-0.5986$^{***(***)[***]}$			-0.5493$^{***(***)[***]}$
Dif (Direct – CF BM)			0.0165			-0.1569$^{**(**)[]}$			-0.0877$^{**(**)[]}$
	24 months			36 months			48 months		
	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
CF Benchmark	0.0036	0.0169	0.1041	0.0037	0.0169	0.0937	0.0035	0.0170	0.0774
Nonproprietary brokers	0.0028	0.0250	0.0016	0.0026	0.0258	-0.0227	0.0021	0.0262	-0.0630
Proprietary brokers	0.0003	0.0107	-0.5186	-0.0000	0.0107	-0.5664	0.0001	0.0100	-0.5669
Direct market	0.0033	0.0243	0.0141	0.0027	0.0258	-0.0085	0.0021	0.0267	-0.0465
Dif (Non-Prop – Prop)			**0.5202**$^{***(***)[***]}$			**0.5437**$^{***(***)[***]}$			**0.5039**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)			-0.1025$^{***(***)[**]}$			-0.1163$^{***(***)[***]}$			-0.1405$^{***(***)[***]}$
Dif (Prop – CF BM)			-0.6226$^{***(***)[***]}$			-0.6600$^{***(***)[***]}$			-0.6444$^{***(***)[***]}$
Dif (Direct – CF BM)			-0.0900$^{***(***)[**]}$			-0.1022$^{***(***)[***]}$			-0.1239$^{***(***)[***]}$

Table 6: Average turnover ratio of each asset class

This table shows the average aggregate turnover ratio of each asset classes for overall mutual funds, funds sold through the non-proprietary broker channel, funds sold through the proprietary channel, funds sold through the direct channel. $Inflow_t$ is calculated as "new sales" in month t plus "exchange sales" in month t. $Outflow_t$ is calculated as "redemptions" in month t plus "exchange redemptions" in month t. $Average\ TNA_t$ is calculated as the average of the TNA at the beginning of month t and the TNA at the end of month t. The turnover ratio in month t is defined as: $Turnover_t = \frac{\min(Inflow_t, Outflow_t)}{Average\ TNA_t}$.

	Domestic Equity	Foreign Equity	Taxable Domestic Bond	Taxable Money Market
Overall	2.38%	3.67%	2.99%	51.62%
Non-Proprietary	2.50%	3.08%	2.93%	35.79%
Proprietary	2.57%	4.16%	2.93%	44.51%
Direct Market	2.31%	3.74%	2.76%	16.17%

Table 7: Average asset allocation weights of different portfolios with three asset classes

This table shows average asset allocation weights overall mutual funds, funds sold through non-proprietary brokers, funds sold through proprietary brokers, funds sold through the direct channel. I rescale aggregate portfolio weights under the assumption that these three asset classes represent the entire investment universe for these funds.

	Domestic Equity	Foreign Equity	Taxable Domestic Bond
Overall	69.09%	14.01%	16.90%
Non-Proprietary	65.90%	18.71%	15.38%
Proprietary	66.66%	12.46%	20.87%
Direct Market	76.60%	10.65%	12.75%

Table 8: Sharpe ratio of different portfolios with three asset classes

This table presents average monthly return, average monthly excess return, standard deviation of monthly excess return and Sharpe ratio of different portfolios: the TNA benchmark portfolio, the overall mutual fund portfolio, the non-proprietary broker portfolio, the proprietary broker portfolio and the direct market portfolio. Asset allocation weights are monthly rebalanced.

	TNA Benchmark portfolio	Overall mutual fund portfolio	Nonproprietary broker portfolio	Proprietary broker portfolio	Direct market portfolio
Mean monthly return	0.48%	0.45%	0.45%	0.39%	0.49%
Mean monthly excess return	0.19%	0.17%	0.16%	0.11%	0.20%
Standard deviation of monthly return	4.07%	4.07%	4.16%	3.94%	4.27%
Sharpe ratio	0.0468	0.0415	0.0407	0.0269	0.0478

Table 9: Performance of net cash flow portfolios for overall mutual funds and CF benchmark with three asset classes

This table presents overall returns based on monthly net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on new cash flows is calculated with method 1. To calculate the return on net flows, I first estimate the dollar gains on all net cash flows over the entire sample period. The net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period The portfolio return for month t is calculated as the sum of dollar gains across all asset classes for month t divided by the sum of absolute net cash flows to all asset classes in month t. Panel C presents Sharpe ratios of net cash flow portfolios based on method 2. For a holding period of one month there is only one Sharpe ratio. I use Jobson/Korkie (1981) test with Memmel (2003) correction to test the Sharpe ratio difference. In the case of a holding period of more than one month, for example 12 months, I calculate first asset allocation weights based on net cash flows in month t. Then I calculate monthly returns in the following 12 months (month t+1 to month t+12) based on asset allocation weights at the end of month t. Next, I calculate Sharpe ratio with these 12 monthly returns. I do that for each month and get a time series of Sharpe ratios. Based on the time series of Sharpe ratios I can test the significance of the Sharpe ratio difference. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0041	0.0200	0.0410	0.1008	0.1553	0.1949
Overall mutual funds	0.0062	0.0281	0.0427	0.0613	0.0745	0.1076
Dif (Overall-CF BM)	**0.0021**[0][]	**0.0081**[0][]	**0.0017**[0][]	**-0.0395**[**(**)][]	**-0.0808**[***(***)[***]	**-0.0873**[***(***)[**]

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0041	0.0200	0.0410	0.1008	0.1553	0.1949
Overall mutual funds	0.0060	0.0330	0.0553	0.0875	0.1204	0.1277
Dif (Overall-CF BM)	**0.0019**[0][]	**0.0130** [0][]	**0.0143**[0][***]	**-0.0133**[0][]	**-0.0350**[*(**)][]	**-0.0672**[***(***)][]

Panel C: Mean Sharpe ratio of net cash flow portfolios for overall mutual funds and the CF benchmark

	Mean monthly return	Standard deviation of monthly return	Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
	1 month			6 months			12 months		
CF Benchmark	0.0041	0.0354	0.0351	0.0033	0.0309	0.1522	0.0034	0.0310	0.1164
Overall mutual funds	0.0060	0.0362	0.0873	0.0055	0.0317	0.1145	0.0046	0.0316	0.0748
Dif (Overall-CF BM)			**0.0522**			**-0.0377**[0][*]			**-0.0416**[0][***]
	24 months			36 months			48 months		
CF Benchmark	0.0042	0.0308	0.1039	0.0043	0.0309	0.0936	0.0041	0.0312	0.0774
Overall mutual funds	0.0036	0.0321	0.0509	0.0033	0.0330	0.0208	0.0027	0.0338	-0.0222
Dif (Overall-CF BM)			**-0.0530**[**(**)[*]			**-0.0728**[***(***)][]			**-0.0995**[***(***)][]

Table 10: Performance of net cash flow portfolios for different sales channels with three asset classes, especially non-proprietary brokers vs. proprietary brokers

This table presents overall returns based on monthly net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on new cash flows is calculated with method 1. To calculate the return on net flows, I first estimate the dollar gains on all net cash flows over the entire sample period. The net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period The portfolio return for month t is calculated as the sum of dollar gains across all asset classes for month t divided by the sum of absolute net cash flows to all asset classes in month t. Panel C presents Sharpe ratios of net cash flow portfolios based on method 2. For a holding period of one month there is only one Sharpe ratio. I use Jobson/Korkie (1981) test with Memmel (2003) correction to test the Sharpe ratio difference. In the case of a holding period of more than one month, for example 12 months, I calculate first asset allocation weights based on net cash flows in month t. Then I calculate monthly returns in the following 12 months (month t+1 to month t+12) based on asset allocation weights at the end of month t. Next, I calculate Sharpe ratio with these 12 monthly returns. I do that for each month and get a time series of Sharpe ratios. Based on the time series of Sharpe ratios I can test the significance of the Sharpe ratio difference. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0041	0.0200	0.0410	0.1008	0.1553	0.1949
Nonproprietary brokers	0.0056	0.0294	0.0469	0.0524	0.0643	0.1025
Proprietary brokers	0.0008	0.0118	0.0129	-0.0220	-0.0434	-0.0343
Direct Market	0.0083	0.0321	0.0489	0.0702	0.0762	0.1084
Dif (Non-Prop - Prop)	**0.0048**$^{()[**]}$	**0.0176**$^{***(***)[***]}$	**0.0340**$^{***(***)[***]}$	**0.0743**$^{***(***)[***]}$	**0.1076**$^{***(***)[***]}$	**0.1369**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)	0.0015$^{()[]}$	0.0094$^{()[]}$	0.0059$^{()[]}$	-0.0484$^{***(***)[*]}$	-0.0910$^{***(***)[***]}$	-0.0923$^{***(***)[*]}$
Dif (Prop – CF BM)	-0.0033$^{()[***]}$	-0.0083$^{()[***]}$	-0.0281$^{()[***]}$	-0.1228$^{***(***)[***]}$	-0.1987$^{***(***)[***]}$	-0.2292$^{***(***)[***]}$
Dif (Direct – CF BM)	0.0042$^{()[*]}$	0.0121$^{()[]}$	0.0079$^{()[]}$	-0.0306$^{(*)[]}$	-0.0791$^{***(***)[***]}$	-0.0865$^{***(***)[***]}$

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
CF Benchmark	0.0041	0.0200	0.0410	0.1008	0.1553	0.1949
Nonproprietary brokers	0.0056	0.0341	0.0636	0.0829	0.1228	0.1302
Proprietary brokers	0.0013	0.0123	0.0199	0.0086	0.0098	0.0272
Direct Market	0.0050	0.0273	0.0528	0.0862	0.1086	0.1160
Dif (Non-Prop - Prop)	**0.0043**$^{**(**)[**]}$	**0.0218**$^{***(***)[***]}$	**0.0437**$^{***(***)[***]}$	**0.0743**$^{***(***)[***]}$	**0.1129**$^{***(***)[***]}$	**0.1030**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)	0.0015$^{()[]}$	0.0141$^{()[*]}$	0.0226$^{()[**]}$	-0.0178$^{()[]}$	-0.0325$^{*(*)[]}$	-0.0647$^{**(***)[]}$
Dif (Prop – CF BM)	-0.0028$^{()[**]}$	-0.0077$^{()[*]}$	-0.0212$^{()[*]}$	-0.0922$^{***(***)[***]}$	-0.1455$^{***(***)[***]}$	-0.1677$^{***(***)[***]}$
Dif (Direct – CF BM)	0.0009$^{()[]}$	0.0073$^{()[]}$	0.0118$^{()[**]}$	-0.0146$^{()[]}$	-0.0467$^{**(**)[]}$	-0.0789$^{***(***)[*]}$

Panel C: Mean Sharpe ratio of net cash flow portfolios for different sales channels with three asset classes

	1 month			6 months			12 months		
	Mean monthly return	Standard deviation of monthly return	Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
CF Benchmark	0.0041	0.0354	0.0351	0.0033	0.0309	0.1522	0.0034	0.0310	0.1164
Nonproprietary brokers	0.0056	0.0368	0.0751	0.0057	0.0325	0.1104	0.0053	0.0322	0.0695
Proprietary brokers	0.0013	0.0349	-0.0435	0.0020	0.0270	-0.1500	0.0017	0.0262	-0.1316
Direct market	0.0050	0.0363	0.0602	0.0046	0.0314	0.0102	0.0044	0.0312	0.0443
Dif (Non-Prop – Prop)			**0.1186****			**0.2604**$^{***(***)[***]}$			**0.2011**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)			0.0400			-0.0418$^{()[*]}$			-0.0469$^{()[**]}$
Dif (Prop – CF BM)			-0.0786			-0.3022$^{***(***)[***]}$			-0.2480$^{***(***)[***]}$
Dif (Direct – CF BM)			0.0251			-0.1420$^{**(**)[]}$			-0.0720$^{*(*)[*]}$
	24 months			36 months			48 months		
	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio	Mean monthly return	Mean standard deviation of monthly return	Mean Sharpe Ratio
CF Benchmark	0.0042	0.0308	0.1039	0.0043	0.0309	0.0936	0.0041	0.0312	0.0774
Nonproprietary brokers	0.0035	0.0325	0.0372	0.0034	0.0332	0.0190	0.0027	0.0343	-0.0222
Proprietary brokers	0.0004	0.0260	-0.1604	0.0003	0.0277	-0.1570	0.0006	0.0284	-0.1247
Direct market	0.0036	0.0315	0.0328	0.0030	0.0336	0.0152	0.0024	0.0346	-0.0198
Dif (Non-Prop – Prop)			**0.1976**$^{***(***)[***]}$			**0.1761**$^{***(***)[***]}$			**0.1045**$^{***(***)[***]}$
Dif (Non-Prop – CF BM)			-0.0667$^{***(***)[]}$			-0.0746$^{***(***)[]}$			-0.0976$^{***(***)[]}$
Dif (Prop – CF BM)			-0.2643$^{***(***)[***]}$			-0.2506$^{***(***)[***]}$			-0.2020$^{***(***)[***]}$
Dif (Direct – CF BM)			-0.0711$^{***(***)[]}$			-0.0784$^{***(***)[]}$			-0.0971$^{***(***)[*]}$

Table 11: Performance of the new money portfolios based on growth rate of asset classes for non-proprietary vs. proprietary brokers

This table presents overall returns based on normalized monthly net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on new cash flows is calculated with method 1. To calculate the return on normalized net flows, I first estimate the gains on all normalized net cash flows over the entire sample period. The normalized net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of normalized absolute net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period. The portfolio return for month t is calculated as the sum of gains across all asset classes for month t divided by the sum of normalized absolute net cash flows to all asset classes in month t. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
Nonproprietary brokers	0.0025	0.0145	0.0263	0.0472	0.0606	0.0696
Proprietary brokers	0.0013	0.0084	0.0122	0.0069	-0.0103	-0.0286
Dif (Non-Prop – Prop)	**0.0012**$^{()[]}$	**0.0060**$^{**(**)[***]}$	**0.0141**$^{***(***)[***]}$	**0.0403**$^{***(***)[***]}$	**0.0709**$^{***(***)[***]}$	**0.0982**$^{***(***)[***]}$

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
Nonproprietary brokers	0.0032	0.0189	0.0349	0.0512	0.0648	0.0639
Proprietary brokers	0.0012	0.0084	0.0131	0.0105	0.0002	-0.0086
Dif (Non-Prop – Prop)	**0.0020**$^{*(*)[*]}$	**0.0105**$^{***(***)[***]}$	**0.0218**$^{***(***)[***]}$	**0.0408**$^{***(***)[***]}$	**0.0645**$^{***(***)[***]}$	**0.0725**$^{***(***)[***]}$

Table 12: Performance of the new money portfolios based on unexpected flows of asset classes for non-proprietary vs. proprietary brokers

This table presents overall returns based on monthly unexpected net cash flows. The sample period is from January 1996 to July 2009. In Panel A the overall return on unexpected net cash flows is calculated with method 1. To calculate the return on unexpected net flows, I first estimate the dollar gains on all unexpected net cash flows over the entire sample period. The unexpected net cash flows of asset class in month t are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by the sum of absolute unexpected net cash flows to all asset classes in all periods. In Panel B the overall return is calculated with method 2. This overall return is equally weighted average of portfolio returns over the entire sample period. The portfolio return for month t is calculated as the sum of dollar gains across all asset classes for month t divided by the sum of absolute unexpected net cash flows to all asset classes in month t. I use three tests: t-test, test with Bootstrap standard error and non-parametric test (Wilcoxon signed-rank test). Significance levels in parentheses are adjusted for bias caused by overlapping observations using the Bootstrap standard error. Significance levels in brackets are calculated by using the non-parametric test. Performance measures are *h*-month cumulative returns for *h* holding period (*h* = 1, 6, 12, 24, 36, 48). * indicates significance at 10%, ** at 5% and *** at 1% levels.

Panel A: Overall return calculated with method 1

	1 month	6 months	12 months	24 months	36 months	48 months
Nonproprietary brokers	0.0021	0.0137	0.0131	0.0116	0.0078	0.0154
Proprietary brokers	-0.0008	-0.0009	-0.0038	-0.0069	-0.0077	-0.0036
Dif (Non-Prop – Prop)	**0.0029**$^{0[]}$	**0.0146**$^{*(**)[**]}$	**0.0170** $^{(*)[*]}$	**0.0185**$^{0[*]}$	**0.0155**$^{0[]}$	**0.019**$^{0[**]}$

Panel B: Overall return calculated with method 2

	1 month	6 months	12 months	24 months	36 months	48 months
Nonproprietary brokers	-0.0000	0.0056	0.0127	0.0142	0.0156	0.0226
Proprietary brokers	-0.0019	0.0006	0.0021	-0.0011	0.0044	0.0038
Dif (Non-Prop – Prop)	**0.0019**$^{0[]}$	**0.0049**$^{0[]}$	**0.0107**$^{0[]}$	**0.0158**$^{0[*]}$	**0.0118**$^{0[]}$	**0.0196**$^{0[**]}$

Figure 1: Proportion of total net assets by distribution channels

The figure shows the proportion of total net assets in different sales channels of mutual funds in the sample period. There are five sales channels based on ICI classification: non-proprietary sales force, proprietary sales force, direct market, variable annuity channel and the institutional.

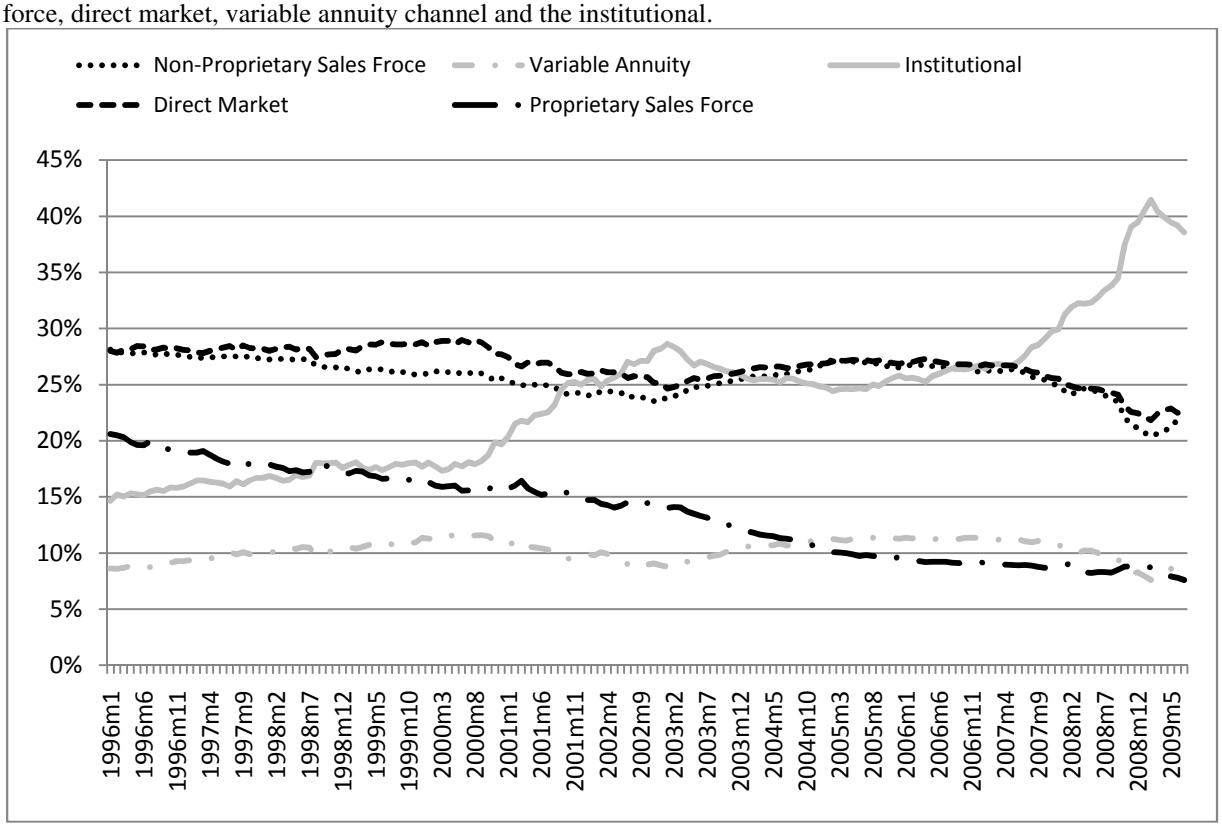


Figure 2: The Cumulative value of a $1 investment in the overall mutual fund portfolio, 1996- 2009

The figure shows differences of the cumulative value between the overall mutual fund portfolio and the TNA benchmark portfolio. I calculate returns based on four asset classes: Domestic Equity, Foreign Equity, Taxable Domestic Bond and Taxable Money Market, and rescale the weights under the assumption that these four asset classes represent the entire investment universe for these funds. The indexes used for asset returns are, respectively, the value-weighted CRSP index returns for the NYSE, AMEX, and NASDAQ stocks, the MSCI All Country World without US, the Barclays US Aggregate Domestic Bond index and the return on the 30-day Treasury bill**.**

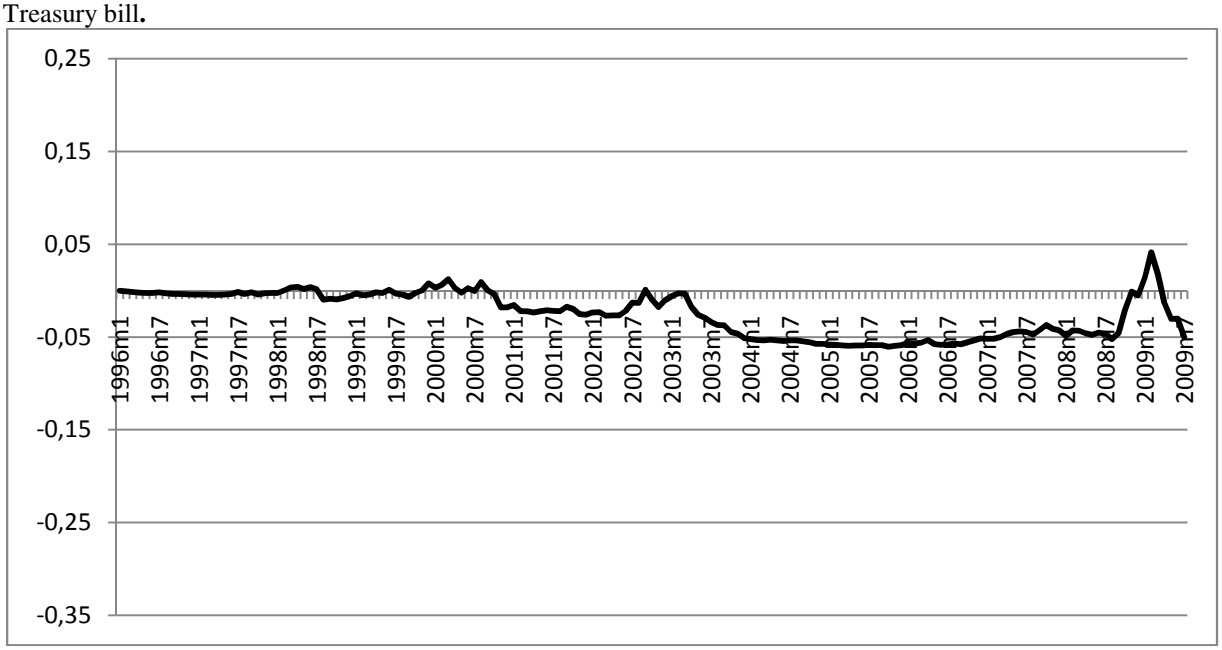
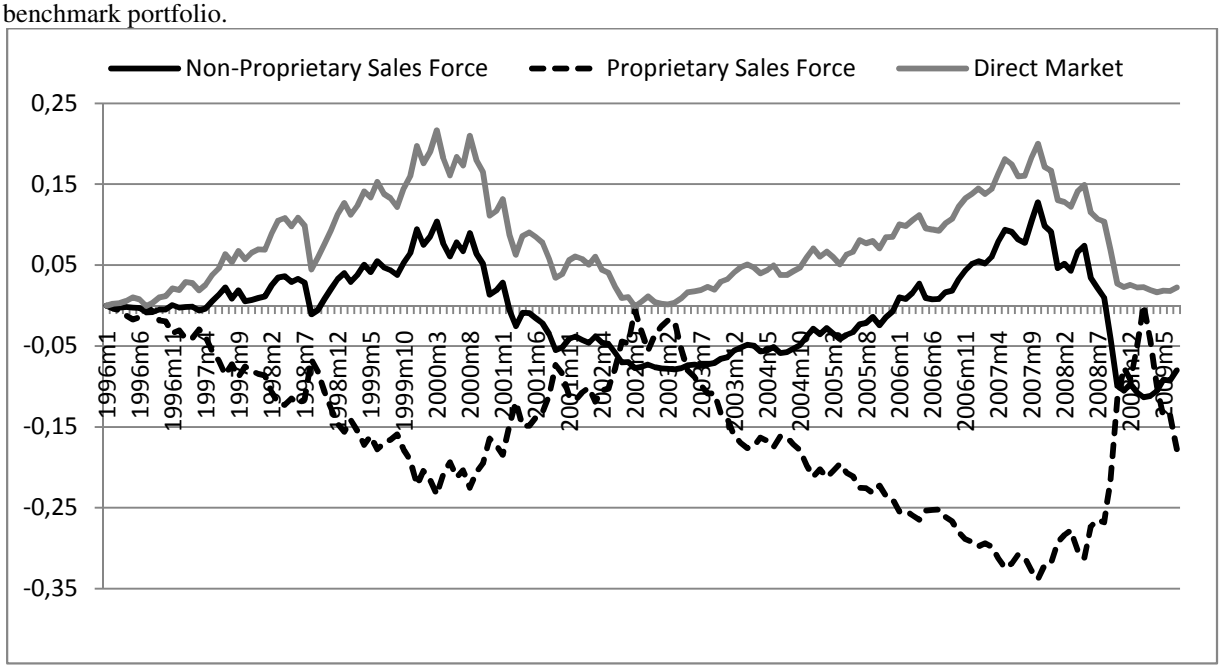


Figure 3: The Cumulative value of a $1 investment in different sales channel portfolios, 1996- 2009

The figure shows differences of the cumulative value between different sales channel portfolios and the TNA benchmark portfolio.



Appendix A: Classification of investment objectives into different asset classes

Asset classes	Investment objectives
Domestic Equity	Aggressive Growth, Growth, Sector, Growth and Income, Income Equity
Foreign Equity	Emerging Markets, Global Equity, International Equity, Regional Equity
Hybrid	Asset Allocation, Balanced, Flexible Portfolio, Income Mixed
Taxable Domestic Bond	Corporate-General, Corporate-Intermediate, Corporate-Short Term, High Yield, Government Bond-General, Government Bond-Intermediate, Government Bond-Short Term, Mortgaged Backed, Strategic Income
Foreign Bond	Global Bond-General, Global Bond-Short Term, Other World Bond
Municipal Bond	State Municipal Bond-General, State Municipal Bond-Short Term, National Municipal Bond-General, National Municipal Bond-Short Term
Taxable Money Market	Taxable Money Market-Government, Taxable Money Market-Non-Government
Municipal Money Market	National Tax-Exempt Money Market, State Tax-Exempt Money Market

Appendix B: Calculation of the overall return

Method 1 is described below. First, I estimate the return on all positive net cash flows. The dollars into any asset class in month *t* are multiplied by the return on that asset class in a subsequent period. This is summed across all asset classes for all periods and divided by total positive net cash flows to all asset classes in all periods. This is the average return earned on positive net cash flows over the entire sample period and is written as:

$$R^{pos} = \frac{\sum_i \sum_t PosNF_{i,t-1} \cdot r_{i,t}^h}{\sum_i \sum_t PosNF_{i,t-1}}. \quad (5)$$

$PosNF_{i,t-1}$ is positive net flows in asset class *i* in month *t-1*. $r_{i,t,}^{\ h}$ is the *h*-month return on asset class *i* in the subsequent *h* months. *i* represents only asset classes which have positive net cash flows in month *t-1*.

Second, I calculate the average return on negative net cash flows over the sample period by using the same procedure, except for the reversed sign. This is the return an investor gets by disinvesting (taking money out of an asset class) and is written as:

$$R^{neg} = -\frac{\sum_j \sum_t \left| NegNF_{j,t-1} \right| \cdot r_{j,t}^h}{\sum_j \sum_t \left| NegNF_{j,t-1} \right|}. \quad (6)$$

$NegNF_{i,t-1}$ is the negative net flows in asset class *j* in month *t-1*. $r_{j,t,}^{\ h}$ is the *h*-month return on asset class *j* in subsequent *h* months. *j* represents only asset classes which have negative net cash flows in month *t-1*.

As a first method to calculate the overall return on new cash flows is a weighted average of returns on positive cash flows and negative cash flows. The weights are respectively the sum of positive cash flows and the sum of absolute negative cash flows divided by the sum of the two. This overall return is written as:

$$R^{overall} = R^{pos} \cdot \frac{\sum_i \sum_t PosNF_{i,t-1}}{\sum_i \sum_t PosNF_{i,t-1} + \sum_j \sum_t \left|NegNF_{j,t-1}\right|} + R^{neg} \cdot \frac{\sum_j \sum_t \left|NegNF_{j,t-1}\right|}{\sum_i \sum_t PosNF_{i,t-1} + \sum_j \sum_t \left|NegNF_{j,t-1}\right|}, \quad (7)$$

where R^{pos} is given by (1) and R^{neg} by (2). For the entire sample period I obtain only one overall return.

Method 2 focuses on the asset allocation ability within each month. I first estimate the return on positive net cash flows in month *t*. The dollars into any asset class in month *t* are multiplied by the h-month return on that asset class in a subsequent period. This is summed across all asset classes for month *t* and divided by the sum of positive net cash flows to all asset classes in month *t*. This is the average return earned on positive net cash flows in month *t* and is written as:

$$R_t^{pos} = \frac{\sum_i PosNF_{i,t-1} \cdot r_{i,t}^h}{\sum_i PosNF_{i,t-1}}. \quad (8)$$

The same procedure is followed for negative net cash flows. Again, the sign is reversed. This is the average return an investor gets by disinvesting in month *t* and is written as:

$$R_t^{neg} = -\frac{\sum_j \left|NegNF_{j,t-1}\right| \cdot r_{j,t}^h}{\sum_j \left|NegNF_{j,t-1}\right|}. \quad (9)$$

The return on new cash flows in month *t* is again defined as a weighted average of the return on positive cash flows in month *t* and negative cash flows in month *t*. The weights are the sum of positive net cash flows in month *t* and the sum of absolute negative net cash flows in month *t* respectively divided by the sum of the two. This return on new cash flows in month *t* is written as:

$$R_t^{overall} = R_t^{pos} \cdot \frac{\sum_i PosNF_{i,t-1}}{\sum_i PosNF_{i,t-1} + \sum_j \left|NegNF_{j,t-1}\right|} + R_t^{neg} \cdot \frac{\sum_j \left|NegNF_{j,t-1}\right|}{\sum_i PosNF_{i,t-1} + \sum_j \left|NegNF_{j,t-1}\right|}. \quad (10)$$

I calculate the return on cash flows for each month and get a time series of cash flow portfolio returns. The overall return on new cash flows in method 2 is equal to the average of the return on new cash flows across the entire sample period. The average value across the entire sample period ignores the difference in total investments in different months.