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Abstract

This paper investigates the performance of 56'723 individual investors using a large French database between 1999 and 2006. In accordance with previous studies, investors in our sample exhibit poor performances and the securities bought are less profitable than the securities sold on the whole period dataset. Taking into consideration the considerable heterogeneity across investors, we show how personal investment objectives, defined by direct proxies, impact portfolio performance. Controlling for diversification, turnover and usual risk factors, investors who have high aspirations underperform their peers whereas those who have low ones outperform their peers.

Keywords: Individual Investor, Performance Evaluation.

JEL Classification : G 11

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It is widely documented in the academic literature that individual investors exhibit poor performance. For example, Barber and Odean (2000) show that individual investors at a U.S discount brokerage firm during the six-year period ending January, 1997 significantly underperform relevant benchmarks. Using small trades as a proxy for the trading of individual investors, Hvidkjaer (2008) and Barber *et al.* (2009a) find that stocks heavily bought by individuals over one month to one year horizons underperform stocks heavily sold by individuals. Their results corroborate the evidence provided by Odean (1999) and Grinblatt and Keloharju (2000) that investors are net buyers of stocks with weak future performance. It is worth noting that the aggregate trading losses of individual investors are considerable. For example, on the Taiwanese market they are evaluated at 32 Billion dollars, which corresponds to 2.2% of Taiwan's total GDP (Barber *et al.,* 2009).

Even if the performance of individual investors has been studied in a number of countries, not such research has been yet carried out in France. Our paper fits this absence by investigating the average and aggregate trading performance of 56'723 investors at a French discount brokerage house between 1999 and 2006. At the same time, the profitability of their transactions is examined.

As it is clearly admitted that investors would be better off by investing in an index fund, one might wonder why do individuals continue to actively self manage their portfolio. Asides the needs of liquidity and rebalancing, hedging and tax motivations mentioned to justify the transactions, several factors such as overconfidence (Odean, 1999), sensation seeking (Grinblatt and Keloharju, 2009) and love of gambling (Barber and Odean, 2000; Kumar, 2009) have been proposed in the behavioral finance literature to explain the investor's preference for the active trading. Moreover, a minority of investors choose to manage their portfolio because they do have success in their trading activity (Coval *et al.*, 2005; Che *et al.*, 2009; Barber *et al.*, 2011). Actually, the global evidence that individual lose money on their trades masks a considerable heterogeneity across investors and scholars demonstrate that personal characteristics such as gender, age, wealth, IQ and experience are correlated with the financial well being of individual investors. For instance, a significant difference in performance exists between men and women, as men trade 45 percent more than women which reduces men's net returns by 2.65 percentage points a year as opposed to 1.72 percentage points for women (Barber and Odean, 2001). Next, Nicolisi *et al.* (2008) and Seru *et. al* (2010) evidence that excess portfolio returns significantly increases with experience. Along the same lines, Grinblatt *et al.* (2011) find that smart investors (based on their IQ) exhibit superior market timing and stock picking skills. The spread in portfolio returns earned by low-versus high-IQ investors is 2.2% per year and is significant. Concerning the age impact, Korniotis and Kumar (2009a) show that older investors (more than age 70), despite greater knowledge about investing, have worse investment skills, and

earn about a 3% to 5% lower annual return. The conclusions are less clear concerning other demographic variable such as wealth. Actually, Barber and Odean (2001) document that both small and large portfolio underperform, and do not show any statistical difference between the subsamples. Notice that, due to missing information, the portfolio value of investors is often used as a proxy of wealth. However, Chen *et al*. (2007) demonstrate that wealthiest investors earn a lower return.

In these studies, it is assumed that investors who share the same observable characteristics have homogenous psychological processes that form similar trading behaviors. Concerning these trading choices, Grinblatt and Keloharju (2000) show for example that individuals on the Finnish market are more prone to apply a contrarian strategy regarding past returns to their detriment. A number of study demonstrate that individuals tilt their portfolio towards local stocks (Grinblatt and Keloharju, 2001; Massa and Simonov, 2006) and there is an ongoing debate about the direction of the impact on performance. Indeed, Ivković and Weisbenner (2005) find that investors who are inclined to this "familiarity bias" generates additional return from their local holdings relative to their non local holdings. Yet, Seasholes and Zhu (2010) contest this result. There also exists an extent evidence on the investor's failure to diversify their portfolio (Kelly, 1995; Goetzman et Kumar; 2008). The American investors who hold most concentrated portfolio earn higher excess returns than those who hold well diversified portfolio (Kumar, 2007 and Ivković. *et al.*, 2009). About trading behavior, Seasholes and Wu (2009) show that rational arbitrageurs profit in response to attention-based buying. When attention-grabbing events appears on the market, individual investors become net buyers in aggregate. Some smart traders take reverse positions and earn one day profits of 0.76% net of transaction costs. Lastly, Barber and Odean (2000) find that the frequency of trading explain the poor investment performance of households. They evidence that the more investors are active, the less they perform. However, Chen *et al*. (2007) prove on a Chinese database that investors who trade very frequently (top 10% of turnover) earn 0.5% more return per month.

However, it might be that investors in the same "socio-demographic group" differ in their objectives, resulting in different preferences. In that paper, individuals are segmented according to their investment expectations towards a better understanding of the heterogeneity across investors performance. Based on a survey, Hoffmann *et al.* (2010) characterize some of the key ways in which individual investors differ from each other in terms of both preferences and beliefs. We contribute to their study, evaluating personal purposes through direct measures. Two opposed profiles of investors are distinguished. The first one, namely the speculative investor, aggregates investors who have high ambition

levels and high risk profiles. Their main objective is to achieve a strong capital growth by taking profit from short-term price deviations on the stock market. Investors are sorted in this subsample if they trade derivative products. The saving investor constitute the second profile which groups together investors who trade for saving and are not risk tolerant. Investors identified to be included in this subset are those who trade bonds

This article devoted to French investors fills a gap in the existing literature relative to individual trading performances. In accordance with previous studies, French individuals exhibit negative risk-adjusted returns and the securities purchased outperforms the securities sold on the whole period. Our sample is next segmented according to individual investments objectives. It is first evidenced that speculative investors exhibit poor portfolio returns, whereas saving investors outperform their peers. The role of underlying investor's goals in the choice of a particular strategy is then analyzed. Compared to the average, speculative investors trade excessively and saving investors hold much more diversified portfolios. Though diversification has a positive impact on performances whereas turnover affect them negatively, these elements are not enough to explain the differences between saving and speculative investors results. Actually, controlling for usual risk factors, turnover and diversification, the financial success of saving investors and the low portfolio returns of speculative investors persist.

A multivariate analysis of the factors that affect portfolio performances bring an interesting additional result. Indeed, the direction of each variable is different with top or bottom performers. A focus on the best investors evidence that excessive trading is not necessarily a burden but instead a driving force to achieve good results, as the trading of derivative product. Along the same line, the best traders are better off holding concentrate portfolios. On the contrary, the reverse is true for the worst traders, and more generally for the average trader.

This paper is organized as follow. Data are described in a first section and section 2 is dedicated to the study of buys-sales profitability. Portfolio performance is analyzed in section 3. A fourth section is devoted to the impact of investor's personal purpose on our results, and a final section contains the conclusions.

1. Data

The primary data set is provided by a large European brokerage house. We obtained daily transactions records of 56'723 French investors over the period 1999-2006, that is 7'911'046 trades with 4'152'312 buy orders and 3'758'734 sell orders.

Some investors open an account within this period, some others close their account before the end of the period. On average, 36'927 investors each month have their account open, with a minimum of 24'204 and a maximum of 41'614. 13'085 investors have their account open during the whole period of our dataset, while the average length of presence is 62.5 months (5.2 year).

From this trade records, we computed the daily stock portfolio of each investor. Therefore realized returns can be calculated on all time horizon. Our analyses are then based on 96 observations (96 months between January 1999 and December 2006).

On average investors realize 139 transactions (73 buy trade and 66 sale trade) between 1999 and 2006. The more active investor realizes 51'361 trades. We observe an average (median) delay between 2 trades of 42 (28) business days. In aggregate, 72'433 trades occurs on average per months. The top record number of trades is observed in March 2000 (203'342). Table 1 presents others descriptive information for the monthly trading activity of our sample. We first calculate the monthly portfolio turnover for each investor. The monthly turnover is the market value of shares purchased in month t, or sold in month t, divided by the average market value of the portfolio during month t. Notice that the purchases turnover and the sales turnover can be interpreted as the value of amount bought and sold, in proportion of the monthly portfolio. On average, investors purchase 19.77% and sell 18.19% of their portfolio each month. The aggregate purchase turnover, calculated by summing all purchases and dividing by the sum of all positions, is 11.57% and the aggregate sale turnover is 11.49%. As revealed in previous studies (Li and Li, 2011; Barber and Odean, 2000) investors trade quite frequently. Over the whole period, they spend an average amount of 2498 Euros monthly to buy 136 stocks and earn an average amount of 2488 Euros with the sale of 130 stocks. Notice that the average portfolio value, based on daily values, is 11'999 Euros, with a median of 2725 Euros and a maximum of 13.5M Euros.

Stock prices data come from two sources, Eurofidai for stocks traded on Euronext and Bloomberg for the other stocks. Investors trade 2491 stocks, of which 1191 are French, and the main part of the others comes from all over the world but essentially from the U.S (1020 stocks). Despite this large part of American stocks, more than 90% of trades concern French stocks.

1. Profitability of transactions

Before analyzing the portfolio performances, an evaluation of the profitability of investor's trades is realized. More precisely, we test whether the stocks bought by the investors in our database outperform those they sell. Ex-post returns are computed over the T ($T = 3\ month, six\ month\ and\ one\ year$) trading period subsequent to the trades, by indexing each

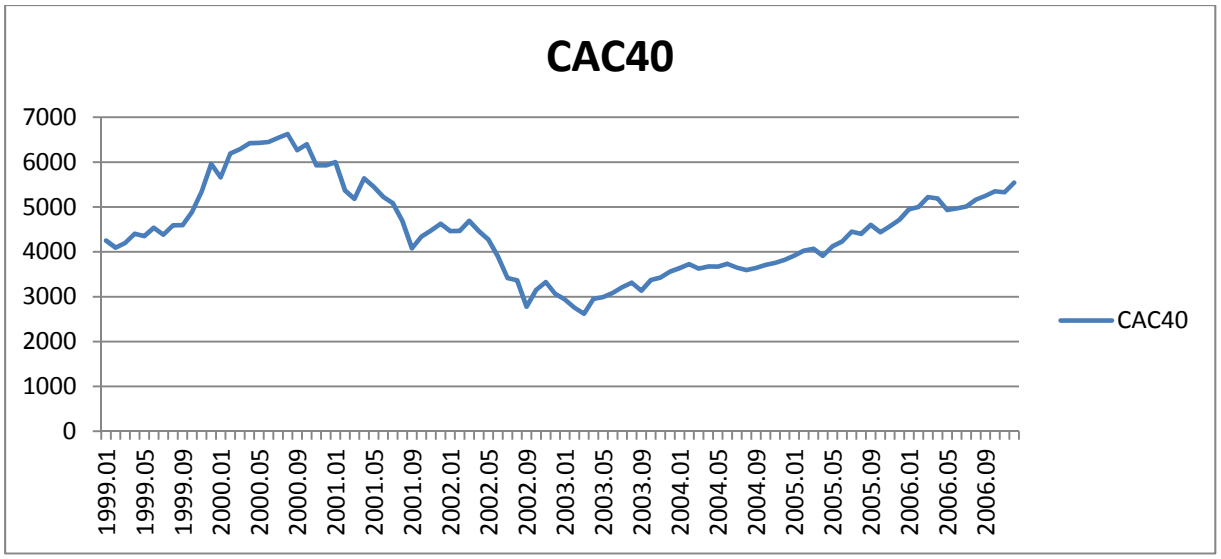
purchase and each sale. If the same stock is purchased (sold) in different accounts on the same day, each trade is counted as a distinct observation. The average return to the securities bought and sold is:

$$R_T = \frac{1}{N}\sum_{i=1}^{N} R_{j,i,i+T}$$

Where $R_{j,i,i+T}$ is the return of stock j between day i and $i+T$. Notice that the mean return is computed with equal weights of transactions. In table 2 results related to buys and sales ex-post returns are presented. Panel A reports the whole period results. For the 3-months (resp. 6-months, 1-year) horizon the securities sold seems to outperform the securities bought by 0.71% (resp. 1.13%, 1.79%). Yet, we need to test statistical significance of these results. To compare the average returns of stocks bought and sold over subsequent period, we cannot employ classical statistical test of means which require independence in the observations. Actually, many securities are bought and sold on more than one date and may even be traded by the same investor on the same day. Statistical significance is thus estimated by conducting a Wilcoxon test of differences. Average ex-post return on stocks bought and sold is determined for each investor, on the three chosen horizons T $(T = 3\ month, six\ month\ and\ one\ year)$. The distributions of average returns in then constructed for stocks purchased and sold, and a comparison between these distributions is allowed by the Wilcoxon test. More formally, we test whether the purchase returns and sale returns samples come from populations with the same medians and the same continuous distributions. This null hypothesis is rejected whichever period considered, therefore the distributions of average returns to bought and sold securities are significantly different. We confirm that the securities purchased have lower ex-post returns than the securities sold each horizons.

The following figure presents the evolution of the French index CAC-40 between 1999-2006. As most of trades are realized on French stocks in this database, the CAC index is the most appropriate benchmark to study the market evolution during our dataset period. Between 1999 and 2006, three sub-periods clearly stand out: First the dot.com bubble from 1999 to September,4 2000, precise date of the peak with the index reaching nearly 7000 points; second the post dot.com bubble with the lowest value on the March, 12, 2003; Third, an increase from 2003 which continue even after 2006, announcing the most recent financial crisis.

Figure 1: CAC 40 changes between 1999-2006



Taking into consideration the special feature of the period analyzed, the sample is split into these three sub-periods. Results are presented in Panel B, C and D. Concerning the first and the second sub-periods, results are quite similar to those obtained on the whole period. Indeed, on each horizon, the stocks purchased significantly underperform the stocks sold. The results relative to the 2003-2006 sub-period depicts a different story as on the 3-months and the 6 months horizon, the securities bought reliably outperform the securities sold. The reverse pattern is observed in the 1-year horizon.

The robustness of our results is controlled with a calendar portfolio approach. Each month t, we build a "Buy portfolio" of all securities bought and a "Sale portfolio" of all securities sold by investors during a portfolio formation period. This test is computed with a 3 months-, 6 months- and one year- formation period. The average monthly return of the "Buy portfolio" and the "Sell portfolio" is then evaluated on month $t+1$. This procedure is realized for 84 (resp.90 and 93) months t, corresponding to the formation period equal to one year (resp. 6 months, 3 months). Thus we obtain 84-, 90- and 93-monthly time-series of calendar portfolio returns. Three measure of performance are then estimated. The first one is simply the difference of the average monthly return between the '"Buy portfolio" and the "Sell portfolio". We then regress the time-series of the "Buy portfolio" minus the time-series of the "Sell portfolio" monthly calendar returns to estimate alpha's Jensen.

$$R_{B,t} - R_{S,t} = \alpha_p + \beta_p \, (Rm_t - rf_t) + \epsilon_t$$

where $R_{B,t}$ is the return of the "Buy portfolio" for the month t, $R_{S,t}$ is the return of the "Sell portfolio" for the month t, Rm_t [2]is the monthly return on a value weighted market index, β_p is the market beta, rf_t is the monthly risk free rate and corresponds to the 1-month Euribor (notice that between 1999 and 2006, the monthly average of the risk free rate is 0.24%, that is 2.92% annualized) and ϵ_t is the regression error term.

Third, we employ an intercept test using the three-factors model developed by Fama and French (1993):

$$R_{B,t} - R_{S,t} = \alpha_p + \beta_p\ (Rm_t - rf_t) + z_p SMB_t + h_p HML_t + \epsilon_t$$

where SMB_t is the monthly return on a value-weighted portfolio of small stocks minus the monthly return on a value-weighted portfolio of big stocks and HML_t is the monthly return on a value-weighted portfolio of high book-to-market stocks minus the monthly return on a value-weighted portfolio of low book-to-market stocks. h_p and z_p are coefficients on factors Size and Book to Market[3]. Table 3 reports the results. Panel A presents the average monthly calendar returns on the "Buy portfolio", on the "Sell portfolio" as well as the difference between the returns. Panel B gives the alphas estimates. For the 3-month and the 6-month portfolio formation period, the difference between the "Buy portfolio" and "Sell portfolio" average return is significantly negative as well as the CAPM and the Fama-French intercepts. Concerning the 1-year portfolio formation period, the results are negatives but insignificant in the risk-adjusted return cases. This test corroborates our previous results that the stocks sold outperform the stocks purchased by investors.

2. Portfolio performances

To evaluate the portfolio performance of individual investors, the gross monthly returns of 56'723 French investors from January 1999 to December 2006 is estimated, based on daily returns. A geometric mean return is computed for each investors across the 96 monthly observations. The average across investors is equal to -0.24%, that is -2.84% annualized. Taking into account the specificity of our period, it is worth mentioning that the annualized geometric mean return earned by individual investors is -22.48% between 1999 and 2002, and 21.41% between 2003 and 2006. A value weighted index on the same period earn a

[2] Data on the market index is given by the Eurofidai general index (computed using the methodology of the Center for Research in Security Prices, CRSP, and based on around 700 stocks over the period under consideration).

[3] SMB_t and HML_t factors are provided by Eurofidai and calculated according to the Fama-French (1993) methodology.

monthly geometric mean of 0.87%, that is 10.95% annualized (0.01% on 1999-2002, that is 0.12% annualized and 1.75% on 2003-2006, that is 23.14% annualized).

The performance reported mask considerable cross-sectional variations across households. Indeed, 46.84% of investors exhibit a negative average monthly return and 42'275 investors underperform a value weighted index. The highest average monthly return is 13.04% whereas the lowest one is -14.73%. To understand what drives these cross-sectional variations, investors own investment goals are related to their performances in a following section.

Next, the gross performances are adjusted in two ways (results are presented in table 4). First, the return that investors could have earned each month if they had kept their beginning-of-year-portfolio is calculated. This return constitute a "passive benchmark" for each investor, and represents the performance they could have had with a passive management (i.e. no transactions) of their portfolio since the first day of the considered year. A 96-months time-series of average adjusted returns is then computed. On one hand, the time-series is created with an equal weight of individual investors to obtain the average investor results. On the other hand, each investor is weighted with her monthly portfolio value to compute aggregate results.

The time-series arithmetic average of passive-benchmark adjusted performance is equal to -0.21% (t=-2.2) for the average investor, and to -0.13% (t=-1.2) in aggregate. Though both returns are negative, only the average investor mean is significantly different from zero at the 5% level. Notice that if they had kept their beginning-of-year-portfolio, investors could have obtained a mean monthly return of 0.92% (t=1.13) for the average investor and 0.86% in aggregate (t=1).

Second, the return of a market index is subtracted to individual monthly returns. Calculations are realized with a value weighted and an equal weighted index. Contrary to the previous benchmark, in which we only evaluate the impact of trading activity of investors, this latter adjustment allows as well to measure to which extent they could benefit from investing in a perfectly diversified portfolio. With an equal weighted index, the average market adjusted return is -1.51% (t=-3.6) for the average investor and -1.44% (t=-3.5) in aggregate. With a value weighted index, the market adjusted return for the average investor (in aggregate) is –0.35% (-0.29%). These two last averages are not significantly different from 0. To sum up, investors would be better off by investing in a perfectly diversified index instead of self-manage their portfolio. Actually, between 1999 and 2006, the average arithmetic monthly return for the equal weighted index is 2.17% and the return for the value weighted one is 1.01%.

We then estimate the CAPM (Capital Asset Pricing Model) intercept by regressing the monthly excess return earned by individual investors (on average and in aggregate) on the market excess return.

$$Rp_t - rf_t = \alpha_p + \beta_p\ (Rm_t - rf_t) + \epsilon_t$$

where Rp_t is the average (aggregate) monthly return of investors, Rm_t is the monthly return on a market index, β_p is the market beta, rf_t is the monthly risk free rate and ϵ_t is the regression error term.

Next, we estimate the following monthly time-series regression corresponding to the Fama-French three-factors model (1993) :

$$Rp_t - rf_t = \alpha_p + \beta_p\ (Rm_t - rf_t) + z_p SMB_t + h_p HML_t + \epsilon_t$$

where SMB_t is the monthly return on a value-weighted portfolio of small stocks minus the monthly return on a value-weighted portfolio of big stocks and HML_t is the monthly return on a value-weighted portfolio of high book-to-market stocks minus the monthly return on a value-weighted portfolio of low book-to-market stocks. h_p and z_p are coefficients on factors size and Book to Market.

Third, we investigate the effect of price momentum on performances of individual investors and add a zero-investment price momentum portfolio to the three-factors regression. We thus estimate the following 96-months time-series regression:

$$Rp_t - rf_t = \alpha_p + \beta_p\ (Rm_t - rf_{_t}) + z_p SMB_t + h_p HML_t + w_p UMD_t + \epsilon_t$$

UMD_t is the return on a value weighted portfolio of stocks that have performed well recently (up) minus the return on a value_weighted portfolio of stocks that have performed poorly (down)[4]. w_p is the corresponding coefficient.

Our main findings relative to the regressions of monthly returns, on the market index, on the Fama-French three-factors and on the Fama-French-Carhart four-factors are reported in table 4. First, though they are not always significantly different from zero, all intercept estimations are negatives. This confirm previous results that investors (on average and in

[4] SMB_t , HML_t and UMD_t factors are provided by Eurofidai and calculated according to the Fama-French (1993) and Carhart (1997) methodology.

aggregate) do not outperform the market index. For example, in aggregate, the CAPM alpha is equal to -0.52% (t=-1.7), the Fama-French intercept is -0.86% (t=-2.7) and the 4-factors model intercept is –0.88%(t=-2.8). Second, the betas are much more higher than one, indicating that investor's portfolios bear a higher risk than the market one. Indeed, for instance on average, the coefficient estimates on the market excess returns are 1.33 and 1.44 for the CAPM, the three-factors and the 4-factors models. Third, the coefficient estimates on size factor are reliably positive. This evidence that individual investors tilt their portfolio toward small stocks. At the same time, the coefficient estimates on Book to Market are negatives but no significant. Thus, Book to Market coefficients have no explicative power on excess returns. Concerning the investor tilt towards small capitalizations, notice that between 1999 and 2006, small capitalizations outperform the large ones by 0.99% per month in average. On 40 months over 96, they underperform large capitalizations. Therefore, this help their performances during our sample period. Finally, coefficient estimates on momentum factors are non reliably different from 0, then our findings on negative excess returns are not affected by the inclusion of a momentum characteristics in the regressions. Consequently, the investors do not have a particular propensity to invest in past winning securities as evidenced by Grinblatt and Keloharju (2001). Based on this result, we do not employ the Carhart model to evaluate investor's performances in the following sections.

3. Investor's objectives and performance

We now examine to what extent personal objectives drive the performance of individual investors, and through which strategies do this goals translate. In this work, two profiles of investors are considered. First, a focus is made on speculative investors, who are risk tolerant, have high aspiration and aim at achieving a strong growth capital. Investors who trade warrants (in addition to stocks trading) are identified to be sorted in this category. Second, saving investors identified with bond trading (in addition to stocks trading) are isolated. These investors are risk averse, they need security and have low aspirations.

Our population is partitioned according to these two variables, and the following subsamples are created:

$Warrants = 1$; $Warrants = 0$; $Bonds = 1$; $Bonds = 0$; $Warrants = 1$ & $Bonds = 1$; $Warrants = 0$ & $Bonds = 0$.

The subset $Warrants = 1$ contains investors who traded warrants during the 1999-2006 period and did not trade bonds during that period, whereas the subset $Warrants = 0$ contains the rest of the population. More precisely, it regroups investors who trade warrants and bonds, investors who trade bonds but do not trade warrants and investor who do not trade any of these two products. Notice that it's enough that the investor has realized one transaction of the product to consider that she trades it. The subsets $Bond = 1$; $Bond =$

0 are built similarly. The subset $Warrants = 1\ \&\ Bonds = 1$ groups together investors who trade bonds and warrants during the period. These investors are particular as they seems to combine two profiles which are opposed in terms of risk tolerance and expectations. Notice that these investors act in a consistent way with the Behavioral Portfolio Theory (Shefrin and Statman, 2000). According to the behavioral portfolio theory, people act as if they are made up of many "doers," each with a different goal and attitude toward risk. In its simplest version, people have two doers: a "downside protection" doer whose goal is to avoid poverty and an "upside potential" doer whose goal is a shot at riches.

A deeper investigation is thus necessary, even if this latter category gather only a handful of investors: in our sample, 15.2% of investors trade warrants but not bonds, 4.5% trade bonds but no warrants and 2.3 % trade both.

Time series are next computed for the six groups, based on equal weighted average and value weighted average of gross monthly returns of investors. The Fama-French and the CAPM intercepts are then estimated for each time series, and intercepts are compared between subsets. At first, we find that all intercepts, whatever the subsets examined, are negatives, and in most cases the values are significantly different from zero at the 10% level. Thus, even if our partition point out that one profile results in a better portfolio management, overall speculative and saving investors do not exhibit positive performances.

Speculative investors significantly underperform investors their peers grouped in the subset $Warrants = 0$. Indeed, the difference in intercepts is significantly negative in all cases (on average and in aggregate, with the CAPM and the three-factors model). For example, on average, the CAPM (Fama French) intercept for speculative investors is 0.18% (0.31%) less than intercept for investors who do not trade warrants. On the contrary, saving investors significantly outperforms their peers. The difference in CAPM alpha is 0.23% on average and 0.21% in aggregate. The gap increases with the Fama-French model, as the difference in intercept is 0.38 on average and 0.48 in aggregate. Concerning investors who satisfy $Warrants = 1\ \&\ Bonds = 1$, the results indicate that they underperform the rest of the population. Therefore, the speculative aspect of this group seems to overcome the saving part.

These results clearly prove that investor's personal objectives impact their performances, and that speculative profiles hurts their portfolio returns. However, to understand this assessment, we still need to evaluate how trading behaviors differ across investors' profile. Actually, the strategies and preferences are the concrete reflection of investor's expectations. A focus on the Size and the Book to Market factors coefficient (reported in table 6) suggests at first that saving and speculative profiles do not hold the same style of portfolio. In fact, speculative investors exhibit greater betas and their preference for small stocks is stronger

than the their peers. On the contrary, saving investors hold lower market risk portfolios and the tilt toward small stocks is lower than the average investors. The coefficient related to Book to Market is lower as well. However, the risk adjusted results (i.e Fama French intercepts) indicate that, taking into consideration these style's investment differences, the outperformance (underperformance) of saving (speculative) investors persist.
Two variables which should infer on performance according to the existing literature are thus introduced: individual diversification and turnover. First we evaluate how diversification and turnover alter or improve performances in our database. Second, their interactions with investor's profiles are evaluated to control the robustness of our previous results.

A great turnover may reveal an overconfident trader, who overweight the quality of her competence, forecasts and information. Thus, high trading frequency may yield poor gross performances. We first test whether trading shortfalls in our sample can be traced to high turnover rates. In this case, it is likely that taxes alter all the more the financial results. Investors are divided into quintile according to their average turnover, based on their 96 individual mean monthly turnovers. The mean monthly turnover is the average of sales and purchase turnover. Time series are then computed for low and large turnover quintile[5]. The average turnover for the first quintile is 1.96% whereas it rises to 64.4% for the fifth one. On average and in aggregate, the CAPM and the three-factors alphas are significantly higher for the lowest quintile than for the highest one (results of the regressions are presented in table 7). For example, if we consider the average investor, the difference in the CAPM alphas between first and fifth quintile is equal to -0.48% (t=-9.7). In aggregate, this difference is equal to -0.43% (t=-9). Though we do not employ the same turnover measure than Barber and Odean (2000)[6], we confirm that trading activity affects portfolio performance. We also consider the largest decile (not reported), into which the average turnover is 96.3% and find that the performance of the most active investors are similar than the ones of the investors in the fifth quintile. Therefore, contrary to Chen *et al*. (2007), we do not find that the investors who trade very frequently earn more return per month.

Next, we estimate the influence of the diversification level of investors based on the average number of different stocks in their portfolio (Div). If investors hold concentrated portfolio because of private information, they might exhibit superior performance. In fact, based on

[5] "Low" refers to the first quintile, whereas the "large" refers to the fifth.

[6] Barber and Odean's measure of the monthly turnover is the beginning-of-month market value of shares purchased in month t-1 (or sold in month t) divided by the total beginning-of-month market value of shares held in month t.

their information advantage they should be able to select securities with strong returns. On the contrary, if the low-diversification is driven by familiarity or others behavioral bias, we should not observe abnormal performance. We count the number of different stocks in portfolio each start of month and average the 96 values. On average, investors hold 6.2 different stocks in their portfolio, with a median equal to 4.3 stocks. As a result, they are far from well-diversified. The maximum is 301.7 securities, and the minimum only one securities. In addition, 56% of investors hold less than 5 stocks in their portfolio. As previously, we sort the investors into quintile based on their average diversification and build time series. On average, the investors in the first quintile hold one stock, whereas the investors in the fifth quintile hold 15 stocks.

Contrary to the results of existing studies, ours are much more confusing (table 7). Indeed, on average, most diversified investors outperforms least diversified ones. Actually, the differences between the CAPM intercepts is equal to 0.42% (t=8.4), and the difference between the three-factors model intercept is equal to 0.44% (t=8.3). Yet, the results for the aggregate investor are completely opposed as the differences in intercepts are negative (this is reliably only with the CAPM intercept). Considering this paradox, it is hard to conclude about the impact of diversification.

We complete the study of the impact of investor's personal style, turnover and diversification on performances by modeling the following linear relationships on the whole sample:

Equation (1)
$$AMR_i = a + b_1\, Diversification + b_2\, Turnover_i + b_3\, Warrants_i + b_4\, Bonds_i + b_5\, Bonds\&Warrants_i + e_i$$

where AMR_i is the geometric average gross monthly return for investor i, e_i is the residual and $b_1, b_2, b_3, b_4, b_5, b_6, b_7$ are the regression coefficients for the explanatory variables. Explanatory variables $Diversification$ and $Turnover$ were defined in the preceding paragraphs. The three variables $Warrants, Bonds$ and $Bonds\&Warrants$ are dummies based on the construction on the corresponding subsets. The significance of each predictors is tested, building the regression model one variable at a time.

The regression results (table 8) corroborates our previous remarks established from risk adjusted returns and give precisions relative to the diversification effect, which is positive, as the bond trading effect. On the contrary, the variables $Warrants$, and $Turnover$ affect negatively portfolio monthly returns of individual investors. Nevertheless, the coefficient estimate for $Bonds\&Warrants_i$ is insignificant. In a consistent way, the Fisher test (not reported) indicates that nested models 1 to 4 are relevant, but it rejects the full model (model 5).

A focus on two new datasets restricted to top and bottom performers is then realized. The regression is thus computed only for investors whom average monthly gross return is higher than the largest (resp. lowest) decile values: 1.95% and -2.65%.

Interestingly, the directions of these relations are not identical when we focus on the top and bottom performers. For example, investors in the largest decile take advantage of trading warrants (in this subsample 15.6% of investors trade warrants, and 2.6% trade bonds), and being frequent traders. Moreover, they are better off if they hold concentrate portfolios. These features may potentially reflect investors' exploitation of information asymmetries. The opposite is true for the investors in the first decile. Indeed, the $Turnover$ variable affect negatively their results whereas the $Diversification$ one affect them positively. Yet, the variables $Warrants$ and $Bonds$ do not have a significant impact. Notice that in this subsample, nearly 20% of investors trade Warrants, but only 1.3% trade bonds. These striking results suggest that the effect of trading behaviors and choices such as excessive trading and underdiversification depends on the investor's profile and skills. As a result, overtrading and low diversification does not necessarily result in underperformance.

With this regression an independence across variables is assumed. However, our main concern is about the relation of diversification and turnover with investor's profiles. In table 9 A and B, we reports turnover and diversification statistics for the segments $Warrants = 1$; $Warrants = 0$; $Bonds = 1$; $Bonds = 0$; $Warrants = 1 \ \& \ Bonds = 1$; $Warrants = 0 \ \& \ Bonds = 0$. First, the average diversification and turnover of investors in each subset is presented in table 9A. Speculative investors trade much more frequently than all others investors. On the contrary, saving investors exhibit a lower turnover than their peers. It is worth mentioning that according to behavioral finance literature, the excessive trading of investors is connected to their propensity to be overconfident[7]. Thus particularly prone to overconfidence, it seems that speculative investors have strong beliefs about their forecasts and their skills, consistent with the fact that they trade complex product such as derivatives. Concerning the average diversification, saving investor exhibit most diversified portfolios, but the investors who share both saving and speculative profiles have the highest number of different stocks in their portfolio. This is contradictory to the fact that they underperform their peers as this portfolio characteristic should enhance their results. Second, in Table 9B, the proportions of investors in low/large - diversification/turnover quintiles of speculative and saving investors are reported.

[7] See for example Odean, 1998; Odean, 1999; Barber and Odean, 2001; Statman *et al.,* 2006 ; Glaser and Weber, 2007.

More precisely, in each subset ($Warrants = 1$; $Warrants = 0$; $Bonds = 1$; $Bonds = 0$; $Warrants = 1$ & $Bonds = 1$; $Warrants = 0$ & $Bonds = 0$ the percentage of investors who belongs to the first and to the fifth turnover (diversification) quintile (built previously on the whole population) is calculated. Confirming the results expounded above, among the 8607 investors who trade warrants, the proportion of those sorted in the fifth turnover quintile is 34.3%, compared to 6.9% sorted in the first turnover quintile. And among the 2594 investors who trade bonds, the proportion of those sorted in the fifth diversification quintile rises to 45.5%. Along the same lines, 50.3%of investors who trade bonds and warrants are sorted in the fifth diversification quintile. These first elements suggest that diversification and turnover might be able to explain the differences in portfolio performances across investor's profiles.

To understand more deeply to which extent turnover and diversification reflect investor's personal goals, and explain their performances, the following test is performed. For both profiles, we focus on investors who belongs to the first and to the fifth turnover (diversification) quintile. For example, based on investors in the subsample $Warrants = 1$, four new subsets are created:

(1)$Warrants = 1 - Div_{low}$ (2) $Warrants = 1 - Div_{large}$

(3) $Warrants = 1 - Turn_{low}$ (4) $Warrants = 1 - Turn_{large}$

As previously, based on equal weighted average and value weighted average, time series and CAPM and Fama-French intercepts are computed for each subsamples. Results relative to turnover and diversification controls are presented in tables 10 and 11.

First, the turnover controlled differences indicate that, though the underperformance of speculative investors persists, it is weaker considering overtrading investors. Actually, the negative effect of excessive trading affect all investors, and the negative differences in CAPM alphas are not reliable in the fifth turnover quintile. The low-quintile-turnover differences are of similar magnitude that the difference computed on the entire sample. For example on average, the low-quintile-turnover gap in intercept is -0.13% (t=-4). Remind that on all investors, it is -0.18%, that is -2.18% annualized. By contrast, the diversification controlled differences suggest that speculative investors underperform all others investors in both diversification quintiles.

Considering next saving investors, results show that individual turnover does not change the conclusion established on the whole sample. The difference in intercepts is positive in each case and significant for all tests. More precisely, the turnover-controlled differences range from 0.10% (1.21% annualized) to 0.36% (4.41% annualized). Along the same line, diversification controls indicate that the outperformance of bonds trading investor persist among less and most diversified investors.

Results relative to the mixed profile investors are much less straightforward. Actually, turnover-controlled differences in returns are significantly positive only in average and in the large quintile case. In all others cases, the differences are insignificant. Diversification-controlled differences are confusing as well. Indeed, on average, the differences in returns are positive in the low quintile cases, and negative in the large quintile cases. Yet, in aggregate, the differences in returns are negatives for both most and worst diversified groups of investors. Remind that without controls, we observed an underperformance of combined profiles investors relative to their peers in aggregate, but did not find a clear pattern on average. The controlled aggregate results indicate that this underperformance does not persist when turnover is included.

To sum up, controlled results evidence that turnover and diversification are not able to explain why saving investors exhibit better returns than their peers whereas speculative ones clearly underperform relative to the others individual traders.

4. Conclusions

Poor trading ability of individual investors have been evidenced on American, Taiwanese, and Finnish populations. French individual investors are no exception. In that paper, the portfolio performance and trade profitability of 56'723 investors are analyzed over eight years. Between 1999 and 2006, the returns earned by investor's portfolios are negative, and the securities bought underperform the securities sold on 1-month, 3-months, 6-months and 1-year investment horizons. It is evidenced that personal investment targets, identified with direct proxy, are able to explain the cross section in portfolio performances of investors. Actually, speculative investors, who have a high tolerance to risks, and high aspiration levels underperform their peers. Though their turnover is far above the average one, this is not the only explanation as turnover controlled results bring similar conclusions. On the contrary, saving investors, who are risk adverse and trade to build a financial shield outperform their peers. There is no doubt that this is connected to their propensity to hold well diversified portfolio but this is not the whole story as proven by diversification controlled results.

Aside from the diversification and the frequency of trading, investors apply such a strategy which result in above or under average results. Fama French regressions bring a part of the answer as saving investors clearly hold riskier portfolios. However risk adjusted returns indicate that this is not the main key to understand our assessment. Therefore, these opposed profiles are characterized by trading behaviors and choices which penalize or enhance their performances.

It remains a challenge to understand what are all the channels translating investor profiles and characteristics into behaviors and resulting performance. In their experimental work, into

which they identify that overreaction is one key of the solution, Nosic *et. al* (2011) underline the importance of opening this "black box of investor behaviors":

[ ], regulators and politicians all around the world currently pursue activities which are designed to increase investor protection on the one hand or to enhance the level of financial literacy on the other hand without knowing which is the better way to help investors. Are attempts to increase financial literacy hopeless as genes are the main drivers of behavior?

Lastly it is evidenced that personal and trading characteristics affect portfolio performance in different direction, focusing on top or bottom performance traders. For example, the relation between diversification and performance is negative for the best investors, while it is positive for the worst ones, and more generally for the average trader. We hypothesize that holding a concentrated portfolio in the case of successful investors is a choice linked to informational advantages.

Table1 :Descriptive information of monthly trading activity

This table reports the average monthly turnover, the average monthly trade size and the average monthly quantities traded computed across 96 months, for 56'723 French investors over the period 1999-2006. Panel A reports the statistics relative to buy trades and Panel B reports the statistics relative to sell trades. The individual monthly turnover is the monthly market value of shares purchased in month t, or sold in month t by the investor, divided by the average market value of portfolio during month t. The individual monthly trade size is the amount traded by the investor during month t. The monthly quantity traded corresponds to the number of stocks traded by the investor during the month t.

	Mean	St. dev.	Median	Min	Max	20%	40%	60%	80%
PANEL A: Purchase									
Average Turnover (%)	19.77	53.98	8	0	8552	3.16	5.98	11.05	24.52
Average trade size (Euros)	2498	12703	394	0	885930	41	233	565	2050
Average quantities	136	1030	11	0	99 193	1	6	19	74
PANEL B: Sales									
Average Turnover (%)	19.19	33.08	7.55	0	1026	2.86	5.57	10.46	23.41
Average trade size (Euros)	2488	12783	381	0	873260	46	224	636	2000
Average quantities	130	1023	10	0	97784	1	6	18	57

Table 2: Profitability of buys and sales

Average returns are calculated for the 3-months, 6-months and 1-year horizons following purchases and following sales of 56'723 investors from a French brokerage house. Panel A reports results for the whole period. Panel B, C and D presents results for the 1999-2000, 2000-2003 and 2003-2006 sub-periods. Significance testing is performed with a non parametric Wilcoxon rank sum test. Z-values are presented in parenthesis, and ***, **, * indicate that results are significant at the 1%, 5% and 10% level.

	3 Months	6 Months	1 Year
PANEL A: 1999-2006			
Number of purchases	4'148'143	4'148'143	4'148'143
Number of sales	3'752'934	3'752'934	3'752'934
Purchases Returns	1.21%	1.74%	2.22%
Sales Returns	1.92%	2.86%	4.01%
Difference	-0.71% ***	-1.13% ***	-1.79% ***
	(47.1)	(53.8)	(66.4)
PANEL B: 1999-2000			
Number of purchases	1'280703	1'280703	1'280703
Number of sales	1'109'516	1'109'516	1'109'516
Purchases Returns	5.80%	6.61%	2.12%
Sales Returns	6.09%	7.11%	3.30%
Difference	-0.29% ***	-0.50%***	-1.18% ***
	(7.8)	(3.1)	(7.6)
PANEL C: 2000-2003			
Number of purchases	1'167'879	1'167'879	1'167'879
Number of sales	996'961	996'961	996'961
Purchases Returns	-10.03%	-15.75%	-20.81%
Sales Returns	-8.36%	-13.60%	-18.47%
Difference	-1.67% ***	-2.15% ***	-2.34% ***
	(50.5)	(54.1)	(63.2)
PANEL D: 2003-2006			
Number of purchases	1'694'207	1'694'207	1'694'207
Number of sales	1'641'951	1'641'951	1'641'951
Purchases Returns	5.46%	10.10%	18.20%
Sales Returns	5.40%	10.08%	18.28%
Difference	0.06% ***	0.02% ***	-0.08% ***
	(2.5)	(3.4)	(3.1)

Table 3: Calendar time portfolio

Calendar-time portfolios consisting of all purchase (sale) events during a "portfolio formation period" (3 months, 6 months and 1 year) are constructed and three measures of performance are computed. Panel A reports the average calendar time return on the "Buy" and "Sell" portfolio. "Difference" is the difference between the average returns on the two portfolios. Panel B gives The CAPM intercepts and coefficient estimates from a time-series regression of the household excess return on the market excess return. Panel C gives the Fama-French intercepts and coefficient estimates from a time-series regression of household excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. t-stats are presented in parentheses.

Formation Period	**3 month**	**6 month**	**1 year**
PANEL A : Buy and Sell portfolio returns			
# transactions	10'830'001	21'024'474	40'182'989
« Buy portfolio » Returns (%)	0.84	0.69	0.43
« Sell portfolio » Returns (%)	1.02	0.87	0.55
Difference (%)	-0.17** (-2.1)	-0.18** (-2.5)	-0.12 (-1.6)
PANEL B : CAPM			
Alpha (%)	-0.19** (-2.4)	-0.19*** (-2.6)	-0.107 (-1.5)
Beta	0.03* (1.9)	0.02 (1.5)	-0.018 (-1.4)
PANEL C : Fama-French three factors			
Alpha (%)	-0.18** (-2)	-0.19** (-2.2)	-0.02 (-0.3)
Beta	0.023 (1.3)	0.019 (1.2)	-0.02 (-1.4)
Facteur B/M	0.009 (0.4)	0.0002 (0.011)	-0.05*** (-3)
Facteur taille	-0.02 (-0.8)	-0.05 (-0.2)	0.012 (0.6)

Table 4: Portfolio performance – Full sample

Percentage monthly returns over the 1999-2006 period are computed for 56'723 investors from a French brokerage house. Panel A presents results for the return on a portfolio that mimics the investment of the average household. Panel B presents results for the return on a portfolio that mimics the aggregate investment of all investors. Own-benchmark excess return is the return on the investor portfolio minus the return on the portfolio she held at the beginning of the year. The excess return on the market index is computed with a value-weighted and an equal weighted index. The CAPM intercepts and coefficient estimates results from a time-series regression of the household excess return on the market excess return. The Fama-French intercepts and coefficient estimates results from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. t-stats are presented in parentheses. The Carhart intercepts and coefficient estimates results from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio, a zero-investment size portfolio and a zero-investment price momentum portfolio. t-stats are presented in parentheses.

	$Excess\ return(\%)$	Coefficient Estimate on $(Rm-rf)$	HML	SMB	UMD	R^2
PANEL A: Average investor results						
Passive benchmark	-0.21** (-2.2)					
Equal-weighted market index	-1.51*** (-3.6)					
Value-weighted market index	-0.35 (-1)					
CAPM	-0.6** (-2.1)	1.33*** (27.4)				86.57
Fama-French	-0.87*** (-2.8)	1.44*** (24)	-0.06 (-0.8)	0.31*** (3.5)		88.22
Carhart	-0.88*** (-2.8)	1.44*** (19.5)	-0.07 (-0.8)	0.31*** (3.5)	0.01 (0.2)	88.23
PANEL B: Aggregate results						
Passive benchmark	-0.13 (-1.2)					
Equal-weighted market index	-1.44*** (-3.5)					
Value-weighted market index	-0.29 (-0.8)					
CAPM	-0.52* (-1.7)	1.3*** (23.3)				85.26
Fama-French	-0.86*** (-2.7)	1.41*** (23.6)	-0.03 (-0.5)	0.33*** (3.7)		87.31
Carhart	-0.88*** (-2.8)	1.47*** (19.6)	-0.11 (-1.2)	0.34*** (3.8)	0.09 (1.2)	87.31

Table 5: Intercept estimates for the subsets based on investor's profile

Percentage monthly returns over the 1999-2006 period are computed for the subsets of speculative investors ($Warrants = 1$), saving investors ($Bonds = 1$) and combined profiles ($Warrants = 1 \,\&\, Bonds = 1$) and compared to the returns of all others investors. Panel A presents results for the gross return on a portfolio that mimics the investment of the average investor. Panel B presents results for the gross return on a portfolio that mimics the aggregate investment of all investors. The CAPM intercept is obtained from a time-series regression of the investor excess return on the market excess return. The three-factors intercept is obtained from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. t-stats are presented in parentheses.

	CAPM intercept (%)	**Three-factors intercept (%)**
PANEL A: Average investor results		
$Warrants = 1$	-0.72** (-2.1)	-1.14*** (-3)
$Warrants = 0$	-0.58** (-2.1)	-0.83*** (-2.8)
$\boldsymbol{Difference}$	-0.18*** (-4)	-0.31*** (-6.3)
$Bonds = 1$	-0.39* (-1.7)	-0.55** (-2.2)
$Bonds = 0$	-0.62** (-2.1)	-0.90*** (-2.9)
$\boldsymbol{Difference}$	0.23*** (6)	0.35*** (8.6)
$Warrants = 1 \,\&\, Bonds = 1$	-0.52* (-1.8)	-0.86*** (-2.8)
$Warrants = 0 \,\&\, Bonds = 0$	-0.61** (-2.1)	-0.88*** (-2.8)
$\boldsymbol{Difference}$	0.08** (2)	-0.02 (0.36)
PANEL B: Aggregate results		
$Warrants = 1$	-0.75** (-2)	-1.2*** (-3.1)
$Warrants = 0$	-0.47* (-1.7)	-0.77*** (-2.6)
$\boldsymbol{Difference}$	-0.28*** (-5.9)	-0.43*** (-8.7)
$Bonds = 1$	-0.33 (-1.2)	-0.42 (-1.4)
$Bonds = 0$	-0.54* (-1.8)	-0.90*** (-2.8)
$\boldsymbol{Difference}$	0.21*** (5.1)	0.48*** (11.2)
$Warrants = 1 \,\&\, Bonds = 1$	-0.63* (-1.9)	-0.99*** (-2.9)
$Warrants = 0 \,\&\, Bonds = 0$	-0.51* (-1.7)	-0.85*** (-2.7)
$\boldsymbol{Difference}$	-0.12*** (-2.6)	-0.14*** (-2.9)

Table 6: Risk factors coefficients for each investor's profile

This table presents the risk factors coefficients computed for the subsets of speculative investors ($Warrants = 1$), saving investors($Bonds = 1$) and combined profiles ($Warrants = 1 \,\&\, Bonds = 1$) and compared to the coefficients of all others investors. Panel A presents results for the gross return on a portfolio that mimics the investment of the average investor. Panel B presents results for the gross return on a portfolio that mimics the aggregate investment of all investors. The CAPM intercept is obtained from a time-series regression of the investor excess return on the market excess return. The three-factors intercept is obtained from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. t-stats are presented in parentheses.

	CAPM	**3-factors**		
	$(\boldsymbol{Rm - rf})$	$(\boldsymbol{Rm - rf})$	$\boldsymbol{HML}$	$\boldsymbol{SMB}$
Panel A: Average results				
$Warrants = 1$	1.467*** (21.9)	1.602*** (22.5)	-0.078 (0.8)	0.415*** (3.9)
$Warrants = 0$	1.316*** (25.1)	1.410*** (24.9)	-0.062 (-0.8)	0.293*** (3.4)
$\boldsymbol{Difference}$	0.151*** (17.5)	0.192*** (20.7)	-0.016 (-1.3)	0.122*** (8.8)
$Bonds = 1$	1.179*** (27.2)	1.262*** (27)	-0.0863 (-1.4)	0.254*** (3.7)
$Bonds = 0$	1.347*** (24.4)	1.449*** (24.3)	-0.062 (-0.81)	0.314*** (3.5)
$\boldsymbol{Difference}$	-0.168*** (-23)	-0.191*** (-24.7)	-0.0242** (-2.4)	-0.060*** (-5.2)
$Warrants = 1 \,\&\, Bonds = 1$	1.307*** (23.4)	1.432*** (25.6)	-0.080 (-1.1)	0.387*** (4.4)
$Warrants = 0 \,\&\, Bonds = 0$	1.338*** (24.6)	1.438*** (24.5)	-0.063 (-0.8)	0.308*** (3.5)
$\boldsymbol{Difference}$	-0.031*** (-4)	-0.006 (-0.7)	-0.017 (-1.5)	0.079*** (6.2)
Panel A: Aggregate results				
$Warrants = 1$	1.477*** (21.1)	1.621*** (21.8)	-0.043 (-0.4)	0.430*** (3.9)
$Warrants = 0$	1.266*** (23.9)	1.369*** (24.1)	-0.047 (-0.6)	0.312*** (3.7)
$\boldsymbol{Difference}$	0.211*** (23.5)	0.252*** (26.4)	0.004 (0.3)	0.118*** (8.3)
$Bonds = 1$	1.186*** (23.7)	1.283*** (23.2)	-0.179** (-2.5)	0.333*** (4)
$Bonds = 0$	1.316*** (23.2)	1.428*** (23.6)	-0.027 (-0.3)	0.331*** (3.7)
$\boldsymbol{Difference}$	-0.130*** (-16.5)	-0.145*** (-17.3)	-0.152*** (-14)	0.002 (0.1)
$Warrants = 1 \,\&\, Bonds = 1$	1.304*** (20.6)	1.445*** (21.8)	-0.103 (-1.2)	0.439*** (4.4)
$Warrants = 0 \,\&\, Bonds = 0$	1.304*** (23.4)	1.413*** (23.7)	-0.035 (-0.4)	0.324*** (3.6)
$\boldsymbol{Difference}$	0.0005 (-0.1)	0.032*** (3.5)	-0.068*** (-5.8)	0.115*** (8.5)

Table 7: Intercept estimates for the subsets based on turnover and diversification

Percentage monthly returns over the 1999-2006 period are computed for the subsets of investors who belong to the largest (lowest) turnover quintile, and for those who belong to the largest (lowest) diversification quintile. Panel A presents results for the gross return on a portfolio that mimics the investment of the average investor. Panel B presents results for the gross return on a portfolio that mimics the aggregate investment of all investors. The CAPM intercept is obtained from a time-series regression of the investor excess return on the market excess return. The three-factors intercept is obtained from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. T-stats are presented in parentheses.

	CAPM intercept (%)	**Three-factors intercept (%)**
PANEL A: Average investor results		
$Turnover\ large$	-0.85* (-1.9)	-1.2*** (-2.7)
$Turnover\ low$	-0.37* (-1.8)	-0.53** (-2.3)
$\boldsymbol{Difference}$	-0.48*** (-9.7)	-0.71*** (-13.5)
$Diversification\ large$	-0.4*3 (-1.9)	-0.67*** (-2.7)
$Diversification\ low$	-0.85** (-2)	-1.11** (-2.4)
$\boldsymbol{Difference}$	0.42*** (8.4)	0.44*** (8.3)
PANEL B: Aggregate results		
$Turnover\ large$	-0.66 (-1.6)	-1.05** (-2.4)
$Turnover\ low$	-0.23 (-1.1)	-0.46** (-2)
$\boldsymbol{Difference}$	-0.43*** (-9)	-0.59*** (-11.8)
$Diversification\ large$	-0.53* (-1.9)	-0.86*** (-2.9)
$Diversification\ low$	-0.40 (-1)	-0.94** (-2.2)
$\boldsymbol{Difference}$	-0.13** (-2.4)	-0.08 (-1.4)

Table 8: Determinants of the portfolio monthly return

This table contains results for the linear regression of the individual geometric average portfolio monthly returns. Model 1 to 5 gives separately the results of equation (1) for each variable. Panel A reports results on the whole sample, Panel B focuses on investors in the top decile average performance, and Panel C focuses on investors on the bottom decile average performance. Student *t* appear in parenthesis. ***, **, * indicate that results are significant at the 1%, 5% and 10% level.

	$intercept$	Div	$Turnover$	$Warrants$	$Bonds$	$Warrants$ & $Bonds$	R^2
PANEL A : Whole Sample (56218 investors)							
Model 1	-0.640 *** (-35.5)	0.064 *** (31.5)					1.73
Model 2	-0.584 *** (-29.4)	0.062 *** (-30.3)	-0.241 *** (-6.8)				1.81
Model 3	-0.555 *** (-27.3)	0.062 *** (30.4)	-0.231 *** (-5.9)	-0.238*** (-6.6)			1.89
Model 4	-0.559 *** (-27.4)	0.061 *** (29.6)	-0.211 *** (-5.9)	-0.229 *** (-6.3)	0.178 *** (2.8)		1.90
Model 5	-0.589 *** (-27.4)	0.061 *** (29.3)	-0.211 *** (-5.9)	-0.231 *** (-6.3)	0.172 *** (2.8)	-0.056 (-0.6)	1.97
PANEL B : Top performers (5644 investors)							
Model 4	3.986 *** (47.5)	-0.111 *** (11.2)	1.310 *** (12.7)	0.372 *** (2.5)	-0.121 (-0.4)		5.7
PANEL C : Bottom performers (5624 investors)							
Model 4	-6.52 *** (-66.2)	0.389*** (-14.6)	-1.441*** (-12.2)	-0.001 (-0.01)	0.360 (0.7)		6.2

Table 9 : Turnover and diversification characteristics of investors according to their profile

Table 9A: Average Diversification and turnover of investors in subsamples

This table reports the average diversification and turnover for each subsets of investors based on their profile. Median are presented in parenthesis.

	Diversification (Nb stocks)	Turnover (%)
$\boldsymbol{Warrants = 1}$	6.2 (4.5)	30.03 (14.8)
$\boldsymbol{Warrants = 0}$	6.2 (4.4)	17 (7)
$\boldsymbol{Bonds = 1}$	10.8 (8.2)	10.5 (5.3)
$\boldsymbol{Bonds = 0}$	6 (4.2)	19.4 (8)
$\boldsymbol{Warrants = 1}$ & $Bonds = \mathbf{1}$	12 (9)	18.7 (10.5)
$\boldsymbol{Warrants = 0}$ & $Bonds = \mathbf{0}$	6.1 (4.2)	19 (7.7)

Table 9B: Proportion of investors in turnover and diversification top/bottom quintile

This table reports the proportion of investors in turnover and diversification top/bottom quintiles, for the six subsets of investors based on their profile. The number of investors in each subset is presented in the second column.

Proportion in %	Investors	Diversification		Turnover	
		Low	Large	Low	Large
$\boldsymbol{Warrants = 1}$	8607	20.7	19.9	6.9	34.3
$\boldsymbol{Warrants = 0}$	48'116	19.7	19.9	22.3	17.4
$\boldsymbol{Bonds = 1}$	2594	6.2	45.5	29.2	9.6
$\boldsymbol{Bonds = 0}$	54'129	20.5	18.7	19.5	20.5
$\boldsymbol{Warrants = 1}$ & $Bonds = \mathbf{1}$	1326	5.5	50.3	9.4	22.6
$\boldsymbol{Warrants = 0}$ & $Bonds = \mathbf{0}$	55'397	20.2	19.2	20.1	19.9

Table 10: Intercept estimates for the subsets based on investor's profile and turnover

Percentage monthly returns over the 1999-2006 period are computed for the subsets of speculative investors ($Warrants = 1$), saving investors ($Bonds = 1$) and combined profiles ($Warrants = 1 \,\&\, Bonds = 1$) who belong to the lowest (largest) turnover quintile and compared to the returns of all others investors who belong to the lowest (largest) turnover quintile. Panel A presents results for the gross return on a portfolio that mimics the investment of the average investor. Panel B presents results for the gross return on a portfolio that mimics the aggregate investment of all investors. The CAPM intercept is obtained from a time-series regression of the investor excess return on the market excess return. The three-factors intercept is obtained from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. T-stats are presented in parentheses.

	CAPM intercept (%)		**Three-factors intercept (%)**	
PANEL A: Average investor results				
Turnover	**Low**	**Large**	**Low**	**Large**
$Warrants = 1$	-0.49** (-2)	-0.86* (-1.9)	-0.71*** (-2.8)	-1.35*** (-2.8)
$Warrants = 0$	-0.36* (-1.8)	-0.86** (-2)	-0.52** (-2.3)	-1.21*** (-2.6)
$\boldsymbol{Difference}$	-0.13*** (-4)	-0.0033 (-0.05)	-0.19*** (-5.4)	-0.14** (-2)
$Bonds = 1$	-0.28 (-1.4)	-0.61* (-1.7)	-0.40* (-1.9)	-0.90*** (-2.5)
$Bonds = 0$	-0.38* (-1.8)	-0.86* (-1.9)	-0.55*** (-2.4)	-1.26*** (-2.7)
$\boldsymbol{Difference}$	0.10*** (3.3)	0.25*** (4.3)	0.15*** (4.5)	0.36*** (5.9)
$Warrants = 1 \,\&\, Bonds = 1$	-0.32 (-1.4)	-0.60 (-1.5)	-0.58** (-2.4)	-1.00** (-2.3)
$Warrants = 0 \,\&\, Bonds = 0$	-0.37* (-1.8)	-0.86* (-1.9)	-0.53** (-2.3)	-1.26*** (-2.7)
$\boldsymbol{Difference}$	0.05 (1.4)	0.26*** (4.2)	-0.05 (-1.2)	0.26*** (4)
PANEL B: Aggregate results				
Turnover	**Low**	**Large**	**Low**	**Large**
$Warrants = 1$	-0.47* (-1.7)	-0.67 (-1.5)	-0.77*** (-2.9)	-1.17** (-2.5)
$Warrants = 0$	-0.22 (-1)	-0.67* (-1.7)	-0.43* (-1.9)	-1.0** (-2.4)
$\boldsymbol{Difference}$	-0.25*** (-7.2)	-0.0023 (-0.03)	-0.44*** (-11.8)	-0.17*** (-2.6)
$Bonds = 1$	-0.19 (-0.9)	-0.04 (-0.1)	-0.26 (1.1)	-0.16 (-0.4)
$Bonds = 0$	-0.24 (-1.1)	-0.71* (-1.7)	-0.50** (-2.2)	-1.11** (-2.5)
$\boldsymbol{Difference}$	0.05 (1.6)	0.67*** (11.1)	0.24*** (7.3)	0.95*** (15.2)
$Warrants = 1 \,\&\, Bonds = 1$	-0.28 (-1.2)	-0.73* (-1.8)	-0.42 (-1)	-1.13*** (-2.8)
$Warrants = 0 \,\&\, Bonds = 0$	-0.23 (-1.1)	-0.65 (-1.6)	-0.46** (-2)	-1.05** (-2.4)
$\boldsymbol{Difference}$	-0.05 (-1.5)	-0.07 (-1.3)	0.04 (1.2)	-0.08 (-1.4)

Table 11: Intercept estimates for the subsets based on investor's profile and diversification

Percentage monthly returns over the 1999-2006 period are computed for the subsets of speculative investors (Warrants=1), saving investors(Bonds=1) and combined profiles ($Warrants = 1 \,\&\, Bonds = 1$) who belong to the lowest (largest) turnover quintile and compared to the returns of all others investors who belong to the lowest (largest) diversification quintile. Panel A presents results for the gross return on a portfolio that mimics the investment of the average investor. Panel B presents results for the gross return on a portfolio that mimics the aggregate investment of all investors. The CAPM intercept is obtained from a time-series regression of the investor excess return on the market excess return. The three-factors intercept is obtained from a time-series regression of investor excess return on the market excess return, a zero-investment book-to-market portfolio and a zero-investment size portfolio. T-stats are presented in parentheses.

	CAPM intercept (%)		**Three-factors intercept (%)**	
PANEL A: Average investor results				
Diversification	**Low**	**Large**	**Low**	**Large**
$Warrants = 1$	-0.88* (-1.9)	-0.62** (-2.1)	-1.25** (-2.5)	-1.01*** (-3.4)
$Warrants = 0$	-0.85** (-2)	-0.40* (-1.8)	-1.09** (-2.4)	-0.61** (-2.5)
$\boldsymbol{Difference}$	-0.03 (-0.44)	-0.22*** (-5.8)	-0.16** (-2.3)	-0.4*** (-10.1)
$Bonds = 1$	-0.68* (-1.7)	-0.34 (-1.6)	-0.85** (-2)	-0.49** (-2.1)
$Bonds = 0$	-0.86** (-2)	-0.45* (-1.9)	-1.12** (-2.4)	-0.70*** (-2.8)
$\boldsymbol{Difference}$	0.18*** (3.1)	0.11*** (3.3)	0.27*** (4.3)	0.21*** (5.9)
$Warrants = 1 \,\&\, Bonds = 1$	-0.53 (-0.88)	-0.46* (-1.7)	-0.49 (-0.75)	-0.76*** (-2.7)
$Warrants = 0 \,\&\, Bonds = 0$	-0.86** (-2)	-0.44* (-1.9)	-1.12** (-2.5)	-0.67*** (-2.7)
$\boldsymbol{Difference}$	0.34*** (4.5)	-0.02 (-0.7)	0.63*** (7.8)	-0.09** (-2.3)
PANEL B: Aggregate results				
Diversification	**Low**	**Large**	**Low**	**Large**
$Warrants = 1$	-0.79 (-1.3)	-0.72** (-2.1)	-1.33** (-2)	-1.28*** (-3.4)
$Warrants = 0$	-0.36 (-0.9)	-0.47* (-1.8)	-0.84** (-2.1)	-0.75*** (-2.6)
$\boldsymbol{Difference}$	-0.43*** (-5.8)	-0.31*** (-6.8)	-0.49*** (-6.1)	-0.53*** (-10.9)
$Bonds = 1$	-0.04 (-0.1)	-0.37 (-1.3)	-0.65 (-0.9)	-0.46 (-1.6)
$Bonds = 0$	-0.43 (-1.1)	-0.55* (-1.9)	-0.95** (-2.2)	-0.92*** (-3)
$\boldsymbol{Difference}$	0.39*** (4.8)	0.18*** (4.5)	0.30*** (3.5)	0.46*** (10.8)
$Warrants = 1 \,\&\, Bonds = 1$	-0.86 (-1.2)	-0.59* (-1.9)	-1.4* (-1.8)	-0.94*** (-2.9)
$Warrants = 0 \,\&\, Bonds = 0$	-0.41 (-1)	-1.52* (-1.8)	-0.93** (-2.2)	-0.86*** (-2.9)
$\boldsymbol{Difference}$	-0.45*** (-5.5)	-0.07 (-1.5)	-0.47*** (-5.1)	-0.08 * (–1.8)

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