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Are European Fund Managers Immune To the Overconfidence Bias after Past Performances?

ABSTRACT

The overconfidence bias among European open-end fund managers is rarely documented. By using a unique data sample of 186 European open-end funds, this research emphasizes its focus whether past good performances positively influence overconfident trading behavior. Besides, it tests the influence between the tracking error, which has never directly been used as an overconfidence proxy, and turnover ratio on excess return and fund return. The insignificant results suggest that European fund managers are indeed immune to the overconfidence bias. Although this conclusion has limited validity as the crisis has definitely a strong impact on the standard deviations. Strong suggestion is to examine the European open-end fund managers again during market upturns and when the general market prospects are positive.

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I. Introduction

Modern finance uses the efficient market hypothesis, developed in the 1960s as a building block. This hypothesis was widely accepted up until the 1990s, when behavioral finance, which had been a fringe element until that period, became mainstream. According to Thaler (1999) traditional finance theory is based on the assumption that representative agents act rational in two ways: (1) the representative agent makes decisions according to the axioms of expected utility theory of Von Neumann and Morgenstern (1947), and (2) makes unbiased forecasts about the future. These assumptions are rather unrealistic (in practice) according to behavioral finance economists who argue that some agents are not fully rational. This statement is also supported by De Long et al. (1990), they accept bounded rationality in finance literature since noise traders (a.k.a. irrational traders) can survive in the long run.

Behavioral finance has two building blocks according to Ritter (2003): cognitive psychology and limits to arbitrage. Cognitive psychology refers to how people think. Many psychology literature showed evidence that people make systematic errors when they think. These studies pointed out that people tend to be overconfident in their own judgment, abilities, and knowledge (e.g. see Skata (2008)). Key puzzle which cannot be solved by traditional finance models is the investor's behavioral biases as the overconfidence bias on financial markets, which assumes rational trading behavior. This gap is well filled in by behavioral finance economists. In practice, financial markets are more or less subjected to investor's overconfidence bias. On financial markets overconfident trading behavior can be manifested in different ways: (1) by limited diversification of holdings, (2) underestimation of the market volatility, (3) miscalibration of own judgment, (4) high trading frequency, and (5) better than average effect[1].

This thesis emphasizes its focus on the overconfidence bias after past performances among European fund managers, active for large European financial corporations. Consistent with related studies, where they made a distinction between individual (retail) and institutional (professional) investors, I classify the European fund managers as professional investors. Related studies have already investigated the investors' overconfidence bias in many countries. Chen et al. (2007) found evidence that in general Chinese investors trade more than US investors. While, Barber and Odean (2001) examined the overconfidence bias in the US differentiated by gender. As a result, men trade more frequently than women. However, the high trading behavior is associated with lower returns. A more recent study by Puetz and Ruenzi (2011), which investigated the overconfidence bias among US equity mutual fund managers, reports that good past fund performances result in high subsequent turnovers. In general, it makes sense that good performance increases the investor's confidence. Although related studies have already investigated the trading behavior of investors in many different

[1] Overconfidence can be measured by different methods. See for instance, Chen et al. (2007), Puetz and Ruenzi (2011), Barber and Odean (2001), Glaser and Weber (2007), and Menkhoff et al. (2006)

countries, the overconfidence bias among European fund managers is rarely documented. If European fund managers, who are supposed to be rational, are subjected to the overconfidence bias, it can have serious consequences for the investors' return. Moreover, according to Puetz and Ruenzi (2011), overconfidence can lead to inefficient asset prices and several pricing anomalies.

With the support of Morningstar, I created a unique sample of European open-end funds from different European countries[2]. I have investigated a total of 186 European open-end funds managed by professional open-end fund managers between January 2007 and December 2011. In order to test the extent to which European fund managers are prone to the overconfidence bias, I used (1) the tracking error (volatility from the Primary Prospectus Benchmark), which has never been used as an overconfidence proxy, and (2) the turnover ratio as proxies. The relation between past fund performances and the overconfidence proxies will be analyzed. The first phase to calculate the overconfidence bias is to test the influence of tracking error and turnover ratio on excess return and fund return. It reveals for instance whether an increase of the overconfidence proxies have led to higher fund performances. When this would be the case European fund managers should be encouraged to increase the turnover ratio and tracking error as they justifiably can rely on their trade skills, knowledge, and information. The second phase will basically test the opposite, the influence of the past excess return and fund return on the tracking error and turnover ratio. In contrast to many other related studies[3], which use (investors) brokerage accounts data I found large differences in average fund size and average turnover ratios. I differentiate the retail investors from professional investors, who are working for large financial corporations in several ways: (1) I assume professional investors to be highly financially educated, (2) I assume the professional investors are responsible for the investigated investment horizon, and (3) professional investors are highly skilled and have (easier) access to superior information. Thus, I expect them to be less prone or almost immune to the overconfidence bias as they are responsible for many different private and institutional investors who rely on their trade skills and knowledge.

The remainder of this thesis is structured as follows. Chapter II has been divided into three sections, the first section elaborates on the overconfidence bias. The second and third section analyze the relevant determinants and proxies of the overconfidence bias. Chapter III outlines results from related researches from US, China, and Europe. This will be followed by the methodology used to determine the overconfidence bias of European fund managers in chapter IV. Thereafter, Chapter V extensively describes how I gathered my data and describes the statistics of all key determinants. Tests and Findings with the tracking error and turnover ratio as overconfidence proxies will be presented in chapter VI. Subsequently, the results of all tests will be summarized and discussed in chapter VII. Finally, chapter VIII concludes the thesis and determines the extent to which European fund managers are prone to the overconfidence bias.

[2] Many other studies, which investigated the behavioral biases uses brokerage accounts from households in their research
[3] See Cheng et al. (2007), Shapira and Venezia (2001), Barber and Odean (2000, 2001)

II. Theoretical background

This chapter has been divided into three sections. First, section II.1 describes the overconfidence bias and its implications. Section II.2 outlines the relevant determinants as the fund manager's experience level, miscalibration of own judgment, primary prospectus benchmark, trading frequency, and better than the average effect. Finally, section II.3 defines the tracking error and turnover ratio. These are the proxies used to calculate the overconfidence bias.

II.1 Overconfidence bias

Overconfidence can be defined as humans having the tendency to overestimate their own abilities and precision of their knowledge according to Fischhoff and Lichtenstein (1977). In a financial context, investors overestimate their own trading abilities and precision of knowledge regarding future financial prospects. Investors, who believe to possess over outstanding trading skills and superior information will try to utilize this by excessive trading behavior in order to earn high returns. However, also investors who unjustifiably believe that they possess over good trading skills and superior information are trading excessively. Consequently, this might end in unsatisfying trading performances. Past (poor) performance brings opportunities to the investors to learn from. Menkhoff et al. (2006) claim there is a negative direct relation between experience and the overconfidence level. As a result, an increase in experience is associated with a decrease in overconfident behavior. This is also consistent with the article of Sargent (1993), which suggests that people often make forecasting errors, but it also suggest that errors will not persistently occur. Other studies by Gervais and Odean (2001), and Odean (1998a) report that investors attribute high returns to their stock picking talent what makes them more overconfident, known as the self-attributing bias. While, poor past outcomes are due to chances according to Miller and Ross (1975).

In financial markets, investor's overconfident trading behavior expresses itself in several ways: (1) by limited diversification of holdings, (2) miscalibration of own judgment, (3) underestimation of the market volatility (4) high trading frequency, and (5) better than the average effect. A form of limited diversification is for instance the home bias which results in limiting their company investment holdings to national boundaries. According to Menkhoff et al. (2006), miscalibration of own judgment relies on the fact that people tend to be 100 percent sure of their own judgment while they seem to be incorrect. Also the paper of Itzhak et al. (2010) shed light on miscalibration, they investigated 11.600 S&P500 forecasts and 80 percent confidence intervals from Chief Financial Officers. They document that miscalibration is highly persistent and does not change much in light of new information. Furthermore, firms with miscalibrated or optimistic executives invest more on average. Overconfident investors (unjustifiably) assume to know market risks while after poor

performances they must admit that they had underestimated it. Glaser and Weber (2007) found evidence that investors, who believe that they are better than the average, trade more. This effect is well known as better than the average effect. A result might be that investors, who are subjected to the better than average effect might alter from the rest by either picking a high standard benchmark or prefer managing an active fund over a passively managed fund. Although there are many proxies which identify overconfident trading behavior, the most commonly used proxies are the (high) trading frequency[4] and number of stocks within a portfolio.

II.2 Relevant determinants of overconfidence

Experience

Experience seems to have a positive impact on trade performance as rational expectation does not deny that people make forecasting errors, but it does suggest that errors will not persistently occur, according to Sargent (1993). This is one of the basic assumptions of rational expectations. In the long run investors do not make systematic errors. Initially, investors can be overconfident about their skills and abilities when making decisions. If their previous decisions led to unsatisfied results, the investor might be less overconfident about his own skills and abilities, and learned from his mistakes afterwards. Therefore, a negative relationship between experience and overconfidence is expected when an investor gains more experience over time. Chen et al. (2007) examined the Chinese stock accounts from both institutional as individual investors. They used the tenure of brokerage account as experience proxy. As a result, they found higher turnover ratios for investors with older accounts. Although, the higher turnover ratios are associated with a higher return. As the relation is significant the positive relation between turnover ratios and returns are not due to the overconfidence bias. However, it is rather difficult to find the origin of high returns. Higher returns can be related to luck but likewise to superior trade skills. A complementary survey on German fund managers by Menkhoff, et al. (2006) examined the impact of experience on risk taking, overconfidence, and herding of fund managers. They present decreasing overconfidence in association with an increase in experience, when overconfidence is defined as miscalibration. The negative relation between experience and overconfidence are possibly due to the importance of learning. Experienced gained from a learning process helps to better estimate the true volatility in asset prices which may lead to a comparatively more risk averse behavior.

[4] For example, see Cheng et al. (2007), Puetz Ruenzi (2011), or Barber and Odean (2001)

Miscalibration of own judgment

Miscalibration is also a measure of overconfidence determination. It can be defined as the tendency to believe that your knowledge is more precise than it really is[5]. An individual who is miscalibrated, means that his confidence intervals are too narrow (e.g. estimating the height of Mount Everest). Managers are expected to estimate the future unknowns in different tasks. Specifically in trading behavior, managers are expected to estimate upcoming fluctuations in asset prices, risk and potential fund returns. From a psychology corner, there is a mount of evidence that individuals are generally miscalibrated, hence their ability to predict future are too narrow due to overestimation of their ability to predict the future according to Itzhak et al. (2010). They tested whether top corporate executives are miscalibrated. Results from their study document that financial executives are miscalibrated on average. Moreover, they tested whether miscalibration persists over time. To explore this issue, they examined the responses of repeat respondents. As a result, both miscalibration persists over time for a given CFO.

Although, it is rather difficult to directly relate miscalibration to trading volume. This can be supported by the study of Glaser and Weber (2003b). They found no relation between measures of miscalibration with trading volume. Also according Biais et al. (2002), they documented that the degree of miscalibration is unrelated to trading volume. However, the relation is rather important as trading volume is one of the key insturments that measures overconfidence.

Primary Prospectus Benchmark

The primary prospectus benchmark used in this thesis is the investment product's primary benchmark, which is stated in the fund's prospectus. It is the benchmark of which the fund manager or company thinks it will match best to its own fund performance. It is key of importance to match the open-end funds to a proper benchmark as it acts as a performance measure to the fund manager's performance. A benchmark, which is not well correlated to the fund holdings, will definitely draw a distorted picture. If persistently negative excess returns are achieved over the years then the fund manager was too enthusiastic when connecting its fund to a benchmark what can be attributed to overconfidence. Although, the opposite of overconfidence is to match the fund returns to a underperforming benchmark. So, fund managers can have their own purpose to pick their (self-designated) benchmark. For instance, according to Berk (2008), almost one-third of the actively managed diversified US equity mutual funds specify a size and value/growth benchmark index in the fund prospectus that does not match the fund's actual style. These mismatched benchmarks do matter

[5] Acker and Deaves (2010), Behavioral Finance – Psychology, Decision-Making, and Markets describe overconfidence and its determinants

to fund investors. He states that performance related to the specified benchmark is a significant determinant of a fund's subsequent inflows.

Trading frequency

Trading frequency is one of the key instruments that measures the overconfidence bias. Frequent trading of fund shares refers to situations in which a high number of purchases and sells of shares within a single mutual fund occur within a certain time period[6]. Overconfident investors seem to trade excessively as they underestimate market volatility or overestimate their own abilities and knowledge. Glaser and Weber (2007) start their study by stating that theoretical models predict that overconfident investors will trade more than rational investors. Approximately 3000 online brokers were asked to an internet questionnaire, which was designed to measure various facets of overconfidence. They found evidence that investors, who think that they are above average in terms of investment skills or past performance (but who did not have above average performance in the past) trade more. According to Barber and Odean (2001), who investigated 35000 US households from a large discount brokerage, men trade 45 percent more than women. High levels of trading on financial markets are due to overconfidence. Human beings are overconfident about their abilities, their knowledge, and their future prospects. They also state that overconfidence is greatest for difficult tasks, for forecasts with low predictability. Selecting common stocks that will outperform the market is a difficult task. According to Barber and Odean (2001) stock selection is the type of task for which people are most overconfident. Odean (1998) documented that overconfident investors trade more than rational investors. As a result, they harm their expected utilities. Odean (1998) finally states that greater overconfidence leads to greater trading and lower expected utility. Using brokerage account data from China, Chen et al. (2007) studied investment decision making in an emerging market. Chinese individual investors appear to be trading quite frequently. The mean monthly turnover is 27.3 percent, or 327 percent annually. This means that (as their portfolio are quite undiversified, on average they hold stocks of 2.60 different companies) when an investor holds only 2 stocks, equates to trading (sell and buy) a stock every month. Institutional investors trade even more but also own more stocks than individual investors. In comparison with the US, according to Zhu (2002) the US monthly turnover amounts 7.59 percent, or 91 percent annually, Chinese investors' trading ratio is almost 4 times higher than the US. Tyynelä and Perttunen (2003) investigated the trading behavior of the Finnish market. They found evidence that young men trade more than old women. However, regardless of gender and age, those who trade the most are also hurt the most. Overconfident investors trade too much. Less trading would do better. Puetz and Ruenzi (2011) who investigated the US professional investors,

[6] Bullard (2005), Mutual Fund as a Firm: Frequent Trading, Fund Arbitrage and the SEC's Response to the Mutual Fund Scandal

found a mean turnover ratio of 90.55 percent for all funds in their data sample. Its mean value per year varies between 82.89 percent in 2005 and 105.09 percent in 2001. The mean turnover ratio of US professional investors seems to be more or less in line with the average of the European professional fund managers in this data sample (99.21 percent).

Better than average effect

The better than average effect basically implies that an individual believes being better than others (the average). On financial markets, the better than average effect, manifest in different ways. An individual believes possessing more trade skills, better market information, better strategy, or simply thinks being better at stock picking than the average. The result of the better than average effect can be tested by different methods. In order to test the better than average effect on overconfidence bias, the tracking error can be used as it can show the overconfidence level of the fund manager by heavily deviating from its benchmark. Glaser and Weber (2007) evaluate traders' confidence level. 50 percent of the respondents insisted that their trading abilities were better than average. Besides, those who think they are better than others trade more. So initially, an investor expects by actively trading to outperform his chosen benchmark (what might also result in a high tracking error).

II.3 Proxies of overconfidence bias

Tracking error

The tracking error calculates the volatility of a fund return compared to its benchmark index return. To be more precisely, Grinold and Kahn (1999) define the tracking error as the time-series standard deviation of the difference between a fund return and its benchmark index return. In general, Exchange Traded Funds[7] (ETFs) are more appropriate to compare its return with the benchmark index return. The main purpose is to track the benchmark. ETFs aim at a Beta of 1, which minimizes its tracking error. However, for actively managed funds the tracking error can also be used to determine the overconfidence bias. The tracking error can effectively be related to better than the average effect, miscalibration of own judgment, and underestimation of market volatility. So, the benchmark needs to be chosen carefully as it might also shows the level of (over)confidence. A low tracking error implies subsequently that the fund return will be closely correlated to the benchmark return. A fund manager who has a high level of overconfidence and deviates a lot from its benchmark holdings, can be

[7] ETFs are also known as index funds or index trackers whereby the fund manager is trying to replicate the benchmark index

interpreted as an active fund manager who is highly convinced to outperform the benchmark (i.e. the fund manager relies on his estimation of the market volatility, his own judgment, and on being better than the average). Following, an abnormal return against the benchmark return is expected. When taking this in account, the tracking error related to the excess fund return tests whether fund managers can justifiably rely on its ability and trade skills when they actively outperform the benchmark. Thus, a high tracking error associated with a high positive excess return and/or fund return might suggest that a fund manager has estimated future correctly by deviating its fund holdings from its benchmark. With the support of Cremers and Petajisto (2009), I introduced the p overconfidence (probability to overconfident trading behavior) into their model.

Figure I[8] – Tracking Error and Overconfidence

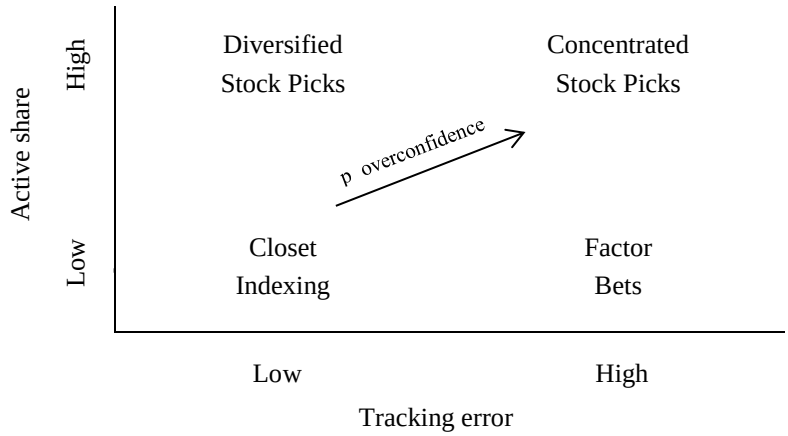


Figure I shows the relation between tracking error and the probability to overconfident behavior. Cremers and Petajisto (2009) introduced a new measure of active portfolio management. They introduced the concept of Active Share, which represents the share of portfolio holdings that differ from the benchmark index holdings. Stock selection is one way for a manager to potentially outperform the benchmark. Cremers and Petajisto (2009) believe that concentrated, high conviction fund managers are best situated to beat the market. They believe that markets are not fully rational and valuation opportunities have and will continue to present themselves in the stocks of quality companies.

To create the line between active share and tracking error with overconfidence, I introduced the arrow, which represents the probability to overconfident behavior. When considering highly actively managed funds with a high tracking error, I expect those fund managers to have the greatest probability to be overconfident in their trading behavior[9]. The more a fund manager actively deviates from its benchmark, the more the conviction to outperform the benchmark. An active fund manager,

[8] Figure adapted from: Cremers and Petajisto (2009). How active is your fund manager? A new measure to predict performance. Yale ICF Working paper, No 06-14

[9] The overconfidence probability is not related to any other aspect, as for instance fund returns

who deviates less from its underlying benchmark, is less prone to the overconfidence bias as diversifying is in contrast to overconfident trading behavior. According to Polkovnivhenko (2005) people underdiversify purposely: They know the risks but attempt to get ahead by hoping to capture the unlikely extreme gains only possible in an underdiversified portfolio.

Turnover ratio

The turnover ratio is directly related to the trading frequency and widely used as an overconfidence proxy (see Barber and Odean, 2000). Also Benos (1998), Odean (1998), and Puetz and Ruenzi (2011) shows theoretically that overconfidence is positively related to trading activity. According to Puetz and Ruenzi (2011), overconfident investors overestimate the precision of their private information and eventually put too much weight on this information. As a results, fund managers do trade too heavily based on their existing or newly produced information. For retail investors, the trading activity works good as a proxy, although this does not have to be for open-end fund managers as they often have to trade because of inflows and outflows.

The turnover ratio has been defined as the absolute value of all purchases for portfolio plus the absolute value of all sales from portfolio deducted by the absolute value of all flows of cash into the fund from investors plus the absolute value of all flows of cash out of the fund investor redemptions.[10] The turnover ratio used as a proxy is calculated as follows:

$$Turnover\ ratio\ = \frac{[(P\ +\ S)\ -\ (I\ +\ O)]}{Average\ Net\ Assets}$$

P = Absolute value of all purchases for portfolio (e.g., all securities bought by the Portfolio Manager)

S = Absolute value of all sales from portfolio

I = Absolute value of all flows of cash into the fund from investors

O = Absolute value of all flows of cash out of the fund (investor redemptions)

Consider the following simplified examples: (1) An inflow of 10 million Euro (I ↑ 10) has been received, so the fund manager needs to invest the new money by purchasing new securities (P ↑ 10). Even though the ANA (Average Net Assets) increases, it will not have any effect on the turnover ratio. (2) If a fund manager sells for 50 million Euro securities (S ↑ 50) and purchases new securities for (P ↑ 50) the total (P+S) value counts for 100. While the ANA remains the same. This can likely be ascribed to frequent trading behavior and overconfidence as the fund manager believes that his strategy will

[10] Morningstar, definition provided by analyst of Morningstar

improve fund performances. However, (3) If the fund receives 10 million Euro (I ↑ 10) and faces a cash outflow of 10 million Euro (O ↑ 10), the turnover ratio will be negative and the ANA remains the same. This is the main reason for the negative turnover ratio values in the data sample. If these flows did not trigger any trading activity at all it will definitely not be ascribed to overconfident trading behavior Notice that when the fund manager does a lot of purchases (P ↑) and sells (S ↑) within the portfolio, it will definitely increase the turnover ratio.

This thesis does emphasize its focus on the change of the turnover ratio between consecutive years. So when the turnover ratio increases from negative to positive, it can reasonably be assumed that the fund manager increased his trading activity. While the opposite can be concluded when a positive turnover ratio turned into a negative turnover ratio. Also, when a negative turnover ratio becomes less negative in the next year, it can be assumed that the fund manager trades more actively. Consider the following situation (4), a fund manager receives 100 million Euro cash inflow (I ↑) and there is a cash redemption for half the cash inflow amount (O ↑), and he purchases new securities for 50 million, the sum of the nominator equals -100 (while ANA remains the same). During the next year, the same situation occurs, however the total value of sales and purchases amounts to 100. In this case the nominator equals -50 while the ANA remains also the same, while the turnover ratio has been increased compared to the previous year. Even though the turnover ratio is still negative during the second year, the fund manager did trade more frequently compared to the previous year.

As a summary, the higher the turnover ratio, the higher the trading activity of the fund manager, the more it can be ascribed to overconfident trading behavior. To provide a benchmark of trading activity; A low turnover figure (20 percent to 30 percent) would indicate a buy-and-hold strategy. High turnover (more than 100 percent) would indicate an investment strategy involving considerable buying and selling of securities. Key difference with related studies[11] that use the number (or value) of stock purchases and sells within a portfolio, is that the turnover ratio formula takes also the value of cash in and outflows into account. As a result, if the calculated value of cash in (I) and outflow (O) exceeds the value of sales and purchases a negative turnover ratio will occur. This basically implies that flows did not trigger any trading activity. While (high) positive turnover ratios or a positive increase in the turnover ratio might be ascribed to more actively trading behavior.

This chapter discussed the key theoretical background of the overconfidence bias. The overconfidence bias and its implications have been discussed and all key qualitative determinants. The last subsection provided an overview of the used proxies for overconfidence determination. The tracking error and turnover ratio will be used as proxies in this thesis. However, the tracking error has rarely been used as an (over)confidence proxy. Hence, the overconfidence bias among European fund managers will be examined from another approach next to the traditional turnover ratio approach.

[11] See for instance Puetz and Ruenzi (2011) or Cheng et al. (2007)

III. Related research

This chapter reviews different relevant related studies. Empirical studies investigating the overconfidence bias in US, Europe, and China are analyzed. This chapter will shed light on the used proxies, data, and results. Discussing prior studies is necessary as it provides a better comprehension when differences in results are compared which will be discussed later in this thesis.

United States

By using a dataset of 78.000 from a large discount brokerage firm between January 1991 until December 1996, Barber and Odean (2000) analyzed the trading behavior of US households. They documented that the gross returns[12] on average for these households are quite ordinary. However, the net returns are poor. The average household underperforms a value-weighted market index by about 1.1 percent annually. They report an average annual turnover rate of 75 percent of its common stock portfolio. And they conclude that the poor performance is directly related with the high level of trading which is also related to costs. When they analyzed the top 20 percent of households that trade most often (i.e. turnover more than twice annually), 10.3 percent underperformance annually compared to the value weighted market index was found. Their key message is that people are overconfident, active trading underperforms passive trading, and those who trade most are hurt the most.

Statman, et al. (2003) conclude their findings by stating that market-wide returns make some investors overconfident because they incorrectly attribute the gains to their stock picking talent. Those, who increase their trading in subsequent periods are subjected to self-attribution bias. Their study mainly reports that trading volume is highly dependent on the past returns over many months. Specifically, market-wide trading activity in NYSE/AMEX shares is positively correlated to past shocks in market return, with the turnover response lasting months and perhaps years.

A more recent paper of Puetz and Ruenzi (2011), which is closely related to this thesis suggests that mutual fund managers with a good past performance subsequently trade more. More specifically, their primary purpose was to examine whether professional investors behave rationally or whether they show signs of irrationality. In their paper they used as a primary data source the CRSP Survivor Bias Free Mutual Fund Database. The used data includes virtually all US open-end mutual funds from 1999 until 2008, which has been rarely documented in contrary to the behavioral biases among retail investors. To determine the overconfidence bias they used the turnover ratios as a proxy. Indeed, they found evidence that funds that performed well in the past have high subsequent turnover ratios.

[12] Return before accounting for transaction costs

However, they also report that funds that performed very poorly in the past also have high turnover ratios.

Europe

Investigations of the overconfidence bias on the European financial market are not well documented in contrary to the overconfidence bias among US and Chinese investors. This is one of the main reason why I investigate the European investors. The end results of this investigation can be compared with other related researches. However, I did find some researches on German (qualitative research) and Finnish (quantitative research) investors.

The paper of Tyynelä and Perttunen (2000) investigated the trade behavior among Finnish households. They hypothesized that investors who trade excessively underperform the passive buy-and-hold strategy. They analyzed the portfolio performance from the beginning of July 1996 to the end of June 2000 by focusing on 1.022.705 private investors. They found an average of 13.8 trades during the whole data period. They excluded investors younger than 20 or older than 80 years as they do not seem to make trading decisions individually. Besides, they divided the investors into three equal subcategories: young investors (20-40 years old), middle aged (40-60), and old (60-80). Furthermore, they distinguish men from women. As a trading measure they used turnover and trading frequency. They found evidence that young male investors trade more than old female investors and hurt their performance more than old women. In all, they report that regardless of age or gender, those who trade the most are hurt the most. Finally as a result, their paper supports the behavioral model of overconfidence with stating that overconfident investors trade too much.

By using a German online broker which consisted of 2.079 individual investors in the period from January 2007 to April 2001, Glaser and Weber (2007) examined various overconfidence dimensions as miscalibration, volatility estimates, and better than the average effect. They tested whether these dimensions are significantly related with trading volume. Regarding miscalibration, they report that those who think to be better than the average trade more. However, they also do report that miscalibration questions are unrelated to trading volume.

China

In general, Chen et al. (2007) found that Chinese investors make poor trading decisions compared to US investors. In their study they investigated the disposition effect, representativeness and overconfidence bias among Chinese investors. They also examined the impact of experience on trading performance. Their dataset counts for 46.969 individual and 212 institutional brokerage

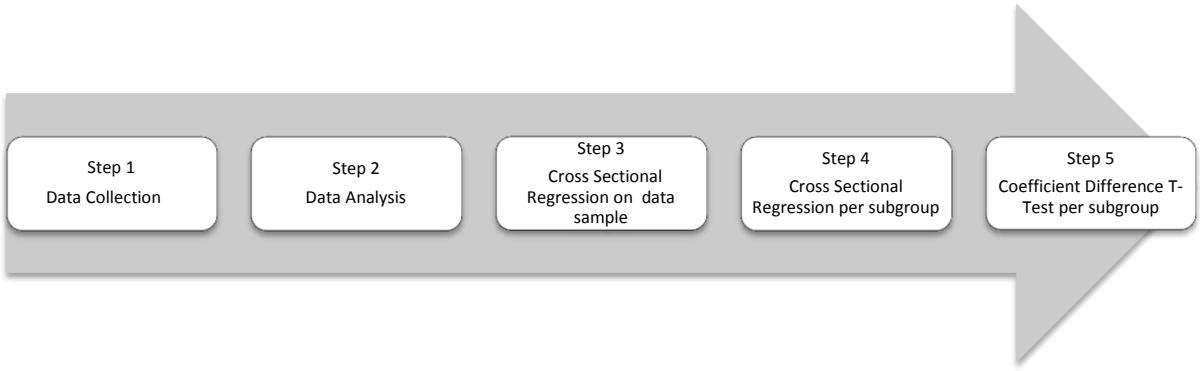
accounts for the period from May 20, 1998 until September 30, 2002. The overconfidence bias has been determined by using monthly portfolio turnover and mean number of stocks held in each account. Individual investors had 2.60 stocks on average in their portfolio and their mean monthly turnover was 0.2731, while institutional investors had 15.46 stocks on average and a mean monthly turnover of 0.4306. Although Chinese investors can only have one brokerage account and do not have access to other ownership forms as for instance pension plans, they still need to maintain diversification within their brokerage account. However, they found a low level of diversification. Underlying thought, is that investors know the risk and still go ahead by hoping to gain an unlikely extreme return in an under diversified portfolio. According to Polkovnichenko (2005) people under diversify purposely. Hence, under diversifying a portfolio is a form of overconfidence in financial markets. Experience seemed to be positively related with trading frequency. Although, high trading frequency was associated with higher returns. They point out that those who trade frequently are more diversified, but they also did earn higher returns despite their frequently trading behavior. Only for larger accounts they did not find this relation. Larger accounts are more diversified, trade more, but earn lower returns. In comparison with other studies as for instance Dhar and Zhu (2006) which reports that US investors hold an average of four stocks and a monthly turnover of 7.59 percent for individual investors. The conclusion can be drawn that Chinese investors are more prone to the overconfidence bias than US investors.

Yates et al. (1997) start their paper by stating that overconfidence in general is typically stronger among Asian than among Western subject groups. The statement is in line with the findings of Zhu (2002). Zhu documents that Chinese' trading frequency is four times higher than US' trading frequency. Following to the papers of Chen et al. (2007), Yates et al. (1997), and Zhu (2002) it might be expected that European fund managers are less prone to the overconfidence bias than their Asian counterparts.

This chapter has clarified some differences in the extent to which Western countries investors and Chinese investors are prone to the overconfidence bias using different proxies. Many studies used trading volume as a proxy for the overconfidence bias. But, the tracking error has not yet been used as an overconfidence proxy. Another strong conclusion that can be made after analyzing differences between Chinese and US investors, is that Chinese investors are more inclined to the overconfidence bias than their US counterparts. In fact, a direct analysis between China and Europe has not yet been examined. Thus, most prior studies relating overconfidence bias has been done for the US or Chinese markets. The overconfidence bias within the European market is rarely documented.

IV. Methodology

In this chapter I will explain the methodology in order to determine the overconfidence bias among European fund managers. The overconfidence proxies (tracking error and turnover ratio) will separately be tested. Next to the overconfidence test, fund performance will also be measured. It will provide insights of the effects of the overconfidence proxies on the fund performance.



(1) The first step explains how I gather data and describes all necessary actions which eventually provided me the appropriate data sample. The second step provides deeper insights of the data sample. Then remarks concerning the data sample will be discussed in depth.

(2) After the data collection, the second step will be used to provide a comprehensive overview of the data sample. Therefore, I create a table from the data sample being managed by European fund managers. The table describes the statistics of all European open-end funds that started from at latest January 2007 until December 2011. Moreover, I distinguish different subgroups for fund age, manager tenure, tracking error, turnover ratio, fund size, and country base in order to create a more comprehensive overview similar to the method of Chen et al. (2007).

(3) The third step uses the Fama-Macbeth Cross Sectional Regression (1973) and Average Time Varying T-Test[13] to examine the overconfidence bias among European fund managers for the total data sample. The cross sectional regression in combination with the average time varying t-test calculates the significance of the factors on the dependent variable for the total data sample during the analyzed investment period. Although, when the average time varying t-test has been taken out from this process (i.e. the average of the yearly coefficients of 2008, 2009, 2010, and 2011 has not been tested on significance), the significance level of separate years can be observed. These results are less relevant as the European investors' overconfidence level from January 2007 until December 2011will be determined. However separate years' significance results can be observed in appendix I.

[13] For all cross sectional regression models the time series T-Test is used to calculate the significance level

The first phase uses the cross sectional regression model to calculate the influence of the average annual change of the tracking error and turnover ratio of consecutive years ($\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$) on the fund's excess return and fund return for the total data sample. It tests the influence of $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$, which are used as overconfidence proxies, on fund performance in terms of excess return_t and return_t. This is called the performance test. By relating the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$ to fund performances, the results will possibly reveal whether the fund performance achieved are due to the fund manager's trade skills. In all cross sectional regression tests the management tenure factor has been included. The management tenure is determined by the number of years minus (2011-observed year). For example when a certain fund managers has managed a fund for 10 years (i.e. until December 2011) already, the manager tenure in 2007 is 10-(2011-2008), which results in 7 years of managing the fund. Similarly, I could have included the number of years a fund is open to the regression, although it will not have an explanatory influence on the overconfidence bias. Moreover, I expect the management tenure to have a stronger explanatory influence on the dependent variable than the number of years a fund is open.

$$excess\ return_t = \Delta tracking\ error_{t-T} + \Delta turnover\ ratio_{t-T} + management\ tenure_t$$

$$return_t = \Delta tracking\ error_{t-T} + \Delta turnover\ ratio_{t-T} + management\ tenure_t$$

The second phase determines the influence of the excess return_{t-1} and return_{t-1} on the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$ (calculated by Δ between e.g. tracking error 2008 and 2007 by subtracting the tracking error of 2008 – tracking error of 2007). If European fund managers are prone to past performances and therefore inclined to overconfident trading behavior, an increase in $\Delta\text{tracking error}_{t-T}$ and/or $\Delta\text{turnover ratio}_{t-T}$ is expected. After finding the yearly coefficients of the excess return_{t-1} and return_{t-1} by using the cross sectional regression test, then the average time varying t-test is used to test the significance level of the coefficients for the investment period. The factor models (presented below) used in the cross-sectional regression model calculate the overconfidence bias among European fund managers for the total data sample:

$$\Delta\ tracking\ error_{t-T}\ ^{14} = \alpha + excess\ return_{t-1} + return_{t-1} + management\ tenure_{t-1}$$

$$\Delta\ turnover\ ratio_{t-T} = \alpha + excess\ return_{t-1} + return_{t-1} + management\ tenure_{t-1}$$

[14] t denotes year (e.g. 2009), while t-1 denotes the previous year (e.g. 2008)

The final step of the process performs the average time varying t-test[15] to reveal the significance level of the coefficients. Whereas H0 = 0 implies no significant relation between coefficient and dependent variable, and Ha $\neq$ 0 means a significant relation between coefficient and dependent variable.

$$H_0 = 0 = no\ relation \qquad H_a \neq 0 = relation$$

$$T = \frac{time\ varying\ average\ of\ observed\ coefficient\ -\ H_0\ (=0)}{\sqrt{\frac{standard\ deviation}{n}}}$$

Based on the results of the cross sectional regression on total data sample, hypotheses will be drawn. The subsequent tests will provide in depth insights of the hypotheses.

(4) The methodology of this step is in broad lines similar to the previous step, although this step divides the total data sample into different subgroups. In order to test whether an increase in trading activity has improved the fund performances, I created the following subgroups. Positively changed tracking error or turnover ratio between consecutive years are defined as high, while negatively changed, are defined as low. As the conjecture exists that good past performances increase the probability to overconfidence, I created the following subgroups with regard to fund performances; excess return (excess return > 0) is compared against non excess return (excess return < 0). While fund returns larger than the average of data sample are compared against fund returns smaller than average of the data sample. With regard to experience, fund managers with relatively more experience than the average of data sample are compared against those who have less experience than the average. Creation of subgroups will ensure a more in depth analysis of the overconfidence bias among European fund managers.

Performance test $\quad High\ tracking\ error\ \ vs.\ \ Low\ tracking\ error$

$$High\ turnover\ ratio\ \ vs.\ \ Low\ turnover\ ratio$$

Overconfidence test $\quad Excess\ return\ \ vs.\ \ Non\ excess\ return$

$$Return\ >\ Average\ return\ of\ data\ sample\ \ vs.\ \ Return\ <\ Average\ return\ of\ data\ sample$$

Experience test $\quad Mng.\ tenure\ >\ Average\ man.tenure\ \ vs.\ \ Mng.\ tenure\ <\ Average\ man.tenure$

[15] The time varying t-test has been used for all cross sectional regression models

After the creation of subgroups, the cross sectional regression and the average time varying t-test will also be performed. The tests' results will provide in depth insights of the drawn hypotheses. It can either support or reject the hypotheses by examining the impact of positive vs. negative $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$ on the fund performances. Similar as step 3, the yearly' coefficients significance level can be observed in appendices III.a, b, c, and d:

$$excess\ return_t[16] = \alpha + High\ tracking\ error_{t-T}[17] + \Delta\ turnover\ ratio_{t-T} + management\ tenure_t$$

$$excess\ return_t = \alpha + Low\ \ tracking\ error_{t-T}[18] + \Delta\ turnover\ ratio_{t-T} + management\ tenure_t$$

$$excess\ return_t = \alpha + High\ \ turnover\ ratio_{t-T} + \Delta\ tracking\ error_{t-T} + management\ tenure_t$$

$$excess\ return_t = \alpha + Low\ \ turnover\ ratio_{t-T} + \Delta\ tracking\ error_{t-T} + management\ tenure_t$$

Secondly, I test the overconfidence level by relating $\text{excess return}_{t-1}$ and return_{t-1} with the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. See below the regression models, which test the overconfidence level based on the excess return and fund returns (divided into different subgroups):

$$\Delta\ tracking\ error_{t-T}[19] = \alpha + excess\ return_{t-1} + return_{t-1} + management\ tenure_{t-1}$$

$$\Delta\ tracking\ error_{t-T} = \alpha + non\ excess\ return_{t-1} + return_{t-1} + management\ tenure_{t-1}$$

$$\Delta\ tracking\ error_{t-T} = \alpha + fund\ return > average\ return_{t-1} + excess\ return_{t-1} + management\ tenure_{t-1}$$

$$\Delta\ tracking\ error_{t-T} = \alpha + fund\ return < average\ return_{t-1} + excess\ return_{t-1} + management\ tenure_{t-1}$$

Thirdly, the influence of experience ($\text{management tenure}_t$) on the excess return_t and return_t will be tested. I also created subgroups by distinguishing more experienced fund managers from less experienced fund managers by using the management tenure as a proxy. More experienced fund managers are those who have managed the fund more than the average of the manager tenure of the total data sample. Detailed calculations can be observed in appendices IV.a and b.

[16] Similarly, the (positive and negative changes)of the tracking errors and turnover ratios are also tested on the returns.
[17] High is defined as positively $\Delta\text{tracking error}_{t-T}$
[18] Low is defined as negatively $\Delta\text{tracking error}_{t-T}$
[19] Similarly, the influence of the previous year's (excess) return on the next year's turnover ratio has also been tested

$$excess\ return_t = \alpha\ + management\ tenure > average_t\ +\ tracking\ error_t +\ turnover\ ratio_t$$

$$excess\ return_t = \alpha\ + management\ tenure < average_t\ + tracking\ error_t +\ turnover\ ratio_t$$

$$return_t = \alpha\ + management\ tenure > average_t\ + tracking\ error_t + turnover\ ratio_t$$

$$return_t = \alpha\ + management\ tenure < average_t\ + tracking\ error_t + turnover\ ratio_t$$

In order to test the influence of experience on the Δtracking error_{t-T} and Δturnover ratio_{t-T} the following regression models have been used[20] for both funds with a manager tenure longer than average as well as funds shorter than average management tenure of the data sample:

$$\Delta\ tracking\ error_{t-T} = \alpha\ + management\ tenure > average_{t-1}\ +\ excess\ return_{t-1} + return_{t-1}$$

$$\Delta\ tracking\ error_{t-T} = \alpha\ + management\ tenure < average_{t-1}\ + excess\ return_{t-1} + return_{t-1}$$

$$\Delta\ turnover\ ratio_{t-T} = \alpha\ + management\ tenure > average_{t-1}\ + excess\ return_{t-1} + return_{t-1}$$

$$\Delta\ turnover\ ratio_{t-T} = \alpha\ + management\ tenure < average_{t-1}\ + excess\ return_{t-1} + return_{t-1}$$

(5) The final step calculates the significance level between different compared coefficients. Therefor the Coefficient Difference T-Test will be used. H0 implies that there is no significant difference between the coefficients of compared subgroups. If Ha is accepted, it implies a significant difference between the coefficients of compared subgroups. Detailed calculations can be observed in appendix V.

$$H_0 = C_{subgroup\ 1} = C_{subgroup\ 2} \qquad H_a = C_{subgroup\ 1} > C_{subgroup\ 2}$$

$$T = \frac{\bar{C}_{subgroup\ 1} - \bar{C}_{subgroup\ 2}}{\sqrt{\frac{S_{s1}^2}{n} + \frac{S_{s2}^2}{n}}}$$

$$P[T(n-1) \leq t; H_0]$$

This chapter has outlined the methodology used to test the extent to which European fund managers are prone to the overconfidence bias. Firstly, the data gathering and delineation will be described. Secondly, the data sample will be described by using the descriptive table. The third step uses the cross sectional regression on the total data sample and create hypotheses. Thereafter, the cross sectional regression per subgroup will provide in depth insights of the hypotheses. As a final step the coefficient difference t-test reveals the significance level between different compared coefficients.

[20] Note: Similar to the performance test the experience test also calculates observed year's management tenure with the same year's tracking error and turnover ratio on the fund performances

V. Data

This chapter will elaborate more on the data sample gathering. Section V.1 explains the method of creating the appropriate data sample. The second section V.2 elaborate further on the data sample and the potential impact of the crisis. It was a great challenge to create the appropriate data sample. Many prior studies investigating the overconfidence bias among investors, using brokerage data accounts of households. With the support of Morningstar, I got access to their database. After analyzing and delineation I finally created the appropriate unique data sample to test whether European open-end fund managers are immune to the overconfidence bias after past performances.

V.1 Data collection

Morningstar provided me access to their database, which gave me insight of all European open-end funds. Initially, I started with a total data set of 82.203 European open-end funds. Firstly, I filtered on some critical data points as category group (equity), and time range (January 2007 until December 2011). As a result of the first phase of filtering, my dataset had been reduced to 3070 funds. Furthermore, I reduced my dataset by omitting all funds of which the manager tenure was shorter than 4 years. Hence, all open-end funds starting at latest from January 2007 are managed by the same manager. This was of key concern because there were many funds that had changed of manager over time. This raises the opportunity to analyze the trading behavior of European fund managers over time. It will show evidence concerning the difference between more and less experienced fund managers. I also omitted outliers from the data sample which belongs to the top 2 percent of the data sample[21]. Eventually, I left with a unique data sample of 186 European open-end funds. I was unable to add another year to the data sample due to data availability. Unfortunately, I did not have access to data which concerns holdings within a portfolio. Hence, I was unable to draw any conclusions regarding portfolio diversification. I strongly suggest (if data is available) to analyze the holdings within a portfolio next to the results of this thesis. In chapter VII (Discussion), I will elaborate further on future investigation possibilities. The final data sample contains information of fund names, funds IDs, company names, manager history, inception dates, and primary prospectus benchmark information. The quantitative part of the data sample contains annual return, excess return, tracking error, turnover ratio, management information and fund size[22]. In contrary to other studies, which have used number of holdings within a portfolio, trading volume or diversification within the portfolio[23], I

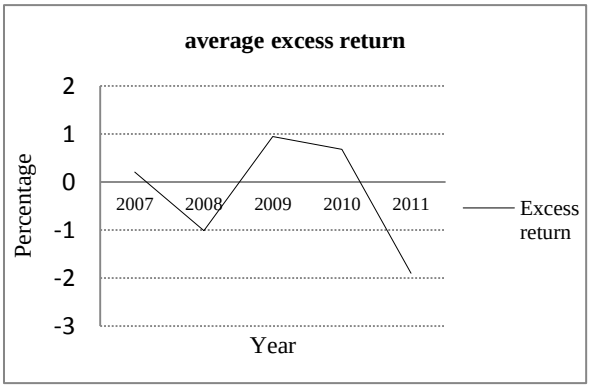
[21] By omitting the top 2 percent of the data sample I captured all outliers. It is unnecessary to use the median. Besides, by using the average of the total data sample I can support the results in the view of the better than the average effect
[22] Data sample contains annual values. For this thesis I use yearly excess returns, returns, tracking errors, and turnover ratios in contrary with related papers that often use monthly or even daily values
[23] See for instance Chen et al. (2007)

will use the tracking error as an overconfidence proxy. It determines the overconfidence proxy from another approach. The excess return and tracking error are calculated against the primary prospectus benchmark. From a qualitative perspective, fund managers in this data sample seem to have a gross of trading experience in contrary to individual investors who mostly have limited trading experience. Moreover, it might be well suggested that fund managers, who are responsible for many individual investors and working for a major European corporations are highly educated.

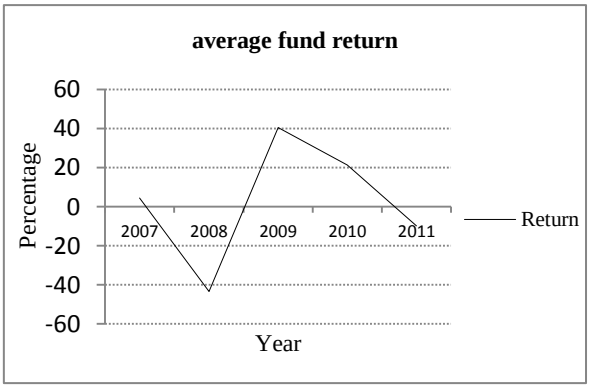
V.2 Data overview

The first impression after gathering and delineation of the data was noticing substantial fund sizes, substantial negative and positive turnover ratios, and substantial negative returns for almost all funds during the crisis. Including the crisis in the investigated investment period, high standard deviations are expected, which will influence the significance level of the determinants. Although, the high potential of insignificancy, I will still try to provide conclusions regarding the overconfidence bias and performance among European fund managers. Below, the graphs present insights in the annual averages of excess returns, fund returns, tracking error, and turnover ratio of the data sample.

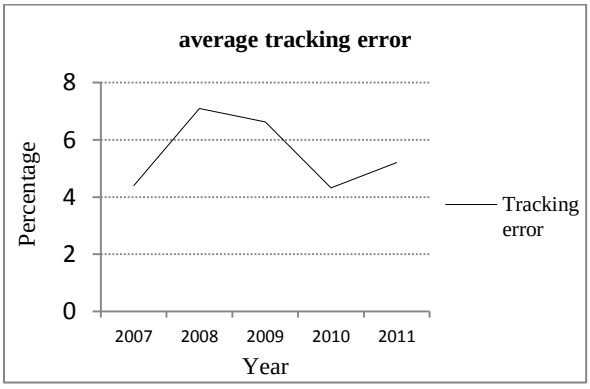
Graph I – excess return



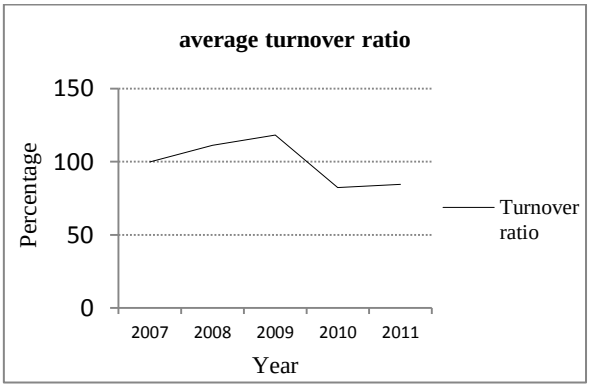
Graph II – Fund return



Graph III – Tracking error



Graph IV – Turnover ratio



The graphs presented on previous page, illustrates the average annual excess returns, fund returns, tracking errors, and turnover ratios for European open-end funds during January 2007 until December 2011.

Graph I and II basically present the fund performances for European fund managers. When focusing on both the negative excess returns and fund returns in 2008, the negativity is in line with the global impact of the financial crisis that harmed basically all investors. Overall, there are due to the uncertainty of the financial market large fluctuations in both excess returns and fund returns. As already mentioned, the large fluctuations will have impact on the standard deviations, which will be analyzed later on.

The third and fourth graph present the average annual tracking error and turnover ratio. The negative turnover ratios are due to the fact that the calculation of the turnover ratio includes absolute values of cash- in and outflows (i.e. cash into the fund and cash redemption to investors. After the crisis of 2008 the reduction of fund returns are associated with an increase in turnover ratio and tracking error. It can well be that the European fund managers immediately reacted to the crisis by large deviations from the PPB. This definitely increases trading activity in terms of turnover ratio. Indeed, the turnover trend is more or less similar to the tracking error. Around 2010 the negative effect of the tracking error and turnover ratio is clearly observable (after the crisis of 2008). It can well be that after the crisis (around 2009 and 2010) European open-end fund managers were hoping the market trend (i.e. asset prices) to mean revert. This could be an acceptable explanation of the reduction in both tracking error and turnover ratio after 2009.

To summarize the graphs, the excess returns and fund returns are moving more or less in the same trend. As similar, the same conclusion can in broad lines be concluded for tracking error and turnover ratio as the trends are moving in the same direction as well. During the crisis, I do not expect great sensitivity of confidence and optimism as the asset prices moves in uncertain directions and European open-end funds faced great losses. The great question at that moment remains whether the asset prices will mean revert or moving further (i.e. lower further). Although, the great losses and non optimism, there is a probability that some or many European fund managers react overconfident about their trade skills and superior (future) information by largely deviating from the PPB and enhance the trading activity in terms of turnover ratio. Although, this thesis focusses on the overconfidence bias (on average) for the entire investigated investment period.

This research uses a unique data sample of 186 European open-end funds to analyze the overconfidence bias among European fund managers. The overconfidence bias among European fund managers is rarely documented. Following, hypotheses will be drawn based on the results of step 3 (cross sectional regression on total data sample). Because of the enormous negative returns and turnover ratios in 2008 for almost all European open-end funds, I expect a high standard deviation during the investment period. I expect that the uncertainty in future expectations around the crisis from

2008 will have a major impact on the significance level to determine the overconfidence bias.

This chapter has described the data collection process and provided important remarks, which includes the interpretation of the average determinants, and the possible impact of the crisis in 2008. Other studies have used the number of holdings within a time frame or diversification of holdings to determine the overconfidence bias. However, I use the tracking error as an overconfidence proxy, which gives the opportunity to approach the overconfidence bias from another perspective.

VI. Tests and Findings

This chapter presents all calculations in order to determine the overconfidence bias among European fund managers. The first section VI.1 describes the total data sample by creating a descriptive table of the data sample. Thereafter, section VI.2, the cross sectional regression on the total data sample provides an analysis of the (positive or negative) influence of factors on performance and overconfidence. Also, the influence of experience on the overconfidence bias and performance has been examined. Based on the cross sectional regression results on the total data sample, hypotheses will be created. Section VI.3 uses the cross sectional regression per subgroup as an in depth analysis. The final section, VI.4 of this chapter uses the coefficient difference t-test to explain differences in coefficients between compared subgroups. The next chapter discusses and summarizes the results. Moreover all remarks, limitations, and suggestions will be considered.

VI.1 Data analysis

Table I. presents the mean value of different determinants for various subgroups. Creating different subgroups are in broad lines similar to the method used by Chen et al. (2007). The total data sample consist of 186 European open-end funds. For all calculations annual data from January 2007 to December 2011 has been used. Also, the mean values of determinants based on countries can be observed. It creates a deeper understanding of the content of the data sample.

The mean value of the total fund size is 475.865.608 Euro, which is substantial compared to related studies. Chen et. al. (2007) reported a mean value of 8.678.648 USD for institutional investors and 113.455 USD for individual investors in China. While Barber and Odean (2000) found a mean value of accounts in the US of 47.334 USD among US households for the period January 1991 untill December 1996. Their study investigated the US households markets and neglected mutual funds. Similar to their study in 2000, Barber and Odean (2001) documented an average amount of 47.000 USD for the US households' accounts. The substantial differences in mean value of accounts can be clarified by the difference between the size of household accounts and open-end mutual funds. In contrary to these studies, Puetz and Ruenzi (2011), who also investigated professional mutual fund managers, found an average fund size of more than 900 million USD for the US.

The mean turnover ratio counts for 99.21 percent for the total data sample during the investment period, which is substantially larger than compared studies. By exception of the study of Puetz and Ruenzi (2011), who also investigated professional mutual fund managers, documented a comparable turnover ratio, respectively 90.55 percent. While, Barber and Odean (2000) reported that individuals turn over their common stock investments about 75 percent annually. This can well be supported by

Carhart (1997). In his research he found similar turnover rates for mutual funds. Tyynelä and Perttunen (2003) found an average of 53 percent annually for men and 37 percent for women. However, they did not take into account those, who do not trade at all. The averages would have reduced to 5.5 percent for women and 12.8 percent for men.

In the fifth column, the tracking error against the Primary Prospectus Benchmark (PPB) can be observed. On average, the tracking error counts for 5.53 percent. The tracking error has never been used to identify the overconfidence bias. Therefore, no comparison can be made with other studies.

The excess return compared to the PPB counts for -0.22 percent for the total researched investment period. This implies that on average the European fund manager has underperformed the benchmark. Although they did achieve a positive fund return of 2.62 percent on average for the total analyzed investment period. Later on, the difference between fund returns and excess returns (against PPB) are more deeply analyzed.

In the second line, where the data sample is subdivided by fund age into two groups, the mean turnover ratio of funds open between 4 and 8 years is substantial larger than the funds open for more than 8 years, respectively 111.13 and 93.94 percent annually for the total analyzed investment period. To use the number of years fund open as a proxy for experience is more or less imprecise. As the probability of changing fund managers within the same fund over the years increases with fund age. Finally, I cannot draw any conclusions whether the funds, which are open for more than 8 years, traded more (in terms of high turnover) in the past (when these funds were relatively new) due to data availability.

In the third line the manager tenure, which is a more appropriate proxy to use to test the influence of experience on overconfidence and performance, is observable. I found 103 funds with a management tenure between 4 and 8 years, and 83 with a management tenure more than 8 years. The total dataset consist more or less of funds being managed by relatively less experienced managers. Although, it is correct to suggest that these managers are still assumed to be highly skilled and well educated. The relatively less experienced European fund managers are more trading than those, who are more experienced (management tenure > 8 years), respectively 107.54 against 88.86 percent in terms of annual turnover ratio. Also a small difference of 0.10 percent in tracking error might slightly support the fact that less experienced managers are more (over)confident and trade more. Although, the difference is small. In terms of performance, I found that less experienced managers performed worse than more experienced managers. The excess return is negative compared to more experienced managers, respectively -0.40 against 0.01. Same conclusion can be drawn based on the average total annual fund return as more experienced managers achieved an average annual return of 2.80 against a return of 2.47 for less experienced managers. These results are in line with studies of Chen et al. (2007), Menkhoff (2006), and Sargent (1993). Especially, Menkhoff (2006) examined the relation between experience and the overconfidence bias. He documented that the overconfidence bias

decreases when more experience was gained over time.

The overconfidence proxies (trading activity), defined as turnover ratio and tracking error, are calculated in the fourth and fifth line. The highest 10% of actively trading fund managers have a turnover ratio of respectively 381.05 against 67.14 percent (low turnover). In other words, the top 10% (19 observations) (overconfident) investors of the data sample trade more than 5.5 times more than their counterparts. Interestingly, the high turnover ratio in association with tracking error is consistent as the tracking error is higher compared to those who trade less. The tracking error for frequent traders is 7.06 and 5.35 percent for those who trade less. In addition, the high turnover ratio is associated with lower returns which is consistent with related studies as higher turnover ratio harms the fund return. Those, who belong to the top 10% of highly frequent traders, achieved a return of 2.61 against 2.62 for less frequent traders. The underperformance difference is more observable when considering the difference in excess return. Fund managers, who trade less excessive achieved higher excess returns, respectively -0.19 against -0.44 percent. Noteworthy, is that on average both did not achieve positive excess return during the investment period from January 2007 until December 2011. These results are in line with related financial studies where excessive trading behavior is negatively related to returns. For instance, Chen et al. (2007), Barber and Odean (1999, 2000), and Tyynelä and Perttunen (2003) reported similar findings where excessive trading behavior harms fund performances. This phenomenon is also in line with the more fundamental financial theory where passively managed funds returns outperform actively managed funds[24].

The tracking error against PPB is observable in line five. The top 10% of managers, who deviate relatively more from its underlying benchmark (PPB), are defined as high tracking error managers. This subgroup deviates on average more than twice as much from the underlying PPB than the low tracking error subgroup, respectively 11.35 and 4.87 percent. Similar conclusion as in the previous section (which observes the turnover ratio) where a high turnover ratio is coupled with a high tracking error, the same relation can be drawn. Although, remarkably the high tracking error is associated with higher fund returns, respectively 8.59 percent on average. This is in contrast with the return of 1.94 percent for those who deviate less from the PPB. The same positive relation can be drawn when observing the difference in excess returns between the two groups. The high tracking error group achieved on average a positive excess return of 1.74 against the negative return of -0.44 for their counterparts. An explanatory reason might be that European fund managers do justifiably rely on their judgment and trade skills as a better fund performance is achieved by deviating from its underlying benchmark. However, the high tracking error is coupled to a high turnover ratio. To determine which proxy influences the return positively the cross sectional regression test might provide deeper insights. It will separately determine the influence of the proxies on the dependent factor.

[24] See for instance Elton, et al. (1996) or Jensen (1968)

Table I – Descriptive statistics on European open-end funds

European open-end funds							
	Number of funds	Mean value of funds	Mean years fund is open	Mean turnover ratio	Mean tracking error (PPB)	Mean excess return (PPB)	Mean total return
All funds	186	475.865.608	13.65	99.21	5.53	-0.22	2.62
By fund age:							
4 ≤ years > 8	57	476.872.747	6.08	111.13	5.61	0.18	2.59
≥ 8 years	129	475.428.400	17.21	93.94	5.49	-0.39	2.63
By mean manager tenure:							
4 ≤ years > 8	103	331.218.413	13.28	107.54	5.57	-0.40	2.47
≥ 8 years	83	513.408.865	14.44	88.86	5.47	0.01	2.80
By trading activity:							
High turnover	19	143.967.239	13.12	381.05	7.06	-0.44	2.61
Low turnover	167	520.765.275	13.88	67.14	5.35	-0.19	2.62
By tracking error (PPB):							
High tracking error	19	651.306.650	13.16	147.90	11.35	1.74	8.59
Low tracking error	167	456.020.292	13.87	95.67	4.87	-0.44	1.94
By fund value							
Small	62	24.307.320	13.44	106.30	5.79	-0.53	2.06
Medium	62	117.656.528	13.73	108.86	5.54	-0.76	1.87
Large	62	1.209.003.708	14.23	82.46	5.25	0.63	3.92
By country							
Austria	5	41.498.420	10.55	255.58	8.30	-1.23	-0.90
Denmark	1	65.647.561	7.00	36.40	5.27	1.48	0.21
Finland	4	37.679.866	9.96	188.16	7.67	-2.72	2.82
France	9	307.595.316	13.59	36.46	2.08	0.54	-1.99
Germany	2	436.824.884	16.04	11.83	4.64	-1.14	2.34
Ireland	28	632.505.183	9.77	103.45	5.93	-0.73	3.81
Luxembourg	67	393.391.789	10.88	114.86	5.36	-0.41	2.10
Netherlands	5	153.699.890	14.43	70.92	5.16	-0.96	1.38
Norway	13	560.015.310	13.89	68.76	5.00	1.68	8.18
Switzerland	25	133.858.082	21.84	83.54	4.96	-0.20	3.10
United Kingdom	27	1.058.341.172	18.95	77.94	6.78	0.31	2.02

Table I presents descriptive statistics of European fund managers' open-end funds started at latest from January 2007. Horizontally presented the number of funds, mean value of funds, years funds is open, turnover ratio, tracking error and excess return against primary prospectus benchmark. Vertically presented, the data differentiated into categories based on how long the fund has been open (2 groups: funds open between 4 and 8 years and more than 8 years, mean tenure of manager (2 groups: funds managed between 4 and 8 years and more than 8 years), trading activity (fund managers trading in top 10% of sample are defined as frequent traders), tracking error (fund managers deviating from primary prospectus benchmark in top 10% of sample belong to high tracking error group), fund value (sorted into three equal groups), and specific country

The influence of fund size on the tracking error, turnover ratio, and returns can be observed in line six. When comparing the difference between subgroups, most remarkable is that large funds have a lower turnover ratio while achieving higher returns. While the other subgroups (small- and midsize open-end funds) achieved negative excess returns and smaller fund returns. Large sized funds achieved a positive excess return in favor and higher fund returns. Also consistent to previous observations, the high turnover ratio is associated with lower returns.

The last line divides the total data sample into subgroups based on country. This can well be used to observe the underlying countries for the total data sample. There cannot be drawn any strong conclusions as the results are randomly distributed.

Overall, after analyzing Table I, it might be concluded that there is some evidence of overconfidence as large turnover ratios are found. However, strong conclusions regarding this relation are needed to be investigated more deeply. In general, it can be concluded that high turnover ratios harm fund (excess) returns, which is in line with many related studies. The approach of using the tracking error as a overconfidence proxy might provide new insights concerning overconfidence behavior among European fund managers. The tracking error is positively related with fund returns. This relation might be due to superior trade skills and correct judgments among European fund managers. If this relation holds, it might be suggested that on average European fund managers justifiably rely on their own skills and knowledge (in terms of tracking error). However, this interpretation still need to be very carefully considered. More in depth research is necessary to support these interpretations. In order to support this interpretations the two following sections will use the cross sectional regression on total data sample and subgroups.

VI.2 Cross Sectional Regression on Total Data Sample

The first model uses the cross sectional regression model to test the overconfidence bias on the total data sample. The results of this test will provide a comprehensive overview of the influence of past performance on the change of overconfidence proxies between consecutive years ($\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. It clarifies whether $\text{excess return}_{t-1}$ and return_{t-1} positively or negatively influence the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. Besides, the influence of the overconfidence proxies on fund performances will also be measured. It determines how the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$ influence the excess return_t and return_t. If the excess return_t and return_t are positively related to the $\Delta\text{tracking error}_{t-T}$ and/or $\Delta\text{turnover ratio}_{t-T}$, it can carefully be suggested that European fund managers know their trade skills and rely on their future financial prospects. Besides emphasizing on the significance test, the overconfidence and performance test on the total data sample also focus on the sign (positive or negative) of the coefficients. If the overconfidence test results in a positive significant relation between

fund performances and the overconfidence proxies, it might be concluded that European fund managers tend to be(come) overconfident after past (good) results. Although, a negative relation implies a reduction of confidence after past results. If the relation between factors and dependent variables seems to be insignificant in general, the opposite might be concluded which means that European fund managers are not prone to past results, which hypothetically influence the overconfidence proxies.

All tests start by first determining the influence of the change in overconfidence proxies on the next year's fund performances. The results will point out whether the increase of the trading activity in terms of tracking error and turnover ratio leads to higher fund performances. If this relation is supported by the test, it is important to reconsider the overconfidence proxies. It can well be that European fund managers possesses superior trading skills and information. Then active trading should be encouraged as it positively affect fund performances. After the performance test, the overconfidence test will be carried out. It tests whether the past fund performances are related to the difference between consecutive year's overconfidence proxies.

Table II.a – Performance Test on Data sample

	European open-end funds manager performance	
	Dependent Variable	
	Excess return$_t$	Return$_t$
Alpha	-0.4328	0.8668
Δ Tracking error$_{t-T}$	-0.1202	-0.1134
Δ Turnover ratio$_{t-T}$	-0.0003	-0.0071
Management tenure$_t$	-0.0119	0.1409

This table illustrates the average parameter coefficients of Alpha, ΔTracking error$_{t-T}$, ΔTurnover ratio$_{t-T}$, and Management tenure$_t$ on the dependent variable Excess return$_t$ and Return$_t$ for European open-end fund managers from January 2007 until December 2011. Δ denotes the difference between last year's tracking error or turnover ratio and next year's tracking error or turnover ratio. The following regression model is used: excess return$_t$/ return$_t$ = Δtracking error$_{t-T}$ + Δturnover ratio$_{t-T}$ + management tenure$_t$ .The management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Time Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 3 in this data sample.***, **, * denote statistical significance at the 1; 5; and 10 percent levels, respectively.

Table II.a presents the influence of the Δtracking error$_{t-T}$, Δturnover ratio$_{t-T}$, and management tenure$_t$ on fund performances during January 2007 until December 2011. obviously an increase of the factors Δtracking error$_{t-T}$, Δturnover ratio$_{t-T}$, and management tenure$_t$ have a negative impact on the excess return$_t$and return$_t$. With the exception of an increase of management tenure$_t$ on return$_t$. This is in contrast with the finding in the previous subsection where the tracking error is suggested to be positive related with fund returns (see Table I; high tracking error subgroup, 8.59 percent). Another important remark is that the all factors are insignificant. Because of the crisis large fluctuations were observable (see Appendix I for annual coefficients values), which lead to high standard deviations.

The Δtracking error$_{t-T}$ has a negative influence on both excess return$_t$ and return$_t$,

respectively -0.1202 and -0.1134. Hence, an increase of deviation from the PPB will lead to a decrease in terms of fund performances. The decrease has a slightly stronger influence on the excess return_t than on the return_t.

In the third line, the influence of $\Delta\text{turnover ratio}_{t-T}$ on the excess return_t and return_t is observable. Similar to the influence of the $\Delta\text{tracking error}_{t-T}$, an increase of the $\Delta\text{turnover ratio}_{t-T}$ has a negative impact on the excess return_t and return_t. Although, the negative impact is much smaller, respectively -0.0003 on excess return_t and -0.0071 on return_t. The negative impact of the Δ turnover ratio_{t-T} on the fund performances is in line with the results of Chen et. al (2007), Barber and Odean (2001), and Puetz and Ruenzi (2011).

Management tenure_t has a negative impact on excess return_t, while being positive on return_t, respectively -0.0119 and 0.1409. So, an increase of management tenure_t, which has been used as an experience proxy, has a positive influence on the return_t.

The first test' signs provide the insight that the overconfidence proxies influence the fund returns negatively. While experience has a positive influence on return_t, but not on the excess return_t. It is an important note that these interpretations still need to be considered carefully as the coefficients are insignificant.

Table II.b – Overconfidence Test on Data sample

	European open-end funds manager overconfidence	
	Dependent Variable	
	Δ Tracking error_{t-T}	Δ Turnover ratio_{t-T}
Alpha	-0.3356	18.9915**
Excess return_{t-1}	0.0067	-1.3085
Return_{t-1}	-0.0161	0.3332
Management tenure_{t-1}	-0.0073	0.1323

This table illustrates the average parameter coefficients of Alpha, Excess return_t, Return_t, and Management tenure_t on the dependent variable $\Delta\text{Tracking error}_{t-T}$ and $\Delta\text{Turnover ratio}_{t-T}$ for European open-end fund managers from January 2007 until December 2011. Δ denotes the difference between last year's tracking error or turnover ratio and next year's tracking error or turnover ratio. The following regression model is used: $\Delta\text{tracking error}_{t-T}/\ \Delta\text{turnover ratio}_{t-T} = \text{excess return}_{t-1} + \text{return}_{t-1} + \text{management tenure}_{t-1}$. The management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Time Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 2 in this data sample.***, **, * denote statistical significance at the 1; 5; and 10 percent levels, respectively.

After analyzing the relation between overconfidence proxies and fund performances, table II.b presents (see Appendix I for annual coefficients) the influence of excess return_{t-1} and return_{t-1} on the overconfidence proxies; $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. It is obvious that the influence of all factors (excess return_{t-1}, return_{t-1} and management tenure_{t-1}) have small impacts on the Δ tracking error_{t-T}. Similar could be concluded for the influence on $\Delta\text{turnover ratio}_{t-T}$ with the exception of excess return_t (although, it is relatively stronger but has still relatively small impact).

The excess return_{t-1} has a small positive insignificant impact on $\Delta\text{tracking error}_{t-T}$, while having a negative impact on $\Delta\text{turnover ratio}_{t-T}$. This implies that an increase in excess return_{t-1} would have on average a positive impact of 0.0067 on $\Delta\text{tracking error}_{t-T}$ and a negative impact of -1.3085 on the $\Delta\text{turnover ratio}_{t-T}$.

In contrary to the excess return_{t-1} coefficients, return_{t-1} has a small negative insignificant impact on $\Delta\text{tracking error}_{t-T}$, while being positive towards the $\Delta\text{turnover ratio}_{t-T}$, respectively -0.0161 and 0.3332. As a result, an increase in return_{t-1} will positively influence the $\Delta\text{turnover ratio}_{t-T}$ while reducing the $\Delta\text{tracking error}_{t-T}$. In this situation, the fund manager would increase his trade activity after past performance while deviate less relative to the PPB. In relation with the performance test, the increase of the $\Delta\text{turnover ratio}_{t-T}$ would lead to lower fund performances.

The last line presents the influence of $\text{management tenure}_{t-1}$ on the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. The influence on $\Delta\text{tracking error}_{t-T}$ is negative, while being positive on $\Delta\text{turnover ratio}_{t-T}$, respectively -0.0073 and 0.1323.

In general, after analyzing the overconfidence and performance test no strong conclusions can be drawn. On the one hand because of the insignificancy and on the other hand excess return and fund return moves the opposite direction regarding influence on $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$. To simplify, the results are rather randomly distributed and insignificant. To support the positive relation between return_{t-1} and $\Delta\text{turnover ratio}_{t-T}$ and between excess return_{t-1} and $\Delta\text{tracking error}_{t-T}$, which might be a sign that European fund managers are prone to the overconfidence bias, further research needs to be done. In line with related studies, is the negative impact of turnover ratio on both excess return and fund returns. Also concerning European fund managers, excessive trading behavior harms the fund performance. Based on these results, the following main hypotheses can be set.

H1 European fund managers are not prone to the overconfidence bias after past performances

H2 The overconfidence proxies are unrelated with fund performances

H3 Experience is unrelated with fund performances and overconfidence

The next subsection will divide the data sample into relevant subgroups and also use the cross sectional regression model. The results will either support or reject the hypotheses. It will test whether funds, which outperformed, are more prone to the overconfidence bias. Besides, with respect to performance, it will determine whether funds, which increases the overconfidence proxies, outperforms those who decreases the overconfidence proxies.

VI.3 Cross Sectional Regression per Subgroup

The methodology of this subsection is in broad lines similar as the previous subsections. First, the performance test will be performed, thereafter the overconfidence test, and finally the experience test. The key difference is that this subsection divides the data sample into different relevant subgroups. For the performance test, high tracking error and turnover ratio subgroups contain funds, which has increased trading activity compared to the previous year. While low tracking error and turnover ratio subgroups contain funds, which has decreased trading activity compared to the year before. The high management tenure subgroup contains funds, whereas the fund manager has managed the fund for more than the average management tenure of the data sample. While the low management tenure subgroup contain funds, whereas the fund manager are less experienced than the average of the data sample.

Table III – Mean determinants per subgroup

	European open-end funds means per subgroup			
	Dependent Variable			
	Excess Return $_t$		Return $_t$	
	Mean	St. dev.	Mean	St. dev.
Performance				
High tracking error $_{t-T}$	-0.8929	1.0902	2.3656	37.2555
Low tracking error $_{t-T}$	-0.4778	1.8615	1.8865	36.4622
High turnover ratio $_{t-T}$	-0.5896	1.2645	1.3240	36.5206
Low turnover ratio $_{t-T}$	0.0515	1.5649	3.4538	37.41.37
Experience				
High management tenure $_t$	-0.1280	1.2127	2.5964	31.6034
Low management tenure $_t$	-0.2658	1.3010	2.6284	31.9526
	Δ Tracking Error $_{t-T}$		Δ Turnover Ratio $_{t-T}$	
Overconfidence				
Excess return $_{t-1}$	0.1260	2.2497	-9.9742	23.2607
Non excess return $_{t-1}$	0.2721	1.9822	1.9051	19.8952
Return > Average return $_{t-1}$	-0.1784	2.3616	-8.2060	28.6196
Return < Average return $_{t-1}$	0.4294	2.0438	-1.4988	18.7482
Experience				
High management tenure $_{t-1}$	0.2517	2.1592	-1.1213	25.7771
Low management tenure $_{t-1}$	0.1713	2.1038	-5.2607	20.0659

This table illustrates the averages of different subgroups. High presents open-end funds, which has positively Δ over consecutive years. While, Low presents open-end funds, which has negatively Δ over consecutive years. High management tenure is defined as open-end funds, whereas the fund manager has managed the fund for more than the average of data sample. While Low management tenure is defined as open-end funds, whereas the fund manager has managed the fund for less than the average of data sample. Management tenure is determined by the number of years minus (2011-observed year.

Table III presents the averages of determinants of different subgroups from January 2007 until December 2011, which influence the performances or overconfidence proxies. Most noticeable are the high standard deviations. The standard deviations for all subgroups are remarkably higher than the averages. Appendix II provides detailed calculations of the mean determinant per subgroup.

Obviously, the crisis has a strong effect on both the standard deviations and averages.

In the following subsections, firstly, the performance of different subgroups are tested, which provides insights whether the tracking error can be designated as an overconfidence proxy. In contrary to turnover ratio, the influence of tracking error on fund performances is rarely documented. However, in advance I still consider the tracking error as an overconfidence proxy. In general, deviations from its underlying benchmark can be considered as confident trading behavior as abnormal (positive) returns are expected compared to the PPB. However, if a strong relation will be found between high[25] tracking error subgroup with fund returns, it could well be that European fund managers justifiably believe in their trade skills and knowledge, and that the tracking error is not an overconfidence proxy. If the results support this hypothesis, it might well be concluded that European fund managers should deviate more from the PPB to increase the fund returns. Which is in line with the study of Cremers and Petajisto (2009), who argue that actively managed funds in terms of tracking error outperform index funds. Perhaps, the qualitative determinants, as high level of education, superior trade trainings, and possession of superior (future) information might influence the fund returns positively. Based on related studies and previous results, I expect that European fund managers, who increases trading activity reduces fund performances. The following sub-hypotheses are set in order to support the main hypotheses.

Sub-H1 High tracking error subgroup underperform the Low tracking error subgroup

Sub-H2 High turnover ratio subgroup underperform the Low turnover ratio subgroup

Table IV.a illustrates the influence of different factors on the fund performances of the European fund managers. See appendix III.a and b for annual coefficients. Based on many other related studies, it is well known that excessive trading behavior does harm the fund performance. As similar to the previous tests, none of the coefficient are significant. Despite of the insignificancy, I will still draw conclusions based on this data sample.

The first line presents the $\text{High tracking error}_{t-T}$ subgroup, which contains European open-end funds with a positive change in tracking error between consecutive years. The positive change of tracking error influences the excess return_t negatively while being positive on return_t, respectively -0.3354 and 0.6228. Despite of the insignificancy and the relative small impact, the $\text{High tracking error}_{t-T}$ subgroup is positively related with return_t. This is not in line with the sub-H1 (sub-Hypothesis1). Although, compared to the PPB, the $\text{High tracking error}_{t-T}$ subgroup underperform the benchmark.

[25] High tracking error is the same as positive Δ tracking error group

Table IV.a – Performance Test per Subgroup

	European open-end fund manager performance	
	Dependent Variable	
	Excess return$_t$	Return$_t$
High tracking error$_{t-T}$	-0.3554	0.6228
Alpha	0.3882	11.8425
Δ Turnover ratio$_{t-T}$	0.0026	-0.0067
Management tenure$_t$	-0.1154	-0.1488
Low tracking error$_{t-T}$	0.2214	-0.6187
Alpha	-0.0893	-2.9954
Δ Turnover ratio$_{t-T}$	0.0047	-0.0029
Management tenure$_t$	-0.0104	0.5070
High turnover ratio$_{t-T}$	0.0015	0.0100
Alpha	-0.3671	-1.1133
Δ Tracking error$_{t-T}$	-0.2806	0.1589
Management tenure$_t$	-0.0532	0.2080
Low turnover ratio$_{t-T}$	0.0055	-0.0066
Alpha	-0.1447	1.8082
Δ Tracking error$_{t-T}$	-0.0090	-0.3248
Management tenure$_t$	-0.0036	0.0717

This table illustrates the average parameter coefficients of Alpha, Tracking error$_{t-T}$, ΔTurnover ratio$_{t-T}$, and Management tenure$_t$ on the dependent variable Excess return$_t$ and Return$_t$ for European fund managers from January 2007 until December 2011. The following Regression model is used: excess return$_t$/return$_t$ = high/low tracking error$_{t-T}$ + Δturnover ratio$_{t-T}$ + management tenure$_t$ and for the turnover ratio the following model has been used: excess return$_t$/return$_t$ = high/low turnover ratio$_{t-T}$ + Δtracking error$_{t-T}$ + management tenure$_t$..The management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 2 in this data sample.***, **, * denote statistical significance at the 1; 5; and 10 percent levels, respectively.

When considering the influence of the Low tracking error$_{t-T}$ subgroup, the opposite can be observed. The European fund managers, who decreased the tracking error between consecutive years, find a positive relation with the excess return$_t$ while being negative with return$_t$. This implies that European fund managers who reduces the deviation from the PPB, earn positive returns with regard to excess return$_t$ and a negative fund performance in terms of return$_t$, respectively 0.2214 and -0.6187. The negative influence on return$_t$ is 2.79 times stronger than on excess return$_t$. Remarkably, when the influence of tracking error$_{t-T}$ on return$_t$ is considered, the High tracking error$_{t-T}$ funds are performing better than Low tracking error$_{t-T}$ funds, respectively 0.6228 against -0.6187. This means that the more a fund deviates from the PPB the more a fund underperform the PPB. However, the more a fund deviates from the PPB, the more a fund manager earns in terms of fund return. Based on the sub-H1, the results partly supports the hypothesis if excess returns and fund returns are both considered as fund performance.

In advance I expect the turnover ratio$_{t-T}$ to be negatively related to fund performance. Moreover, I expect the High turnover ratio$_{t-T}$ subgroup to underperform those fund managers, who lowers the turnover ratio compared to the previous year. As suggested by the sub-H2.

The High turnover ratio$_{t-T}$ subgroup achieves both a positive excess return$_t$ and return$_t$. This is definitely not in line with related studies and the predetermined expectation. An increase of the

turnover ratio leads to an increase of 0.0015 in excess return_t and 0.0100 in return_t. However, it can well be that during downturn of the market (e.g. crisis), asset prices moves in (highly) uncertain directions, which makes it difficult for fund managers to predict the future.

The Low turnover ratio_{t-T} subgroup also achieves a positive excess return_t and a negative return_t, respectively 0.0055 and -0.0066. This basically means that a reduction of turnover ratio compared to the previous year leads to higher excess return while being negative on fund return. This phenomenon is against many findings of related studies and the predetermined expectation. In order to support the sub-H2, the Low turnover ratio_{t-T} subgroup should have outperformed the High turnover ratio_{t-T} subgroup. Thus, the sub-H2 is partly supported when the excess return_t (0.0055 vs. 0.0015) is considered but unsupported according to return_t results.

After analyzing the performances test of European fund managers, it is rather difficult to draw strong conclusions. The results are rather randomly distributed. The results are partly in line with the predetermined sub-hypotheses. In advance, I had expected the low tracking error and turnover funds to perform better than the high tracking error and turnover ratio funds. A result, which is worthy to observe, is the positive influence of tracking error on fund returns. In the description table I, this phenomenon was already noticeable. While lowering the tracking error is negatively related with fund returns. This can also be supported by Cremers and Petajisto (2009), who argue that actively managed funds with respect to tracking error are able to outperform index closing. Besides, the mean determinants Table III also points out this phenomenon. The mean difference table shows a positive fund return for High tracking error_{t-T} of 2.3656 compared to 1.8865 for the Low tracking error_{t-T} subgroup. An important note is that conclusions based on these results should carefully be interpreted and are limited applicable as the coefficients are insignificant. As European fund managers are rarely scrutinized concerning their trade behavior and skills, it is difficult to compare the results with other studies.

The next subsection will test the influence of past performances on the overconfidence bias. The creation of subgroups will strengthen the conclusion of the research. Although, I still do expect that the influence of the crisis will have an impact on the significance level of the test.

The following subsection will shed light on the overconfidence bias among European fund managers by testing the influence of past performances on the overconfidence proxies. With regard to the overconfidence bias, I divide the total data sample into positive excess returns (excess returns > 0) and negative excess returns (excess returns < 0), and fund returns larger than the average (fund return > average return of total data set) and those who underperformed the average return (fund return < average return of total data sample). As I already filtered out the outliers, I did not use the median instead of the average. Besides, by using the average of the total data sample I can support the results in the view of the better than the average effect. In general, good past performances increase the confidence level of humans. The results of this tests will show whether European fund managers are

also inclined to excessive trading behavior and overconfidence after good past performances. However, this might be different during market downturns. During crises humans are less optimistic. Based on general human behavior, I expect fund managers, who performed well in the past, are more prone to overconfident trading behavior than those, who performed worse. Based on this expectation the following sub-hypotheses are set. These sub-hypotheses will either support or reject the main hypotheses.

Sub-H3 European fund managers, who outperformed the PPB in the previous year, are more prone to the overconfidence bias.

Sub-H4 European fund managers, who performed better than the average of the data sample in the previous year, are more prone to the overconfidence bias.

Table IV.b – Overconfidence Test per Subgroup

	European open-end fund manager overconfidence	
	Dependent Variable	
	Δ Tracking error$_{t-T}$	Δ Turnover ratio$_{t-T}$
Excess return$_{t-1}$	-0.0299	-1.7825
Alpha	0.9706	27.5302
Return$_{t-1}$	-0.0033	0.8613
Management tenure$_{t-1}$	-0.0488	0.2125
Non excess return$_{t-1}$	0.0505	-1.1989
Alpha	0.1776	11.9228
Return$_{t-1}$	-0.0282	-0.0561
Management tenure$_{t-1}$	0.0156	0.7584
Return $>$ Average return$_{t-1}$	-0.0148	1.7276
Alpha	-0.1471	-3.1146
Excess return$_{t-1}$	0.0301	-1.7308
Management tenure$_{t-1}$	-0.0565	-0.9484
Return $<$ Average return$_{t-1}$	-0.0001	0.0062
Alpha	-0.4218	22.3409
Excess return$_{t-1}$	-0.0112	-0.7733
Management tenure$_{t-1}$	0.0222	1.1099

This table illustrates the average parameter coefficients of Alpha, Excess return$_{t-1}$, Return$_{t-1}$, and Management tenure$_{t-1}$ on the dependent variable Δ Tracking error$_{t-T}$ and Δ Turnover ratio$_{t-T}$ for European fund managers from January 2007 until December 2011. Following Regression models are used for the excess returns and non excess returns subgroups: Δtracking error$_{t-T}$/Δturnover ratio$_{t-T}$ = excess/non exces return$_{t-1}$ + return$_{t-1}$ + management tenure$_{t-1}$ and for the return compared to average data sample return this model : Δtracking error $_{t-T}$/Δturnover ratio$_{t-T}$ = return > average$_{t-1}$/ return < average$_{t-1}$ + excess return$_{t-1}$ + management tenure$_{t-1}$. Management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 2 in this data sample.***, **, * denote statistical significance at the 1; 5; and 10 percent levels, respectively.

Table IV.b presents the influence of different fund performance subgroups on the Δtracking error$_{t-T}$ and Δturnover ratio$_{t-T}$. See appendix III.c and d for annual coefficients. Similar to the previous test, the determinants are also insignificant. A fund manager is overconfident when past performance influence the Δtracking error$_{t-T}$ and Δturnover ratio$_{t-T}$ positively. Based on the

sub-hypotheses, I expect those fund managers, who did well in the past to be more inclined to overconfident behavior. The study of Puetz and Ruenzi (2011), who investigated more or less the same relation for US mutual fund managers, i.e. whether past performance increases subsequent turnover ratios, documented that both funds (which performed well as well as bad) increase the subsequent turnover ratios. The following model will test whether the same can be concluded for European open-end funds.

The first subgroup concerns European fund managers, who outperformed the PPB in the last year. Although, I expected a positive relation between excess return_{t-1} with $\Delta\text{tracking error}_{t-T}$ and /or $\Delta\text{turnover ratio}_{t-T}$, I found a negative relation with both overconfidence proxies. The influence on $\Delta\text{tracking error}$ is less stronger than on the $\Delta\text{turnover ratio}_{t-T}$, respectively -0.0299 and -1.7825. In general, an increase in excess return is associated with a decrease in the overconfidence proxies. This is definitely not in line with the sub-H3. The conclusion arises that European fund managers are not overconfident and immune to the overconfidence bias when past fund performances are considered (during the crisis).

This conclusion can be strengthened by the results on the non excess return_{t-1} subgroup. They reduction of fund performance in terms of excess return_{t-1} increases the $\Delta\text{tracking error}_{t-T}$ with 0.0505 and reduces the $\Delta\text{turnover ratio}_{t-T}$ with -1.1989. These results are a direct violation of the sub-H3. When comparing the excess return_{t-1} and non excess return_{t-1} results, it seems to be that European fund managers, who underperformed the PPB, are more inclined to the overconfidence bias (0.0505 vs. -0.0299 and -1.1989 vs. -1.7825). The next chapter will elaborate further on this.

When the European funds with respect to return_{t-1} are analyzed, the results are more or less similar to the excess return_{t-1} comparison. The funds, which performed better than the average, deviate less from the PPB in the upcoming year, respectively -0.0148. While an increase is expected based on the predetermined sub-H4. However, the influence on the $\Delta\text{turnover ratio}_{t-T}$ is positive, respectively 1.7276. This supports the general sense that humans get more confident after past good results.

The last subgroup concerns those funds, which underperform the average return of the total data sample. It seems that those funds are less strong affecting the $\Delta\text{tracking error}_{t-T}$ and $\Delta\text{turnover ratio}_{t-T}$, respectively -0.0001 and 0.0062. When the results of subgroups based on fund return (return > average return vs. return < average return) are compared, it might be concluded that only the difference in turnover ratio is supporting the sub-H4.

As a summary, it turns out to be that European fund managers are not inclined to the overconfidence bias as the results are insignificant and rather randomly distributed, even after past good performances. In the next chapter, these results are discussed. Qualitative explanations behind these results should reveal the reasons of insignificancy and the low level of overconfidence among European fund managers. The impact of the crisis has definitely a strong impact on all tests. However, additional research (perhaps after the crisis) might shed new light on this subject.

The following subsection tests the influence of experience in terms of manager tenure on the overconfidence proxies and fund performances.

Experience seems to have a positive impact on fund returns. Sargent (1993) suggested that experience seems to have a positive impact on trade performance as rational expectation does not deny that people make forecasting errors, but it does suggest that errors will not persistently occur. Chen et al. (2007) found that older accounts are associated with higher returns. Although, the older accounts also have higher turnover ratios. Experience improves the excess portfolio return when account tenure is used as an experience proxy, according to Nicolosi et al. (2009). Moreover, they reported that trade quality also significantly increases with experience (i.e., average raw and excess buy-minus-sell returns). Based on the results of well documented studies, I expect that an increase of experience improves the fund performances. Dividing the data sample into two groups, raises the opportunity to create the following sub-hypothesis.

Sub-H5 European fund managers with more experience than the average of the data sample achieve higher fund performances than European fund managers with less experience than the average of the data sample

Table IV.d – Experience Test per Subgroup - Performance

	European open-end fund manager performance	
	Dependent Variable	
	Excess return_t	Return_t
$\text{Mng. tenure} > \text{Av. tenure}_t$	-0.0616	0.1094
Alpha	-0.9211	-1.1364
Tracking error_t	0.3793	0.5152
Turnover ratio_t	-0.0075	-0.0071
$\text{Mng. tenure} < \text{Av. tenure}_t$	0.3654	0.7812
Alpha	-2.1872	-4.4330
Tracking error_t	0.1469	0.8189
Turnover ratio_t	0.0007	-0.0050

This table illustrates the average parameter coefficients of Alpha, $\text{Management tenure}_t$, Tracking error_t, and Turnover ratio_t on the dependent variable Excess return_t and Return_t of European open-end funds from January 2007 until December 2011. The following regression model is used: $\text{excess return}_t/\text{return}_t = \text{management tenure } (>/<) \text{ average mng. tenure}_t + \text{tracking error}_t + \text{turnover ratio}_t$. The management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 2 in this data sample.***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table IV.d presents the influence of experience in terms of management tenure on the fund performances. See appendix IV.a for annual coefficients. All the coefficients are insignificant. Hence, there is no strong relation between determinants and fund performances. This is in line with the main-Hypothesis3, which suggest that overconfidence is unrelated to fund performances and overconfidence. The latter will be tested in the next subsection.

The first line shows the coefficients of European fund managers with more experience than the average of the data sample. They reduce the fund performance in terms of excess return_t with -0.0616, but an increase in experience improves the return_t with 0.1094. These results partly support the sub-H5.

European fund managers, who are less experiences than the average of the data sample, improve the excess return_t with 0.3654. And the influence is also positive for return_t, respectively 0.7812. When both subgroups are compared, the sub-H5 is not supported.

When comparing excess return_t, the results do not support the sub-H5 as the excess return_t is lower for more experienced European fund managers. Moreover, when the coefficients of return_t are compared, the results violate the sub-H5. The return_t for less experienced fund managers is substantially higher than for more experience fund managers. Moreover, to strengthen the violation, the return_t is more positive for less experienced fund managers compared to more experienced fund managers.

The next subsection will test the influence of experience per subgroup on the overconfidence proxies.

Experience reduces the overconfidence bias in terms of trading frequency, according to Menkhoff et al. (2006). An increase in trading experience is associated with a decrease in the overconfidence bias in terms of miscalibration. Also in this subsection, trading experience is defined in terms of manager tenure. It is rather difficult to draw conclusions regarding the influence of experience on the overconfidence bias. Although, I expect fund managers, who are relatively longer active, are more rational and deviate less from the PPB and has a more negative impact on turnover ratio. Hence, the following sub-hypothesis will be tested.

Sub-H6 European fund managers with more experience than the average of the data sample are less prone to the overconfidence bias than European fund managers with less experience than the average of the data sample

The final test of the cross sectional regression per subgroup analyzes the influence of experience on the overconfidence proxies. It is generally expected that experience has a positive influence on human behavior. On financial markets, an increase in trading behavior can lead to more precise trading behavior. Fund managers will trade more rationally over the years. This can be measured by level of trade activity. According to Chen et al. (2007) experience does not conclusively lead to learned rational behavior. Empirical tests show that investors still exhibit behavioral biases. However, Menkoff et al. (2006) found evidence that fund managers, who gained experience from a learning process helps better estimate the true volatility in asset prices which may lead to a

comparatively risk averse behavior. In this sense, experienced fund managers are less overconfident and take lower risk.

Table IV.e – Experience Test per Subgroup - Overconfidence

	European open-end fund manager overconfidence	
	Dependent Variable	
	Δ Tracking error$_{t-T}$	Δ Turnover ratio$_{t-T}$
Mng. tenure $>$ Av. tenur$_{t-1}$	-0.0467	-0.8596
Alpha	0.5209	43.3392
Excess return$_{t-1}$	0.0162	-0.7540
Return$_{t-1}$	-0.0369	-0.1534
Mng. tenure $<$ Av. tenur$_{t-1}$	-0.0147	-5.6808
Alpha	0.4604	29.3262
Excess return$_{t-1}$	0.0058	-1.5743
Return$_{t-1}$	-0.0061	0.5619

This table illustrates the average parameter coefficients of Alpha, Management tenure$_{t-1}$, Excess return$_{t-1}$, and Return$_{t-1}$ on the dependent variable ΔTracking error$_{t-T}$ and ΔTurnover ratio$_{t-T}$ European open-end funds from January 2007 until December 2011.The following regression model is used: Δtracking error$_{t-T}$/Δturnover ratio$_{t-T}$ = management tenure$_{t-1}$ + excess return$_{t-1}$ + return$_{t-1}$. The management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the coefficients the Average Varying T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 2 in this data sample.***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table IV.d presents the influence of the management tenure$_{t-1}$ coefficients, which are used as an experience proxy, on Δtracking error$_{t-T}$ and Δturnover ratio$_{t-T}$. See appendix IV.b for annual coefficients.

The first line shows the influence of fund managers who are longer active for the same funds than the average management tenure of the data sample. As the mean hypothesis suggest, an increase in experience is associated with lower level of deviations from the PPB and a reduction in turnover ratio. The Δtracking error$_{t-T}$ changed negatively with -0.0467, while the Δturnover ratio$_{t-T}$ reduces with -0.8596.

When the European fund managers are considered, who are less experience, also a reduction in both Δtracking error$_{t-T}$ and Δturnover ratio$_{t-T}$ is observable. An increase in management tenure has a negative impact on Δtracking error$_{t-T}$ with -0.0147 and an even stronger negative impact on Δturnover ratio$_{t-T}$ with -5.6808. Thus, these results are partly supporting the sub-H6. The influence of management tenure on Δtracking error$_{t-T}$ supports the sub-H6. While, the comparison between Δturnover ratio$_{t-T}$ subgroups points out that less experienced fund managers reduces the turnover ratio more than experienced fund managers. This is a direct violation of the sub-H6. When both subgroups are considered, both have a negative impact on Δtracking error$_{t-T}$ and Δturnover ratio$_{t-T}$. However, when both subgroups are compared, the turnover ratio's results do not fully support the predetermined sub-H6 as European fund managers, who are longer active, influence the turnover ratio more negatively than those with a management tenure shorter than the average. The

opposite can be concluded. The turnover ratio reduction for the less experienced subgroup is more than 6.6 times stronger than for experienced fund managers.

Subsection VI.4 will test whether there are significant differences between compared subgroups. Based on all subgroup tests (which is highly randomly distributed) I will disconnect the Coefficient Difference T-Test from the predetermined sub-hypotheses as these only partly holds.

VI.4 Coefficient Difference T-Test

The Coefficient Difference T-Test will provide insights whether there are significant difference between compared subgroups. It will not perform the t-test based on the predetermined sub-hypotheses from the previous subsection (VI.3) as these are only partly supported and sometimes even directly violated. Similar as in the previous tests, I expect that the impact of the crisis is decisive. Large fluctuations in both fund performances and standard errors, market uncertainties, difficulties in market predictions, and non-optimism are some features during crises.

Table V – Coefficient Difference T-Test per subgroup

	European open-end funds Coefficient difference T-Test			
	Dependent Variable			
	Excess return$_t$		Return$_t$	
	Mean	St. dev.	Mean	St. dev.
Performance				
High tracking error$_{t-T}$	-0.3554	0.9904	0.6228	2.0358
Low tracking error$_{t-T}$	0.2214	0.5462	-0.1687	1.4821
High turnover ratio$_{t-T}$	0.0015	0.0038	0.0100	0.0312
Low turnover ratio$_{t-T}$	0.0055	0.0128	-0.0066	0.0332
Experience				
Mng. tenure $>$ Av. tenure$_t$	-0.0616	1.2127	0.1094	0.2082
Mng. tenure $<$ Av. tenure$_t$	0.3654	0.7955	0.7812**	0.4683
	Δ Tracking error$_{t-T}$		Δ Turnover ratio$_{t-T}$	
Overconfidence				
Excess return$_{t-1}$	-0.0299	0.1003	-1.7825	2.4284
Non excess return$_{t-1}$	0.0505	0.0705	-1.1989	2.0042
Return $>$ Av. return$_{t-1}$	-0.0148	0.0265	1.7276	1.2093
Return $<$ Av. return$_{t-1}$	-0.0001	0.0539	0.0062	1.8841
Experience				
Mng. tenure $>$ Av. tenure$_{t-1}$	-0.0467	0.1572	-0.8596	1.3680
Mng. tenure $<$ Av. tenure$_{t-1}$	-0.0147	0.1678	-5.6808	11.6366

This table illustrates the averages of different subgroups. High presents open-end funds, which has positively Δ over consecutive years. While, Low presents open-end funds, which has negatively Δ over consecutive years. High management tenure is defined as open-end funds, whereas the fund manager has managed the fund for more than the average of data sample. While Low management tenure is defined as open-end funds, whereas the fund manager has managed the fund for less than the average of data sample. Management tenure is determined by the number of years minus (2011-observed year). To calculate the significance level of the Mean Difference T-Test has been used. The degrees of freedom is calculated by the total of observed means for each coefficient – 1, which is 3 in this data sample.***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table V presents the different coefficients of compared subgroups. These are basically extracted from the previous tests. Thereafter, I performed the t-test. As already expected, the high standard deviations that basically underline the large fluctuations during January 2007 to December 2011, have a decisive impact on the significance test. Indeed, there are some evidence that would support sub-hypotheses or even the main hypotheses. However, due to the large movements it will not be strong enough to be regarded as significant.

Based on Table V, European fund managers, who has less experience than the average of the data sample, significantly outperform the European fund managers, who has relatively more experience. See appendix V for detailed calculations. This is the only strong conclusion I could draw from this test. Although, this relation is significant, there are not many related studies that could support this relation. Many related studies emphasizes that experience has a positive effect on fund performances.

To summarize the chapter, I performed different tests in order to reveal the influence of past performance on the overconfidence bias among European fund managers. Besides, the influence of the overconfidence proxies on the fund performances are tested. First, I started by performing tests on total data sample. To subsequently, create main hypotheses, which in broad lines underline that European fund managers are not prone to the overconfidence bias after past performances. Besides, the influence of the overconfidence proxies are unrelated with fund performances. Also, experience will not have any significant influence on neither the overconfidence proxies and fund performances. In order to strengthen the main hypotheses, I have created sub-hypotheses. The tests per subgroup did not provide strong evidence with regard to different subgroups. Although in general, the results of the tests were all insignificant. As a total picture, the results do support the main hypotheses.

VII. Discussion

This chapter will summarize the results of the previous chapter and provide reasonable explanations behind the results. The first section VII.1 provides insights regarding the overconfidence bias among European fund managers. Thereafter, VII.2 analyzes the fund performance results. Also, the influence of experience will separately be described in section VII.3. Finally, the last section provides last remarks and possible research suggestions.

In order to make the results comprehensive Figure II presents a summary of the results. Based on this figure the next subsections will elaborate further.

Figure II – Summary of results

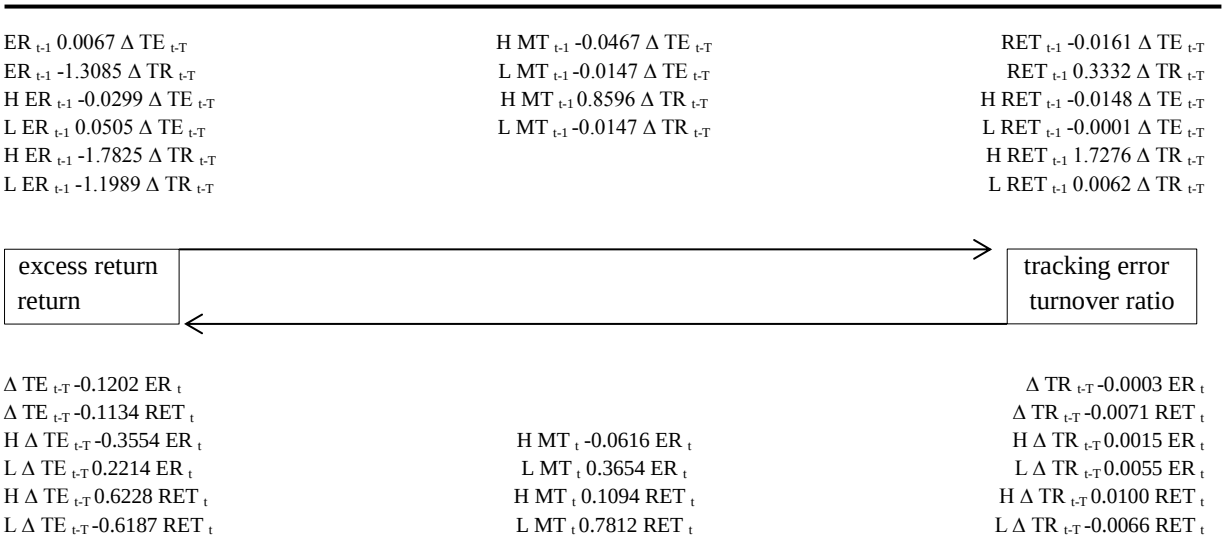


Figure II presents a summary of all results. The top illustrates the influence of past performance on the overconfidence proxies. The underside illustrates the influence of overconfidence proxies on the fund performances. The following abbreviations are used: ER (excess return), MT (management tenure), RET (return), TE (tracking error), TR (turnover ratio)., H (high), and L (low). High excess returns stands for excess return > 0, Low excess return for excess return < 0, High management tenure stands for more experience than the average of data sample, Low management tenure for less experience than the average of data sample, High return stands for higher return than the average return of data sample, Low return for less return than the average of data sample, High tracking error stands for an increase of tracking error between consecutive years, Low tracing error for a decrease between consecutive years, High turnover ratio stands for an increase of turnover ratio between consecutive years, Low stands for a decrease of turnover ratio between consecutive years.

VII.1 Overconfidence

European fund managers are not prone to past performances. Past performances do not significantly influence the overconfidence proxies. It even seems to be that in general the fund managers lower the overconfidence proxies during the investigated investment horizon (see the average coefficients for the total data sample tests). The crisis has definitely a major impact on the overconfidence bias. I found large fluctuations of basically all determinants from January 2007 to

December 2011. Hence, high standard deviations were found for basically all tests. This implies that during market down turns, European fund managers do not get overconfident. It seems to be that their trading behavior is highly dependent on the (uncertain) movements of the market. Noteworthy is that other related studies did not investigate the overconfidence bias during a crisis. Puetz and Ruenzi (2011) investigated the overconfidence bias from 1999 until 2008. Chen et al. (2007) used data of the Chinese market from May 1998 until September 2002. While Barber and Odean (2001) used US data from 1991 until 1997.

Also the attempt to still find a significant relation on the overconfidence bias, I tested the effect of fund managers, who achieved good past performances, on overconfident behavior. Also, this test did not show overconfident trading behavior among European fund managers. Neither after good nor bad past fund performances. This is not in line with the results of Puetz and Ruenzi (2011) who did find evidence that professional mutual fund managers in the US increased turnover ratios after both good and worse past performances.

Puetz and Ruenzi (2011) tested the market returns vs. individual returns in order to examine the impact of market performance on individual performance. Which is also examined by Gervais and Odean (2001), who suggest that overconfidence could also increase if investors expect high returns because of the fact that the market performed well. Deaves et al. (2010) and Statman et al. (2006) also supports this statement. According to Deaves et al. (2010) good past market returns push the entire market towards greater overconfidence. Statman et al. (2006) found evidence that in the stock market, higher overall trading volume is in relation with good past market returns. So, I can carefully suggest that during market downturns (the fund managers do not expect high returns), fund managers do not get overconfident. Even more, it seems to be that European fund managers sense a more or less non-optimism.

Another evidence, which can be supported by this test is due to the negative cash in- and outflows during the investigated investment horizon, the fund managers trade activity (in absolute values) do not exceed the absolute amount of in- and outflows of cash. This is definitely in line with the study of Pollet and Wilson (2008). They examined the reactions of fund managers towards cash in- and outflows. They reported that fund managers usually respond to asset growth by simply scaling up their existing investments. In this sense, European fund managers are indeed not overconfident, even from the cash in- and outflows point of view.

When the European fund managers are compared based on their past performances, it can carefully (as it is insignificant) be suggested that after worse performances, they deviate more from the PPB. This can partly be supported by Puetz and Ruenzi (2011). They document higher turnover ratios due to managers trying to get rid of their poorly performing stocks. In order to adjust the fund portfolio to a new strategy, consequently the fund manager has to do some trading in order to adjust the fund's portfolio to a new strategy. This would eventually lead to an increase of the turnover ratio. It can well be that European fund managers, who performed less well, try to catch up the others (and

try to change the investment strategy) and experience a similar effect as suggested by Puetz and Ruenzi (2011). As they also have to do something in order to adjust the fund's portfolio. This might lead an increase of the tracking error. This can well be supported by the comparison between European fund managers, who performed well with those who performed worse. Those who performed well deviate less from the PPB and reduce the turnover ratio even more.

Important note is that all conclusions drawn, are based on this data sample. So the interpretations should carefully be considered. Further investigation opportunities will be discussed in the last subsection.

VII.2 Performance

When performance in relation with the overconfidence proxies are observed, there is no significant relation between excess return or return and the tracking error and turnover ratio.

The crisis also has a major impact on the excess returns and fund returns. Although, I still do find a mean fund return of 2.62 for European fund managers but a negative excess return of -0.22. The crisis also affects the fund performances enormously. Large fluctuations ensures high standard deviations, which affects the significance level.

However, I found little evidence that an increase of tracking error improves the fund return but negatively affects excess returns. Perhaps, during market upturns the positive affection is stronger and might even be significant. If this would be the case, it suggest that the tracking error, which is considered as an overconfidence proxy, might be considered as a skill to earn higher returns. I found signs that an increase of the tracking error harms the excess returns as the portfolio deviates more from the PPB. This can be stated based on the results when the High vs. Low tracking error subgroups are compared.

When the turnover ratio is considered, the results of total data sample prove that the turnover ratio generally harms fund performances. This is definitely in line with many related studies, which argue that excessive trading behavior in terms of turnover rates harm fund returns.

VII.3 Experience

The influence of experience on the overconfidence bias and fund performances are also insignificant. With regard to the overconfidence proxies, the results between more and less experienced European fund managers are more or less random. Although, it seems to be that more experienced fund managers increase the turnover ratio even more.

The only significant relation in this thesis is between the fund returns between more and less experienced fund managers. Less experienced fund managers perform better than more experienced fund managers in terms of fund returns. They achieve 7.14 times more return than more experienced

fund managers. An acceptable explanation might be that on average they decrease the turnover ratio with -5.2607 annually. While more experienced fund managers decrease the turnover ratio less, respectively -1.1213, which is 4.69 times smaller.

To analyze the total picture concerning experience, based on the large fluctuations of the market, it can carefully be concluded that experience does not (significantly) seem to affect neither the overconfidence bias nor fund performances.

VII.4 Remarks and Suggestions

Most important remark is that during January 2007 and December 2011 European fund managers are immune to the overconfidence bias. The conclusion has limited validity as the investigated investment period definitely has a strong impact. The inclusion of the crisis in the examined investment period ensures large fluctuations for both the overconfidence proxies and fund returns and excess returns. Even after omitting the outliers from the data sample. Also, to increase the probability of overconfident behavior after past performances, I created subgroups. Despite the effort, I could not find evidence that European fund managers are prone to the overconfidence bias after past good performances (compared to the average of the total data sample or primary prospectus benchmark). This is not in line with the results of Puetz and Ruenzi (2011), who in broad lines examined the fund managers in the US.

The tracking error showed the percentage of holdings, which deviate from the underlying primary prospectus benchmark. The mean tracking error for this data sample is 5.53 percent. When taking the tracking error of the top 10 percent of the data sample, it counts for 11.35 percent annually. These numbers suggest that European fund managers do not deviate heavily from the underlying primary prospectus benchmark. It can well be that during market downturns they changed their investment strategy in order to limit their losses, which likely lead to deviations from the primary prospectus benchmark. This can well be supported by the study of Puetz and Ruenzi (2011), who suggest that investment strategy changes lead to higher deviations (from the initial benchmark) and turnover ratios. However, as they are responsible for many investors, who trust their money into their hands, I assume they are not taking high risk decisions. Besides, they cannot deviate a lot from the underlying benchmark as they are expected by investors (who invest their money in these funds) to follow the benchmark (which states in the fund prospectus). To support this phenomenon, large sized open-end funds is associated with lower tracking errors (see Table I). This might be because the fund managers are responsible for a greater amount of money of investors. While relatively small sized funds deviate more from the primary prospectus benchmark. As the results in this thesis reveal some signs that the tracking error is positively related with fund returns, the tracking error might be considered as a fund manager skills proxy.

The mean turnover ratio of the total data sample is 99.21 percent, which can be considered as relatively high compared to related studies. A reasonable explanation is that due to new (large) cash in- and outflows into the fund, the fund manager needs to trade more in order to remain to their investment strategy. The investment strategy mostly carries a predetermined risk profile. This can also be supported by Chen et. al (2007), their results suggest that institutional investors trade more than individual investors. Their explanation suggests that institutional investors have relatively more money available in their funds. Moreover, Puetz and Ruenzi (2011) who also investigated open-end fund managers, found a turnover ratio of more than 90 percent annually. It can be well concluded that professional fund managers do trade more compared to individual investors. However, it does not necessarily imply that they are overconfident.

After examining the influence of past performances on the overconfidence proxies, this relation turned out to be insignificant. Also when focusing on the Alpha and R-square of the models (which can be observed in the appendix) of the cross sectional results, it reveals that past performance does not have strong explanatory power on the overconfidence proxies. It can well be concluded that European fund managers are not prone to past performances. Hence, other factors might influence the turnover ratio and tracking error more strongly. When the overconfidence proxies are related to the excess returns and fund returns, similar conclusion can be drawn. To be more precise, based on the low R-square value of the models and high Alpha, it can well be suggested that the fund returns and excess returns are not strongly affected by the overconfidence proxies.

This research investigated investors' overconfidence bias in Europe. Besides it also use recent European financial data. However, further research still needs to be done. I have investigated the European fund managers during the crisis. It seems to be that large fluctuations create high standard deviations. If future research (during a better economic state), with a similar methodology points out that European fund managers are overconfident, it can be well suggested that the market condition is indeed a major factor for overconfident trade behavior.

Related studies as for instance, Barber and Odean (2001), Chen et al. (2007), or Tyynelä and Perttunen (2003) used brokerage account data of households. Regarding European households, there are still opportunities for investigation. The European households investors have not yet been tested on the overconfidence bias. As professional investors need to follow the predetermined investment strategy (and risk profile), they are required to trade in a certain predetermined strategy. Indeed, this can be associated with higher trade frequencies. Which can also be supported by Puetz and Ruenzi (2011). However, European brokerage households accounts are less required to trade following a predetermined strategy (as they are only responsible for their own money instead of other investors' money). I expect an increasingly probability to the overconfidence bias among individual investors.

In order to test the overconfidence bias from another approach, the number of fund holdings or value changes of holdings can be included. It would reveal whether European investors diversify their fund holdings, which is also a common used proxy to calculate the overconfidence bias.

This chapter summarizes the results. It turns out to be that European fund manager are not prone to the overconfidence bias after past performances. Decisive factor is the crisis, which ensures large fluctuations. This is an acceptable explanation as in general during market downturns people are less optimistic and uncertain. Also the influence of experience does not seem to be significant during market downturn. The chapter ends with the final remarks and suggestions. Examining the European fund managers on the overconfidence bias during another point in time would definitely generate more insights. Also, the analysis of the (value of) holdings within a portfolio generates more insights in the trading behavior from another approach.

VIII. Conclusion

This thesis has examined the overconfidence bias among European open-end fund managers by testing the influence of past (good) performances on the tracking error and turnover ratio, which are used as overconfidence proxies. Also, it has tested whether the overconfidence proxies should be regarded as superior trade skills instead of an overconfidence proxy. It is rather important that European fund managers are not inclined to overconfident trading behavior as it might harm investors' return.

Based on the results, I can conclude that European open-end fund managers are not prone to the overconfidence bias (i.e. the turnover ratio and/or tracking error did not significantly increase on average) from January 2007 to December 2011 after past (good) performances. The strong impact of the crisis around 2008 has clearly a significant influence on the trading behavior during this period. This is in line with the common market sense at that moment, which was highly uncertain, hence many are less optimistic about the future and especially uncertain about future market expectations.

With regard to the overconfidence proxies, I did find some signs that the tracking error is positively related with fund returns. Hence, it can well be that European fund managers justifiably rely on their trade skills in terms of tracking error. Although, the turnover ratio is relatively high (99.21 percent annually) compared to other studies, this does not necessarily mean that the professional fund managers are overconfident. In general, professional fund manager are responsible for large sized funds (which are subjected to frequent cash in- and outflows) and are required to trade in order to follow the predetermined and/or changed investment strategy[26].

In addition, I tried to test whether experience (with management tenure as a proxy) has a significant influence on the overconfidence proxies. Also, the insignificant results of these tests point out no strong relation between neither fund performances nor the overconfidence proxies.

As a summary, it is acceptable to suggest that European open-end fund managers are immune to the overconfidence bias after past fund performances. Moreover, also past good performances do not significantly positively influence the overconfidence bias in terms of tracking error and turnover ratio.

Strong suggestion is to examine the overconfidence bias among European fund managers when the general market sense is positive and the market fluctuations are upward moving.

[26] This statement can also be supported by Chen et. al (2007) and Puetz and Ruenzi (2011)

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Appendix

Appendix I – Performance and Overconfidence Test on Total Data Sample

Performance and Overconfidence Cross Sectional Regression Test on Total Data Sample																				
	2008					**2009**					**2010**					**2011**				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
alpha	186	-2.3294	0.9007	0.0105	0.0271	186	3.1638	1.6815	0.0615	0.0135	186	-0.7546	1.0371	0.4678	0.0352	186	-1.8109	1.0457	0.0850	0.0420
Δ tracking error$_{t-T}$		0.2407	0.1657	0.1480			0.2172	0.3167	0.4837			-0.4072	0.1691	0.4678			-0.5317	0.2091	0.0118	
Δ turnover ratio$_{t-T}$		-0.0068	0.0044	0.1286			-0.0025	0.0090	0.7794			0.0055	0.0045	0.2231			0.0025	0.0030	0.4004	
mng. ten.$_t$		0.1245	0.1105	0.2615			-0.3001	0.2084	0.1517			0.0866	0.1067	0.4179			0.0414	0.1019	0.6849	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
alpha	186	-44.0670	1.7420	0.0000	0.0098	186	41.9220	3.7784	0.0000	0.0140	186	17.2935	1.8668	0.000	0.0451	186	-11.6814	1.8745	0.0000	0.0080
Δ tracking error$_{t-T}$		-0.0501	0.3207	0.8760			0.3015	0.7117	0.6723			-0.6860	0.3045	0.0255			-0.0189	0.3748	0.9598	
Δ turnover ratio$_{t-T}$		-0.0094	0.0086	0.2716			-0.0299	0.0203	0.1420			0.0100	0.0081	0.2161			0.0001	0.0054	0.8880	
mng. ten.$_t$		0.1605	0.2139	0.4539			-0.1657	0.4684	0.7238			0.3570	0.3570	0.0647			0.2120	0.1826	0.2472	
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	186	2.7883	0.3233	0.000	0.0146	186	-1.6031	0.8423	0.0586	0.01842	186	-1.8045	0.4815	0.0002	0.0854	186	1.9617	0.4166	0.000	0.0532
excess return$_{t-1}$		0.03911	0.0284	0.1694			0.0406	0.0341	0.2353			-0.0487	0.0174	0.0057			-0.0042	0.0267	0.8741	
return$_{t-1}$		-0.0183	0.0145	0.2081			-0.0191	0.0177	0.2829			-0.0147	0.0077	0.0581			-0.0120	0.0149	0.4191	
mng. ten.$_t$		-0.0034	0.0499	0.9456			0.0568	0.0487	0.2445			0.0197	0.0467	0.6742			-0.1023	0.0354	0.0043	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	186	7.8031	12.1688	0.5222	0.0051	186	87.1119	28.9099	0.0030	0.0532	186	-42.5231	18.6647	0.0239	0.0313	186	23.5740	28.9878	0.4171	0.0081
excess return$_{t-1}$		-0.2738	1.0670	0.7978			-2.1084	1.17053	0.0733			-1.6263	0.6753	0.0170			-1.2254	1.8593	0.5107	
return$_{t-1}$		-0.3389	0.5466	0.5360			1.8793	0.6092	0.0024			0.1968	0.2990	0.5111			-0.4043	1.0347	0.6964	
mng. ten.$_t$		1.0691	1.8763	0.5695			-0.1334	1.6710	0.9365			0.0132	1.8091	0.9942			-1.4783	2.4627	0.5491	

Appendix II – Mean Determinants per subgroup

High Tracking Error $_{t-T}$	Number of funds	Excess return $_{t}$	Return $_{t}$	Low Tracking Error $_{t-T}$	Number of funds	Excess return $_{t}$	Return $_{t}$
2007-2008	168	-0,8472	-43,2905		18	-2,5676	-43,9217
2008-2009	78	0,5328	42,203		108	1,2484	39,1199
2009-2010	22	-1,1551	20,6938		164	0,9251	21,4543
2010-2011	123	-2,1020	-10,144		63	-1,5172	-9,1067
Average		-0,8929	2,365575			-0,4778	1,8865
High Turnover Ratio$_{t-T}$	Number of funds	Excess return $_{t}$	Return $_{t}$	Low Turnover Ratio$_{t-T}$		Excess return $_{t}$	Return $_{t}$
2007-2008	110	-1,5364	-44,1975		76	-0,2571	-42,1274
2008-2009	107	0,3840	37,4847		79	1,7127	44,3789
2009-2010	62	0,6119	22,9994		124	0,7126	20,5468
2010-2011	75	-1,8179	-10,9905		111	-1,9621	-8,9833
Average		-0,5896	1,3240			0,0515	3,4538
High Mng. Tenure $_{t}$	Number of funds	Excess return $_{t}$	Return $_{t}$	Low Mng. Tenure $_{t}$		Excess return $_{t}$	Return $_{t}$
2007	66	1,0524	3,2378		120	-0,2602	5,1205
2008	66	-0,9729	-43,1732		120	-1,0362	-43,4498
2009	66	0,277	39,6824		120	1,3176	40,8146
2010	66	0,7935	22,3037		120	0,6161	20,8477
2011	66	-1,7901	-9,0687		120	-1,9665	-10,1908
Average		-0,12802	2,5964			-0,26584	2,62844
Excess Return $_{t-1}$	Number of funds	Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$	Non Excess Return $_{t-1}$		Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$
2007-2008	93	2,8199	6,0877		93	2,5756	17,0354
2008-2009	27	-0,5001	-1,0569		159	-0,4581	12,7875
2009-2010	45	-2,5505	-44,5284		141	-2,0493	-26,9407
2010-2011	37	0,7347	-0,3991		149	1,0202	4,7380
Average		0,1260	-9,974175			0,2721	1,90505
Return > Average $_{t-1}$	Number of funds	Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$	Return < Average $_{t-1}$		Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$
2007-2008	74	2,4370	8,2836		112	2,8700	13,7273
2008-2009	88	-0,4440	11,5689		98	-0,5054	2,6914
2009-2010	63	-3,2320	-50,1787		123	-1,8347	-28,7653
2010-2011	85	0,5255	-2,4976		101	1,1878	6,3515
Average		-0,1784	-8,2060			0,4294	-1,4988
High Mng. Tenure $_{t}$	Number of funds	Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$	Low Mng. tenure		Δ Tracking error $_{t-T}$	Δ Turnover ratio $_{t-T}$
2007	66	2,8262	22,5029		120	2,6270	5,5438
2008	66	-0,1604	10,1426		120	-0,6490	5,2433
2009	66	-2,3869	-37,2711		120	-2,2646	-35,3292
2010	66	0,7280	0,1406		120	0,9716	3,4993
Average		0,2517	-1,1213			0,1713	-5,2607

Appendix III.a – Performance Test per subgroup – Tracking error

Performance – Cross Sectional Regression Test per subgroup																				
	2008					**2009**					**2010**					**2011**				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
alpha	168	-2.2603	1.0509	0.0330	0.0362	78	2.0428	2.9973	0.4977	0.0380	22	1.9694	2.8257	0.4947	0.0906	123	-0.1990	1.4812	0.8934	0.0586
H Δ tracking error$_{t-T}$		0.1856	0.2018	0.3590			0.7074	0.9058	0.4373			-1.4995	1.4540	0.3161			-0.5317	0.2091	0.0118	
Δ turnover ratio$_{t-T}$		-0.0099	0.0048	0.0423			0.0154	0.0170	0.3692			0.0042	0.0159	0.7949			0.0008	0.0034	0.7994	
mng. ten.$_t$		0.1628	0.1187	0.1724			-0.3898	0.3137	0.2180			-0.1813	0.2282	0.4373			-0.0534	0.1398	0.7032	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
alpha	168	-42.8890	1.9309	0.0000	0.0135	78	40.1851	6.3500	0.0000	0.0486	22	21.2226	6.4177	0.0039	0.0127	123	-9.7488	2.5406	0.0002	0.0158
H Δ tracking error$_{t-T}$		-0.2461	0.3707	0.5078			3.4529	1.9191	0.0761			-1.2920	3.3024	0.7002			0.5766	0.5217	0.2713	
Δ turnover ratio$_{t-T}$		-0.0106	0.0089	0.2336			-0.0040	0.0361	0.9111			-0.0108	0.0363	0.7693			-0.0012	0.0055	-.8281	
mng. ten.$_t$		0.0865	0.2182	0.6924			-0.5604	0.6647	0.4019			0.0379	0.5184	0.9425			-0.1593	0.2397	0.5076	
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
alpha	18	-0.0917	2.4950	0.9712	0.2012	108	3.9468	2.5330	0.1222	0.0326	164	-1.1943	1.1634	0.3062	0.0329	63	-3.0178	1.5288	0.0531	0.0580
L Δ tracking error$_{t-T}$		0.7681	0.6376	0.2483			0.6085	0.5191	0.2438			-0.3171	0.1928	0.1020			-0.1739	0.7587	0.8195	
Δ turnover ratio$_{t-T}$		0.0144	0.0095	0.1501			-0.0123	0.0101	0.2288			0.0050	0.0047	0.2908			0.0118	0.0100	0.2397	
mng. ten.$_t$		-0.2105	0.2833	0.4697			-0.1896	0.2837	0.5055			0.1853	0.1232	0.1347			0.1734	0.1702	0.3125	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
alpha	18	-45.9190	8.7633	0.0001	0.0883	108	31.7740	5.8900	0.0000	0.0652	164	16.3656	2.0285	0.0000	0.0614	63	-14.2023	2.8627	0.0000	0.1079
L Δ tracking error$_{t-T}$		1.3340	2.2393	0.5609			-2.2714	1.2070	0.0627			-0.7745	0.3361	0.0225			-0.7630	1.4206	0.5932	
Δ turnover ratio$_{t-T}$		0.0061	0.0333	0.8576			-0.0492	0.0236	0.0395			0.0122	0.0082	0.1389			0.0192	0.0187	0.3079	
mng. ten.$_t$		0.6074	0.9950	0.5514			0.4574	0.6597	0.4896			0.4413	0.2148	0.0416			0.5220	0.3187	0.1068	

Appendix III.b – Performance Test per subgroup – Turnover ratio

Performance – Cross Sectional Regression Test per subgroup																				
	2008					**2009**					**2010**					**2011**				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
alpha	110	-2.4812	1.1976	0.0407	0.0082	107	1.7856	2.3676	0.4525	0.0150	62	-1.2688	2.2037	0.5670	0.0596	75	0.4959	1.6444	0.7639	0.0972
H Δ turnover ratio$_{t-T}$		0.0008	0.0067	0.9098			0.0066	0.0172	0.7006			-0.0026	0.0186	0.8887			0.0012	0.0033	0.7239	
Δ tracking error$_{t-T}$		0.0649	0.1994	0.7457			0.4005	0.4286	0.3523			-0.5831	0.3076	0.0630			-1.0047	0.4017	0.0147	
mng. ten.$_t$		0.1161	0.1319	0.3806			-0.2293	0.2693	0.3965			0.0818	0.1956	0.6774			-0.1813	0.1748	0.3032	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
alpha	110	-43.9952	2.3698	0.0000	0.0082	107	35.1106	5.0548	0.0000	0.0535	62	16.2337	3.6171	0.0000	0.1106	75	-11.8022	2.8554	0.0001	0.0037
H Δ turnover ratio$_{t-T}$		-0.0056	0.0133	0.6738			0.0557	0.0367	0.1319			-0.0129	0.0305	0.6731			0.0027	0.0057	0.6439	
Δ tracking error$_{t-T}$		-0.2340	0.3946	0.5544			1.8826	0.9151	0.0422			-1.0058	0.5048	0.0510			-0.0073	0.6976	0.9917	
mng. ten.$_t$		0.1338	0.2609	0.6092			0.0302	0.5750	0.9583			0.5953	0.3211	0.0688			0.0728	0.3035	0.8111	
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
alpha	76	-2.9984	1.6253	0.0692	0.0682	79	4.8820	3.0640	0.1153	0.0193	124	-0.2901	1.2439	0.8160	0.0346	111	-2.1724	1.4814	0.1455	0.0698
L Δ turnover ratio$_{t-T}$		-0.0104	0.0092	0.2593			0.0036	0.0169	0.8312			0.0083	0.0056	0.1414			0.0206	0.0111	0.0668	
Δ tracking error$_{t-T}$		0.5583	0.2923	0.0602			0.0691	0.4831	0.8866			-0.3595	0.2088	0.0877			-0.3038	0.2518	0.2303	
mng. ten.$_t$		0.1445	0.1988	0.4696			-0.4079	0.3367	0.2295			0.0957	0.1304	0.4643			0.1532	0.1278	0.2334	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
alpha	76	-44.1631	2.1086	0.0000	0.0082	79	43.0954	6.9217	0.0000	0.0405	124	18.2240	2.3291	0.0000	0.0192	111	-9.9235	2.7376	0.0004	0.0240
L Δ turnover ratio$_{t-T}$		-0.0041	0.0175	0.8177			-0.0530	0.0382	0.1692			0.0060	0.0105	0.5702			0.0248	0.0205	0.2300	
Δ tracking error$_{t-T}$		0.2993	0.5592	0.5941			-1.0693	1.0914	0.3304			-0.5108	0.3910	0.1938			-0.0183	0.4653	0.9687	
mng. ten.$_t$		0.1902	0.3803	0.6184			-0.3262	0.7606	0.6693			0.1983	0.2441	0.4183			0.2243	0.2362	0.3443	

Appendix III.c – Overconfidence Test per subgroup – Excess return

Overconfidence – Cross Sectional Regression Test per subgroup																				
	2007 - 2008					**2008 - 2009**					**2009 - 2010**					**2010 – 2011**				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	93	2.9328	0.5486	0.0000	0.0201	78	-0.3090	1.4445	0.8312	0.0214	96	-0.4807	0.6988	0.4933	0.2973	88	1.7392	0.5568	0.0025	0.0781
excess return$_{t-1}$		0.0368	0.0526	0.4861			-0.0070	0.0947	0.9415			-0.1777	0.0315	0.0000			0.0283	0.0467	0.5465	
return$_{t-1}$		-0.0328	0.0247	0.1884			0.0164	0.0285	0.5664			0.0094	0.0105	0.3744			-0.0061	0.0190	0.7491	
mng. ten.$_t$		-0.0064	0.0747	0.9316			0.0831	0.0799	0.3023			-0.1506	0.0752	0.0483			-0.1214	0.0473	0.0121	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	93	-20.4800	21.6356	0.3464	0.0254	78	140.1307	50.3311	0.0068	0.1194	96	-33.8070	29.8738	0.2607	0.1114	88	24.2770	21.4241	0.2604	0.0365
excess return$_{t-1}$		1.3340	2.0752	0.5221			-1.6892	3.3010	0.6104			-4.5750	1.3479	0.0010			-2.1995	1.7977	0.2245	
return$_{t-1}$		-0.0171	0.9747	0.9860			3.0893	0.9928	0.0026			0.7238	0.4499	0.1111			-0.35088	0.7330	0.6334	
mng. ten.$_t$		3.7847	2.9471	.2024			-1.50290	2.7855	0.5911			-0.8075	3.2153	0.8023			-0.6245	1.8211	0.7325	
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	93	2.9054	0.5202	0.0000	0.0143	108	-2.3795	1.0822	0.0301	0.0830	90	-1.9899	0.5955	0.0012	0.1130	98	2.1746	0.6904	0.0022	0.0421
non excess return$_{t-1}$		0.0627	0.0602	0.3000			0.1343	0.0576	0.0216			0.0420	0.0366	0.2551			-0.0369	0.0686	0.5915	
return$_{t-1}$		-0.0078	0.0187	0.6785			-0.0525	0.0225	0.0214			-0.0193	0.0111	0.0855			-0.0332	0.0260	0.2054	
mng. ten.$_t$		-0.0054	0.0681	0.9367			0.0298	0.0609	0.6257			0.1222	0.0518	0.0206			-0.0841	0.0557	0.1344	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	93	14.6731	18.1842	0.4219	0.0207	108	34.0488	36.9045	0.3583	0.0110	90	-30.2323	23.3200	0.1983	0.0161	98	29.2014	62.9470	0.6438	0.0065
non excess return$_{t-1}$		-1.8242	2.1030	0.3881			-1.3595	1.9628	0.4901			1.5737	1.4350	0.2759			-3.1855	6.2556	0.6118	
return$_{t-1}$		-0.6116	0.6519	0.3507			0.6893	0.7662	0.3704			0.2704	0.4341	0.5350			-0.5724	2.3726	0.8099	
mng. ten.$_t$		-1.2536	2.3815	0.5999			0.6028	2.0766	0.7722			0.7017	2.0279	0.7302			-3.0844	5.0790	0.5451	

Appendix III.d – Overconfidence Test per subgroup – Fund return

Overconfidence – Cross Sectional Regression Test per subgroup																				
	2007 - 2008					**2008 - 2009**					**2009 - 2010**					**2010 – 2011**				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	74	2.7167	0.8802	0.0029	0.0350	90	-2.0752	1.2708	0.1061	0.0765	63	-3.5529	1.5151	0.0224	0.1600	85	2.3230	0.8915	0.0109	0.0940
return > av. ret$_{t-1}$		-0.0183	0.0345	0.5981			-0.0369	0.0330	0.2660			0.0233	0.0182	0.2049			-0.0275	0.0267	0.3061	
return$_{t-1}$		0.0564	0.0384	0.1469			0.1115	0.0461	0.0177			-0.0780	0.0250	0.0028			0.0307	0.0345	0.3767	
mng. ten.$_t$		-0.0210	0.1000	0.8345			0.0481	0.0606	0.4298			-0.1333	0.1063	0.2150			-0.1198	0.0425	0.0061	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	74	-11.5720	28.8518	0.6291	0.0398	90	135.6047	40.8784	0.0013	0.1116	63	-131.9948	62.3000	0.0383	0.1450	85	-4.4964	88.5190	0.9596	0.0312
return > av. ret$_{t-1}$		0.7196	0.9342	0.4438			3.4790	1.0600	0.0015			1.4740	0.7476	0.0533			1.2377	2.6495	0.6416	
return$_{t-1}$		1.5782	1.0416	0.1342			-1.5348	1.4828	0.3036			-2.3820	1.0270	0.0239			-4.5848	3.4263	0.1846	
mng. ten.$_t$		0.4798	2.7086	0.8599			-0.4240	1.9496	0.8283			-1.2442	4.3725	0.7770			-2.6053	4.2214	0.5389	
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	112	2.9728	0.3923	0.0000	0.0089	96	-3.8698	2.1431	0.0742	0.0317	123	-1.6402	0.6687	0.0156	0.0560	101	0.8502	0.7095	0.2337	0.0357
return < av. ret$_{t-1}$		0.0367	0.0377	0.3329			-0.0584	0.0408	0.1550			-0.0326	0.0213	0.1283			0.0528	0.0344	0.1208	
return$_{t-1}$		-0.0172	0.0516	0.7400			-0.0305	0.0502	0.5452			0.0167	0.0265	0.5313			-0.0138	0.0457	0.7641	
mng. ten.$_t$		0.0087	0.0555	0.8757			0.0467	0.0780	0.5512			0.0960	0.0448	0.0342			-0.0625	0.0628	0.3223	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	112	-5.1076	17.4600	0.7704	0.0500	96	128.5386	77.1681	0.0992	0.0503	123	-46.6428	25.5021	0.0699	0.0051	101	12.5756	29.6369	0.6723	0.0468
return < av. ret$_{t-1}$		-1.3529	1.6798	0.4224			2.5075	1.4676	0.0909			0.4084	0.8111	0.6155			-1.5380	1.4354	0.2866	
return$_{t-1}$		-3.7365	2.2947	0.1064			-2.6741	1.8088	0.1427			-0.0551	1.1024	0.9567			3.3726	1.9106	0.0807	
mng. ten.$_t$		1.3673	2.4710	0.5812			-0.5763	2.8100	0.8379			1.0333	1.7093	0.5466			2.6153	2.6251	0.3216	

Appendix IV.a – Experience Test per subgroup – Performance

Performance – Cross Sectional Regression per subgroup – Experience																				
	2007					2008					2009					2010				
	N. of funds	Coefficient	Standard Error	Probability	R-Squared	N. of funds	Coefficient	Standard Error	Probability	R-Squared	N. of funds	Coefficient	Standard Error	Probability	R-Squared	N. of funds	Coefficient	Standard Error	Probability	R-Squared
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
A	66	-0.4896	2.5489	0.8483	0.0683	66	-1.6601	2.8176	0.5579	0.0992	66	0.9262	4.7686	0.8466	0.1204	66	-2.1304	3.1304	0.4997	0.0708
H mt$_t$		-0.1698	0.2222	0.4476			0.3158	0.2184	0.1532			-0.5762	0.3642	0.1187			0.0790	0.2441	0.7472	
TE$_t$		0.7100	0.3640	0.0556			-0.2335	0.2318	0.3177			0.7463	0.3334	0.0288			0.5848	.3361	0.0868	
TR$_t$		0.0000	0.0070	0.9978			-0.0088	0.0065	0.1841			0.0051	0.0102	0.6206			-0.0109	0.0096	0.2586	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
A	66	-1.9772	5.1853	0.7043	0.0840	66	-44.2921	5.3362	0.0000	0.1128	66	33.9431	10.2055	0.0015	0.0344	66	17.8775	4.8959	0.0005	0.0254
H mt$_t$		-0.0188	0.4520	0.9669			0.2051	0.4135	0.6217			-0.1140	0.7794	0.8842			0.4179	0.3809	0.2768	
TE$_t$		0.8410	0.7403	0.2604			0.3081	0.4389	0.4854			0.7644	0.7135	0.2881			-0.0588	0.5244	0.9111	
TR$_t$		0.0232	0.0142	0.1067			-0.0331	0.0124	0.0097			0.0154	0.0219	0.4843			-0.0056	0.0150	0.7085	
	Excess return $_t$					Excess return $_t$					Excess return $_t$					Excess return $_t$				
A	120	-5.3714	2.1154	0.0124	0.0660	120	-0.8941	2.1061	0.6720	0.0032	120	-2.4543	5.1295	0.6332	0.0447	120	1.0961	2.6939	0.6848	0.0404
L mt$_t$		1.7313	0.6163	0.0058			0.1135	0.4668	0.8083			-0.0604	0.9218	0.9479			-0.2822	0.4184	0.5014	
TE$_t$		0.1733	0.2360	0.4642			-0.0703	0.1473	0.6341			0.4065	0.3116	0.1946			0.4031	0.2312	0.0840	
TR$_t$		-0.0025	0.0050	0.6204			-0.0005	0.0043	0.9013			0.0116	0.0072	0.1078			-0.0061	0.0045	0.1762	
	Return $_t$					Return $_t$					Return $_t$					Return $_t$				
A	120	-5.2135	3.9125	0.1853	0.1198	120	-39.8130	3.9598	0.0000	0.0496	120	26.6205	11.9645	0.0280	0.0615	120	10.5375	5.4395	0.0551	0.0654
L mt$_t$		1.2422	1.1398	0.2780			0.2465	0.8777	0.7793			0.5784	2.1502	0.7884			1.3065	0.8448	0.1247	
TE$_t$		1.6921	0.4365	0.0002			-0.6466	0.2770	0.0213			2.0000	0.7268	0.0069			0.9946	0.4669	0.0353	
TR$_t$		-0.0041	0.0092	0.6578			0.0001	0.0080	0.9876			-0.0105	0.0168	0.5338			-0.0136	0.0091	0.1371	

	2011				
	N. of funds	Coefficient	Standard Error	Probability	R-Squared
	Excess return $_t$				
A	66	-1.2516	3.0130	0.6793	0.1554
H mt$_t$		0.0432	0.1868	0.8177	
TE$_t$		0.0891	0.2524	0.7254	
TR$_t$		-0.0230	0.0072	0.0022	
	Return $_t$				
A	66	-11.2333	5.6106	0.0496	0.1223
H mt$_t$		0.0570	0.3478	0.8703	
TE$_t$		0.7214	0.4700	0.1299	
TR$_t$		-0.0356	0.0134	0.0099	
	Excess return $_t$				
A	120	-3.3125	3.1903	0.3013	0.0143
L mt$_t$		0.3247	0.4383	0.4603	
TE$_t$		-0.1779	0.1784	0.3206	
TR$_t$		0.0009	0.0030	0.7554	
	Return $_t$				
A	120	-14.2963	5.4901	0.0104	0.0066
L mt$_t$		0.5325	0.7543	0.4816	
TE$_t$		0.0546	0.3070	0.8592	
TR$_t$		0.0029	0.0052	0.5737	

A denotes Alpha, H mt. denotes, fund managers with more experience than the average of data sample, L mt denotes, fund managers with less experience than the average of adata sample, TE denotes tracking error, and TR denotes turnover ratio.

Appendix IV.b – Experience Test per subgroup – Overconfidence

Overconfidence – Cross Sectional Regression per subgroup – Experience																				
	2007 - 2008					2008 - 2009					2009 - 2010					2010 – 2011				
	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared	Number of funds	Coefficient	Standard Error	Probability	R-Squared
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	66	3.3346	0.8218	0.0001	0.0745	66	-3.4018	1.5438	0.0313	0.0902	66	-1.7817	1.2999	0.1754	0.2195	66	3.9326	0.9300	0.0001	0.2299
mng. ten > av. ten$_{t-1}$		-0.0428	0.0828	0.6069			0.0576	0.0876	0.5130			0.0687	0.0979	0.4854			-0.2701	0.0630	0.0001	
excess return$_{t-1}$		0.0551	0.0512	0.2852			0.0941	0.0552	0.0937			-0.0927	0.0333	0.0071			0.0083	0.0393	0.8332	
return$_{t-1}$		-0.0535	0.0249	0.0353			-0.0636	0.0285	0.0295			-0.0340	0.0160	0.0383			0.0035	0.0259	0.8933	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	66	23.6603	36.2595	0.5165	0.0347	66	107.6201	56.8539	0.0630	0.0791	66	-18.3012	49.9535	0.7153	0.07881	66	60.3773	39.6451	0.1329	0.0432
mng. ten > av. ten$_{t-1}$		0.2140	3.6545	0.9635			0.3149	3.2252	0.9225			-1.4570	3.7629	0.6999			-2.5104	2.6863	0.3537	
excess return$_{t-1}$		1.9784	2.2570	0.3841			-2.8372	2.0347	0.1682			-2.8405	1.2791	0.0300			0.6833	1.6759	0.6849	
return$_{t-1}$		-1.6071	1.0974	0.1481			2.3960	1.0513	0.0261			-0.0479	0.6164	0.9383			-1.3546	1.1034	0.2242	
	Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$					Δ tracking error$_{t-T}$				
alpha	120	2.7637	0.6841	0.0001	0.0092	120	0.4457	1.3033	0.7330	0.0111	120	-2.8092	0.9246	0.0029	0.0445	120	1.4412	0.9110	0.1164	0.0169
mng. ten < av. ten$_{t-1}$		-0.0427	0.2351	0.8561			-0.2088	0.2156	0.3348			0.1996	0.1812	0.2729			-0.0068	0.1552	0.9652	
excess return$_{t-1}$		0.0366	0.0355	0.3056			0.0211	0.0439	0.6311			-0.0237	0.0193	0.2218			-0.0108	0.0364	0.7672	
return$_{t-1}$		-0.0025	0.0181	0.8887			0.0070	0.0228	0.7580			-0.0087	0.0082	0.2890			-0.0204	0.0179	0.2574	
	Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$					Δ turnover ratio$_{t-T}$				
alpha	120	34.4763	23.3834	0.1431	0.0233	120	120.6020	43.3510	0.0063	0.0657	120	-98.9835	37.1774	0.0089	0.03671	120	61.2010	75.0781	0.4166	0.0133
mng. ten < av. ten$_{t-1}$		-11.2490	08.0355	0.1642			-12.6597	7.1712	0.0801			11.7240	7.2839	0.1102			-10.5387	12.7933	0.4118	
excess return$_{t-1}$		-0.6552	1.2150	0.5907			-1.7860	1.4608	0.2240			-0.9607	0.7769	0.2187			-2.8952	2.9983	0.3362	
return$_{t-1}$		0.1869	0.6196	0.7634			1.6276	0.7590	0.0341			0.2485	0.3210	0.4527			0.1847	1.4745	0.9005	

Appendix V – Coefficient Difference T-Test between compared subgroups

High Tracking error vs Low Tracking error on Excess return		
2007-2008	0.1856	0.7681
2008-2009	0.7074	0.6085
2009-2010	-1.4995	-0.3171
2010-2011	-0.8153	-0.1739
Average	-0.3554	0.2214
Standard dev.	0.9904	0.5462
Standard dev.^{2}	0.9809	0.2983
N	4	4
T-Value	-1.0200	
High Tracking error vs. Low Tracking error on Return		
2007-2008	-0.2461	1.3340
2008-2009	3.4529	-2.2714
2009-2010	-1.2920	-0.7745
2010-2011	0.5766	-0.7630
Average	0.6229	-0.6187
Standard dev.	2.0358	1.4821
Standard dev.^{2}	4.1443	2.1966
N	4	4
T-Value	0.9861	
High turnover ratio vs. Low turnover ratio on Excess return		
2007-2008	0.0008	-0.0104
2008-2009	0.0066	0.0036
2009-2010	-0.0026	0.0083
2010-2011	0.0012	0.0206
Average	0.0015	0.0055
Standard dev.	0.0038	0.0128
Standard dev.^{2}	0.0000	0.0002
N	4	4
T-Value	0.60332	
High turnover ratio vs. Low turnover ratio on Return		
2007-2008	-0.0056	-0.0041
2008-2009	0.0557	-0.0530
2009-2010	-0.0129	0.0060
2010-2011	0.0027	0.0248
Average	0.0100	-0.0066
Standard dev.	0.0312	0.0332
Standard dev.^{2}	0.0010	0.0011
N	4	4
T-Value	0.7268	

High excess return vs. Low excess return on Δ tracking error		
2007-2008	0.0368	0.0627
2008-2009	-0.0070	0.1343
2009-2010	-0.1777	0.0420
2010-2011	0.0283	-0.0369
Average	-0.0299	0.0505
Standard dev.	0.1003	0.0705
Standard dev.^{2}	0.0101	0.0050
N	4	4
T-Value	1.3116	
High excess return vs. Low excess return on Δ turnover ratio		
2007-2008	1.3338	-1.8242
2008-2009	-1.6892	-1.3595
2009-2010	-4.5750	1.5737
2010-2011	-2.1995	-3.1855
Average	-1.7825	-1.1989
Standard dev.	2.4284	2.0042
Standard dev.^{2}	5.8973	4.0168
N	4	4
T-Value	0.3707	
High return vs. Low return on Δ tracking error		
2007-2008	-0.0183	0.0367
2008-2009	-0.0369	-0.0584
2009-2010	0.0233	-0.0326
2010-2011	-0.0275	0.0538
Average	-0.0148	-0.0001
Standard dev.	0.0265	0.0539
Standard dev.^{2}	0.0007	0.0029
N	4	4
T-Value	0,4895	
High return vs. Low return on Δ turnover ratio		
2007-2008	0.7196	-1.3529
2008-2009	3.4790	2.5075
2009-2010	1.4740	0.4084
2010-2011	1.2377	-1.5380
Average	1.7276	0.0062
Standard dev.	1.2094	1.8841
Standard dev.^{2}	1.4626	3.5500
N	4	4
T-Value	1,5377	

High Mng. Tenure vs. Low Mng. Tenure on Excess return		
2007	-0.1698	1.7313
2008	0.3158	0.1135
2009	-0.5762	-0.0604
2010	0.0790	-0.2822
2011	0.0432	0.3247
Average	-0.0616	0.3654
Standard dev.	0.3353	0.7955
Standard dev.^{2}	0.1124	0.6329
N	5	5
T-Value	1,1060	
High Mng. Tenure vs. Low Mng. Tenure on Return		
2007	-0.0188	1.2422
2008	0.2051	0.2465
2009	-0.1140	0.5784
2010	0.4179	1.3065
2011	0.0570	0.5325
Average	0.1094	0.7812
Standard dev.	0.2082	0.4683
Standard dev.^{2}	0.0434	0.2193
N	5	5
T-Value	-2,9309	
High Mng. Tenure vs. Low Mng. Tenure on Δ tracking error		
2007-2008	-0.0428	-0.0427
2008-2009	0.0576	-0.2088
2009-2010	0,0687	0.1996
2010-2011	-0.2701	-0.0068
Average	-0.0467	-0.0147
Standard dev.	0.1572	0.1678
Standard dev.^{2}	0.0247	0.0281
N	4	4
T-Value	0,2782	
High Mng. Tenure vs. Low Mng. Tenure on Δ turnover ratio		
2007-2008	0.2140	-11.2490
2008-2009	0.3149	-12.6597
2009-2010	-1.4570	11.7240
2010-2011	-2.5104	-10.5387
Average	-0.8596	-5.6808
Standard dev.	1.3680	11.6366
Standard dev.^{2}	1.8714	135.4114
N	4	4
T-Value	0,8230	