

Professionalism and Portfolio Biases

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Abstract:

The effect of professionalism on investment decisions has been found to be ambiguous. If professional investors exhibit typical portfolio biases of laymen, however, financial markets can hardly be efficient. An examination of this important question requires comparable data on various investor groups, portfolio biases and control variables. Accordingly, we have conducted a survey of about 500 investors, covering professionals and laymen. We find that investors' professionalism consistently reduces home bias, portfolio churning and reluctance to loss realization. The three measures of professionalism used – occupation, experience and knowledge – are statistically significant and economically important for explaining portfolio biases, even when introduced in combination.

JEL-Classification: D 80, F 30, G 23

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1 Introduction

Participants in financial markets often show biased behavior that reduces their performance (e.g. Barber and Odean, 2000). It may be less expected that not only participants in general but even professionals are plagued by “biased” behavior as demonstrated by herding (Grinblatt et al., 1995), overconfidence (Glaser and Weber, 2005) or loss-aversion (Coval and Shumway, 2005). Professionals' deficits can become so severe that their decisions are even inferior to those of laymen (e.g. Haigh and List, 2005, Glaser et al., 2005). However, professionalism has also proved to be a performance-enhancing factor (e.g. Locke and Mann, 2005). Thus, professionalism is an important determinant of behavior but whether it fosters or hinders successful decision making in financial markets is not clear yet. Accordingly, we examine the effect of professionalism on three portfolio biases in a broad cross-sectional study. To get the necessary data, a new survey of about 500 investors, covering institutional as well as individual investors, has been conducted.

The blurry evidence about the impact of professionalism provides a strong challenge to economic reasoning. It is obvious that markets require rational, i.e. here unbiased, behavior to be efficient. This also applies to those increasingly popular models where heterogeneous agents are considered (e.g. De Long et al., 1990). It is a common assumption in these models that one group behaves according to conventional capital market theory, i.e. relies on fundamental information and rational decision-making. This group is usually thought to be made up by professionals whereas laymen, such as individual investors, are typically assumed to belong to the group of noise traders (De Bondt, 1998, Kaniel et al., 2005). If empirical research could not identify significant differences regarding portfolio biases of these two groups this would pose a clear disappointment for models with heterogeneous agents and for the efficient market hypothesis.

Earlier research on this issue seems to be handicapped by a trade-off: either studies focus on one investor group which is analyzed in some detail, such as by Odean (1998),¹ or studies compare two groups – professionals and laymen – but then often consider a rather narrow issue only, such as the disposition effect (Shapira and Venezia, 2001).² Due to these limitations, the question emerges whether any relation found holds either for another group of investors or for another phenomenon of interest. Recent studies have taken up this concern by examining in a cross-sectional approach whether there are robust structures underlying the manifold observations and explanations in the recent literature on investment behavior (e.g. Shiller, 1999). Candidates that have been suggested to help our understanding of several behavioral distortions include the wealth of investors (Vissing-Jørgensen, 2003), their perceived competence (Graham et al., 2005), their risk aversion (Dorn and Huberman, 2005) or their experience (Menkhoff et al., 2006). Thus, recent empirical research aims to identify robust factors that seem to be useful in analyzing more than one behavioral bias within a single framework. All existing studies, however, rely on information from either individual or institutional investors and accordingly do not focus on the impact of professionalism.

The present paper aims to fill this gap by examining the impact of professionalism on three portfolio biases which can be seen as stylized facts of financial markets, i.e. home bias, portfolio churning and reluctance to loss realization. Home bias means that investors tend to diversify their portfolios less internationally than is expected from theory and advisable from empirical work (Lewis, 1999, Baxter and Jerman, 1997, Karolyi and Stulz, 2003). Regarding portfolio churning, evidence indicates that trading is often not based on useful information but driven by improper motives such as overconfidence (Glaser and Weber, 2005); consequently, this high

¹ Studies on individual investors observe for example their trading behavior (e.g. Barber and Odean, 2000), ask for their views (e.g. De Bondt, 1998) or analyze experimental evidence gained from students (e.g. Glaser and Weber, 2005). Other studies infer lessons from behavior of professionals, such as fund managers trading decisions (Grinblatt et al., 1995) or fund managers' views (Menkhoff et al., 2006).

² These studies include Shiller and Pound, 1989, who show that institutional investors rely more on fundamental information; Grinblatt and Keloharju, 2000, Barber and Odean, 2005, reveal superior perform-

turnover – called portfolio churning – reduces rather than improves portfolio performance (Barber and Odean, 2000). Finally, the reluctance to loss realization is a major problem of practitioners in financial markets and its damaging effect on portfolio performance has been convincingly demonstrated (e.g. Odean, 1998). There is no question that home bias, portfolio churning and reluctance to loss realization are puzzling phenomena and it would be important to know whether professionalism affects them.

The bottleneck in empirically analyzing professionalism is to have data available that covers persons with a different degree of professionalism in a uniform way. To overcome this data problem we have conducted a new survey study which is linked to an established regular survey of market participants, the weekly so-called “sentix” survey. Due to this linkage we received about 500 responses from persons participating at the weekly survey. Their occupation can be classified either as professional, e.g. fund managers, or semi-professional, i.e. investment advisors,³ or non-professional in the financial domain, i.e. other individual investors. Accordingly, we receive a uniform data set which covers investors with a different degree of professionalism.

The identification of a potential impact from professionalism on portfolio biases obviously requires one to carefully consider two questions: first, is the above introduced “occupation-derived” measure of professionalism appropriate and, second, have other possible determinants of the biases been controlled for? Regarding the appropriate measure of variables, the discussion of measures of overconfidence has revealed that several intuitive concepts do not necessarily lead to the same findings (Glaser and Weber, 2005). This suggests capturing our core concept of professionalism by more than the one occupation variable – we will use three measures which have been introduced in the literature. The “occupation” measure is obvious and does not need

ance of institutional investors; Shapira and Venezia, 2001, find a weaker disposition effect for institutional investors; see also Glaser et al., 2005, Haigh and List, 2005, introduced above.

³ Investment advisors are professional in the sense that they work for a financial institution and that they give advice to customers. However, they seem to be less professional on average than institutional investors because of their job profile: their customers are less qualified in financial terms, they have to deal with more clients, they do not have access to first hand information (but get financial information from the bank’s headquarter) and they earn usually a lower salary than institutional investors.

further explanation. Another measure takes the years of “experience” in investment decisions as a measure (see e.g. Feng and Seasholes, 2005).⁴ Finally, we derive a “knowledge” variable from a variance forecast of participants which we will explain in detail in Section 2.4. It is interesting to note that these measures of professionalism are not necessarily highly correlated to each other.

Regarding the set of control variables used when analyzing the possible impact of professionalism on portfolio biases, it is our ambition to consider the most important determinants being identified before. The survey approach is extremely useful in this respect as we can decide about the variables to be compiled; some of the variables cannot be compiled at all without conducting a survey.⁵ We divide these variables into objective attributes, such as demographic variables, versus subjective beliefs, such as self-assessments. Starting with objective attributes, it has been shown that investment behavior is related to demographic variables, as home bias increases for older men (Karlsson and Nordén, 2004 for individual investors, Lütje and Menkhoff, 2004 for institutional investors) and for less wealthy individuals (Vissing-Jørgensen, 2003, Karlsson and Nordén, 2004). Further objective attributes have included the degree of education and seniority of position as indicators of better understanding and thus bias-reducing influences (Agnew et al., 2003, Graham et al., 2005, Menkhoff et al., 2006). Then, indicators of behavior towards risk are usually considered when analyzing investment behavior, expecting that less risk aversion may reduce home investments and increase turnover. This includes the share of equities (Karlsson and Nordén, 2004) – as the last objective attribute considered – and the direct question for risk aversion in investment decisions (Dorn and Huberman, 2005), which belongs to the set of subjective beliefs. Moreover, there are three more general phenomena influencing investment behavior. The most researched among them may be the disposition effect, which distorts decision making (e.g. Shefrin and Statman, 1985, Weber and Camerer, 1998, Shapira and Venezia,

⁴ An important role of experience has been found in other settings too, such as the field study of List (2003) and the experiment of Loomes et al. (2003).

⁵ Accordingly, questionnaire surveys have become a standard research tool when information is required that cannot be drawn from other sources (see e.g. Blinder, 2000, on central banks’ views about credibility,

2001), although it has not been considered before for the biases examined here. A second general influence has been found for investors' horizon, where longer horizons are related to a more rational investment behavior. The third influence concerns self-assessment. We know that investors are overconfident and that this reduces performance. An important mechanism in this respect is that overconfidence produces too much uninformed trading (Barber and Odean, 2000). Moreover, this heavy trading is biased in that there is a reluctance to realize losses (Odean, 1998), which can be interpreted as overconfidence in investors' forecast ability. In contrast to the conventional overconfidence effect, Graham et al. (2005) argue that perceived competence in investment decisions makes investors "more willing to act on their judgment" (p.27) and thus leads to a higher share of foreign investments (less home bias) and higher turnover.

Finally, we consider two variables which matter for home bias only. It has been argued that informational asymmetries between better informed domestic and less informed foreign investors play a role (Gehrig, 1993). Recent research has indeed found controversial evidence: there can be local information advantages (e.g. Coval and Moskowitz, 2001 for fund managers and Ivkovic and Weisbenner, 2005 for individual investors) but there is also evidence that this advantage is not real but possibly perceived only (e.g. Huberman, 2001 for individual investors, Lütje and Menkhoff, 2004 for institutional investors). Moreover, the effect of distance on investment allocation seems to be even stronger for individual than for institutional investors as demonstrated for the case of Finland (Grinblatt and Keloharju, 2001).⁶ As a second important variable explaining home bias Shiller et al. (1996) found unrealistic return optimism among institutional investors. As this was confirmed later on, it can be regarded as a well established behavioral determinant of home bias (Strong and Xu, 2003).

surveys on investors' beliefs as for example Shiller and Pound, 1989, or surveys on investors' price expectations, such as Frankel and Froot, 1987).

⁶ Much literature shows that the extent of home bias can be partially explained by capital controls or other transaction costs (Ahearne et al., 2004, Edison and Warnock, 2004). However, reasonable doubt has been raised on the general importance of these restrictions as strong home bias also occurs without restrictions (e.g. Tesar and Werner, 1995). So, we do not cover this aspect in our cross-sectional approach.

Our study provides three contributions to the literature: first, we establish that professionalism is a statistically significant and economically meaningful characteristic of investors that unambiguously reduces the portfolio biases considered here. Accordingly, professionalism may be one of the underlying factors that could help to better structure behavioral finance findings. Second, the three measures of professionalism used all point – when introduced in isolation or in combination – in the same direction. Thus, even though the evidence on the direction of impact of professionalism is homogeneous in this respect, the strength of this effect is not, so that professionalism should be measured by more than just one variable. Third, our broad-based cross-sectional approach contributes to the understanding of possible determinants of home bias, portfolio churning and the reluctance to loss realization.

The paper proceeds in the following way. Section 2 gives information on the data generated, including a discussion of reliability and representativeness. Section 3 provides descriptive analyses, showing the portfolio biases for our sample as well as some correlations of interest. The core of the analysis is laid out in Section 4, where we perform regression analyses to learn about the impact of professionalism on home bias, portfolio churning and reluctance to loss realization. Conclusions are presented in Section 5.

2 Data

This section shows that the data set is useful to serve our research purpose. The data are by and large reliable (Section 2.1) and they are representative for relevant investor groups (Section 2.2). We find portfolio biases in the data (Section 2.3), relate our three measures of professionalism to each other (Section 2.4) and describe participants' behavior and beliefs (Section 2.5).

2.1 Data compilation

The data employed here have been compiled to examine our research questions. Data come from an online survey of German investors conducted from 4th to 11th November 2004 in cooperation with sentix[®]. The latter is a large German online platform that asks about 1500 German individual and institutional investors for their expectations concerning relevant financial and economic indicators and asset prices on a weekly basis.⁷ We used this platform to distribute our own survey questionnaire and received a total of 497 responses during the above-mentioned week in November 2004.

Since the survey is anonymous we asked participants to indicate whether they are individual investors, investment advisors or institutional investors. Our 497 responses are made up of 75 institutional investors, 78 investment advisors and 344 individual investors. This self-indication of respondents can be cross-checked with the database of sentix[®], which contains information about the affiliation of investors with professional financial institutions such as banks, asset managers, or insurance companies, so we can be sure that participants did not indicate themselves as professionals although they are not.

Often-voiced concerns regarding survey data are that participants do not fully understand all questions, that they answer strategically or that they randomly answer without thinking about the questions. However, none of these objections seems to be a problem in this online survey. First, we conducted a pretest to ensure understandable wording and relevant questions. Nevertheless, investors did not have to answer all questions if they did not like to or if they did not understand the questions. Second, since the questionnaire was anonymous and announced to be used for academic purposes only, there does not seem to be an incentive for strategic answering. Strategies aiming for a distortion of the overall level of answers were useless ex ante due to the large number of participants addressed; this disincentive has proved to be credible because of the many responses realized. Third, since participants in our survey are registered users of sentix[®]

⁷ The online survey is anonymous and voluntary. The number of participants has increased since late 2004. Details can be inferred via www.sentix.de.

and take part in the weekly questionnaire voluntarily, it can be expected that they are highly interested in financial market research and have an intrinsic motivation to answer correctly.

Overall, the data seem to be as reliable as can be expected for a survey questionnaire. Further insights can be gained from analyzing participants attributes.

2.2 Participants' objective attributes

This section shows objective attributes of participants, such as age, education etc. These objective attributes characterize respondents in a way that allows comparisons with other data sets describing investors. We find that our sample is by and large representative for our target investor groups.

Seven objective attributes of the respondents are presented in Table 1. We first describe the median investor of our survey, whose characteristics can be seen from column 3 of Table 1. This respondent is between 36 and 45 years old, has 10 to 12 years of investment experience, has earned a university degree, is male, occupies a senior position, invests a securities volume of about 50 to 100 thousand Euros and holds an equity share of 30 to 40%. Therefore, we have a sample of well-qualified investors.

Table 1 presents in columns 4 to 6 the answers disaggregated for three categories of investors, i.e. institutional investors, investment advisors and individual investors. Column 7 shows Kruskal-Wallis test results displaying whether the median answers from the three groups of investors are the same. This hypothesis is rejected four times. Regarding the age variable, individual investors are older than the two other groups. Regarding investment experience, individual investors have the shortest experience – despite their highest age. Comparing the two remaining groups, we find investment advisors' experience is different from institutional investors as there are more persons with shorter experience as well as more persons with very long experience of more than 15 years. Regarding hierarchy, individual investors occupy most senior positions on average, possibly reflecting their higher age. Investment advisors are the opposite with the low-

est share of leading positions, whereas institutional investors are in between the two other groups. Finally, regarding portfolio volume, the group of institutional investors stands out, as about a quarter of respondents own portfolios of the highest volume category, i.e. more than one million Euros. In contrast to these differences between groups, the groups are very similar to each other in the three remaining attributes: two thirds of participants have earned a university degree, almost all of them are male and the share of equities in the portfolios is not statistically different between groups although it varies extremely within groups.⁸

Many of these attributes have been compiled in earlier survey studies on investors in Germany and can thus be compared across various studies. In 2002, Menkhoff et al. (2006) conducted a survey on fund managers. As can be seen, our pool of institutional investors is not very different: it is slightly older, has a somewhat inferior education and contains a similar share of males (see [Appendix 1](#)). Regarding individual investors, demographic information about survey respondents from a June 2000 survey by Dorn and Huberman (2005) and UBS/Gallup participants studied by Graham et al. (2005) is quite similar to the characteristics of our individuals ([Appendix 1](#)). Respondents have wealth of more than 50,000 EUR, more than 60% of all participants have a college degree or better and the median age is about 40 to 50 years. When we compare our individual investors with information about the total population in Germany, it becomes obvious that our sample is distorted towards more qualified individual investors in a very similar way to the sample of Dorn and Huberman (2005) ..

In summary, our sample of investors in Germany is quite representative of institutional investors. Unfortunately, we do not know about any other study about investment advisors; regarding individual investors, our sample reflects characteristics of highly-qualified persons. This heightens the stakes to find any effect by professionalism on investment behavior because individual investors in our sample seem to be more similar to institutional investors than one would find for the overall population.

⁸ Unfortunately, the low variance of “gender” in our sample does not allow us to include this item in any

2.3 Participants' portfolio biases

In addition to participants' objective attributes – covered in Section 2.2 – we make use of the survey instrument to learn more about investors in the following sections. We do indeed find portfolio biases, i.e. too much home investment, too high portfolio turnover and too strong reluctance to loss realization.

The exact questions on domestic investment share, portfolio turnover and reluctance to loss realizations are summarized – as are all further survey questions and statements – in [Table 2](#). For our measure of home bias see item 1 in Table 2. We ask participants to allocate an amount of 10,000 € to five world regions. The share being invested in Germany, i.e. in the domestic country, is the figure of interest.⁹ [Figure 1](#) gives the frequency distribution of preferred domestic investment share. One can directly infer that only about 6% of these investors prefer a German investment share of up to 5% and less than 10% would invest up to 10% in Germany. The remaining 90% would thus invest more than 10% of their portfolio in the domestic country. The mean value of home investment is 29.6% and the median is still 20%.¹⁰ The figures for the groups of institutional investors, investment advisors and individual investors are 19.2 (17.5), 31.8 (25.0) and 31.5 (20.0) for the mean (median) respectively.

This preference contrasts with Germany's share in world stock market capitalization of 3-5% only, depending on the type of securities considered. So investment shares of 10% and more, as they characterize the preferences of about 90% of investors, can be qualified as home bias.

regression.

⁹ This measure of preferred home investment is thus undistorted by any regulatory requirements that effectively limit for example pension funds to invest abroad.

¹⁰ When one analyzes the share of home investment in absolute terms, the mean value of 30% seems rather low compared to earlier measures given in the literature for Germany (Lewis, 1999, Lütje and Menkhoff, 2004). A reason may be that our sample is probably biased towards more sophisticated investors as indicators of education, experience, equity share and volume reveal.

Accordingly, we simply take the share being invested in Germany – grouped into six categories – as the degree of home bias.¹¹

To measure our second portfolio bias of interest, i.e. portfolio churning, we relate portfolio turnover to portfolio volume (see item 2 in Table 2). Participants had to choose between four categories, where long-term buy and hold investors would select category 1 or possibly 2, whereas investors with a clear tendency towards portfolio churning would fall into categories 3 and 4 accordingly. Figure 2 gives the frequency distribution, showing that only about 10% of investors belong to the category with very low turnover and another 30% to the next category. 60% of our investors, however, have a turnover rate of more than 25%, 40% are even above 50%. Figures for the groups of investors, i.e. institutional investors, investment advisors and individual investors show that 30%, 40% and 43% respectively have an annual turnover of more than 50%. Assuming a rather conservative midpoint of 75% for the highest turnover category, the mean turnover rates for these three investor groups are roughly 38%, 43% and 44%.¹²

We will use these four categories of increasingly higher turnover as our measure of portfolio churning. We are aware that this is an imprecise measure because there may be very different motivations for transactions, such as pure liquidity motives or private information. However, the same criticism would also apply to a statistical figure being derived from bank accounts and is thus a price that has to be paid when analyzing turnover.

Finally, to measure our third portfolio bias, i.e. the reluctance to loss realization, we take the degree of approval to the statement that investors usually wait for a price recovery instead of selling those securities in case of loss positions (see item 3 in Table 2). Participants could answer

¹¹ Two qualifications have to be made here: First, Germany's share in bond markets is higher at about up to 7%. So, Germany's total share in world market capitalization may be up to 5%. Second, all investors who allocate 3-5% to Germany do not show any home bias. These qualifications are considered in our analysis, however, as we categorize the degree of home bias into six groups, starting with all investors in the same group who allocate less than 10% to the German market.

¹² Turnover figures vary considerably in the literature and seem to depend on investor and portfolio type. For example, investors with an online broker show higher turnover, such as roughly 75% p.a. (Barber and Odean, 2000, p.775) for a US case, or about 100% (Dorn and Huberman, 2005) for a German case, contrasted by the figure from US single 401(k) pension investments with turnover of 16% (Agnew et al., 2003, p.194). Graham et al. (2005) report a median transaction frequency of once a quarter.

with one of six categories, ranging from complete approval to complete disapproval. In theory, there is no reason to wait for a price recovery which is simply an orientation on past prices. In reality, however, the frequency distribution of answers in [Figure 3](#) shows that investors say to behave reluctantly to realize losses: 30% of the respondents rather agree with the statement and less than 25% completely disapprove. The figure also directly visualizes the difference between investor groups: whereas 40% of individual investors and even 43% of investment advisors rather agree with the statement, only 28% of institutional investors do so.

2.4 Three measures of professionalism

This section introduces our third measure of professionalism, which is related to the two other measures (see Section 2.2) but not the same. Nevertheless, all three measures of professionalism are inversely related to both portfolio biases.

Whereas the competent occupation of investors and their investment experience do not need further elaboration as measures of professionalism, our third measure does. The fourth item in Table 2 introduces this knowledge-based measure of professionalism. The question in this respect asks investors to give a 90%-interval within which they expect the DAX to develop over the next one-month period. Experts should give a more precise response. In particular, they should be aware that volatility can be predicted to some degree. Therefore, the degree of knowledge being incorporated in the answers can be identified by comparing the forecast given with the forecast generated by a simple GARCH (1,1) model. Thus, the variable “worse variance forecast” measures the absolute deviation of the investor's forecast from the model-generated forecast (as a percentage share and adjusted for the DAX point forecast), i.e. it captures investors' absolute variance forecast “errors” (Table 2, item 4). Therefore a higher value of this spread measures too large or too low interval forecasts and thus indicates poor market knowledge.

Interestingly, the knowledge measure of professionalism is not related to professional occupation in a statistically significant manner (see [Table 3](#)). More knowledgeable investors, how-

ever, tend to be more experienced (at a 6% level of significance only). Finally, institutional investors are more experienced than others, as we also know from Table 1. So the “worse variance variable” measures a different dimension of professionalism than the two other measures do. These other measures, occupation and experience, are closely related but not identical. Accordingly, these measures of professionalism will not necessarily have the same relation to further variables.

As we are interested in three portfolio biases, we examine – as a first approximation – correlations of professionalism measures with these biases. Table 3 shows that the biases are not significantly correlated to each other. Furthermore, the nine coefficients of correlation between three biases and three professionalism measures are not all statistically significant: occupation and experience seem to work unanimously against all three biases; knowledge does so against home bias only, whereas its relation to portfolio churning and reluctance to realize losses has the “correct” sign but fails to be significant.

We have thus gained a first insight into the relations of interest, which will be tested more appropriately in a regression approach in Section 3. This requires a more complete set of possibly relevant determinants of portfolio biases, which is discussed next.

2.5 Participants’ beliefs

Portfolio biases may be influenced by further determinants which are presented as items 5 to 11 in Table 2. Items 5 to 7 are general control variables of financial decision making, considering behavior towards risk in particular. The remaining items 8, 9 and items 10, 11 have been put forward in the explanation of our three portfolio biases.

To control the importance of professionalism in explaining portfolio biases, three variables are included which are obviously related to decision making in financial markets (see Table 2, items 5 - 7). First, the general attitude regarding risk aversion in professional investment decisions is asked for. Second, it has been shown that the disposition effect distorts investment deci-

sions and that institutional investors are less affected by the disposition effect than individual investors (Shapira and Venezia, 2001). Including a variable capturing the disposition effect thus allows disentangling the effect of a behavioral distortion from a pure professional effect. Third, a long-term forecasting horizon when making investment decisions may influence behavior and is thus elicited (Klos et al., 2005).

Descriptive information about these variables is presented in [Table 4](#). The variables' distributions for institutional investors, investment advisors and individual investors show that investors classify themselves as being somewhat less risk averse than the calculatory mean of 3.5 and that classification does not differ between groups. Regarding the question of a possible disposition effect, groups' answers are again not significantly different. Finally, forecasting horizon when making investment decisions is distributed around "2-6 months" as the median and modus. In this respect, individual investors have a significantly shorter horizon than the two other groups.

The following two items 8 and 9 in Tables 2 and 4 address the issue of appropriate self-evaluation. We know that people tend to overestimate their performance and their information. It is thus not surprising that almost all investors in our sample think of themselves as having better performance and information than other investors. We understand the relative performance question (item 8) as a conventional "better-than-average" measure of overconfidence (Glaser and Weber, 2005). Somewhat different from this, the question on a relative level of information (item 9) also captures perceived knowledge. The perception of being more knowledgeable is a core element of the Graham et al. (2005, p.9) understanding of competence. As a cautious warning, we notice the benchmark of self-evaluation, which is here defined as "other investors". It may well be that our sample is not so much overconfident but indeed superior to other investors. This applies in particular to the significant differences between more confident institutional and less confident individual investors, whereas the high self-evaluation of investment advisors is more surprising.

The last two items 10 and 11 are relevant for the issue of home bias only (see French and Poterba, 1991). To capture a possible impact from asymmetric information between domestic and foreign investors, it is stated whether domestic investors benefit from information advantages when compared to foreign investors. Due to the categories' coding used in the analysis, a positive relation with higher home bias means that these investors do not think to benefit from an information advantage. Thus, the abbreviation for this item is "less domestic information advantage". The distributions in Table 4 show that the belief in a domestic information advantage is not so strong because answers tend slightly towards contradiction than approval. Interestingly, individual investors believe least in a domestic information advantage and investment advisors most.

Finally, investors are asked to give their return expectation for Germany's leading stock market index, the DAX. A higher share of investments at home would make sense if return optimism for the DAX were higher too. However, we recognize from Table 4 that return expectations of respondents are distributed around zero with comparatively large standard deviations. Note that differences *within* groups are large whereas differences *between* the three groups are not statistically significant.

Up to this point of analysis, lessons from descriptive statistics tentatively confirm earlier findings and indicate that professionalism may lead to lower portfolio biases. The complex relations give a strong warning, however, not to rely too early on univariate analyses but to perform multivariate regressions. This is done in the following section.

3 Regression analysis

The many determinants of portfolio biases found in the literature as well as our own descriptive statistics (see Section 2) call for a multivariate approach. We do indeed find that a bunch of determinants robustly holds when considered in the same framework. All three meas-

ures of professionalism are among these robust determinants. To make the message even stronger, all three measures hold simultaneously, indicating the different aspects of professionalism being captured. We present results for home bias in Section 3.1, for portfolio churning in Section 3.2 and for the reluctance to loss realization in Section 3.3. Finally, we compare results for the three portfolio biases in Section 3.4.

3.1 Results for home bias

Our regression explaining the share of domestic investment includes as right hand variables the main determinants from earlier research, i.e. information advantage, return optimism and higher age. In addition, and even when considering further variables, we find that more professionalism in all three aspects reduces home bias.

In a first regression, all relevant variables that have been discussed in Section 2 are included in an ordered logit regression. The dependent variable is a categorical transformation of our domestic investment variable, since this original variable lies in the interval $[0,1]$ and is thus not well captured by standard linear regression models. Therefore, we make use of the ordered nature of our data and form six different categories: $[0,10)$, $[10,30)$, $[30,50)$, $[50,70)$, $[70,90)$, $[90,100]$. The two smaller categories in the left-hand and right-hand margins are used to capture the observed extreme realizations of home bias.

Results of this ordered logit model are given in [Table 5](#), column 1. As can be seen, all three measures of professionalism are statistically highly significant: institutional investors have a lower home bias than the two other groups, i.e. investment advisors and individual investors. More experienced investors have a lower home bias and a worse variance forecast is related to more home bias.

Further variables are presented in the order of our earlier discussion (see Tables 2 and 4). Coming to the group of personal characteristics as the next group of variables, we find that older investors prefer home assets compared to younger ones. Whereas this determinant has been

found by Karlsson and Nordén (2004) and Lütje and Menkhoff (2004) before, further determinants that have been claimed by Karlsson and Nordén (2004) are not significant in the extended approach here. This refers to share of equities and more portfolio volume, i.e. higher wealth, and also to better education and more senior position.¹³

Next, let us discuss the group of further controls to single out the effect from professionalism. One can recognize in this regression that the degree of general risk aversion is not important. By contrast, a smaller disposition reduces home bias, independent of the professionalism of the investor. We see this as further evidence for the disturbing power of the disposition effect in financial decision making. Moreover, the variable longer forecasting horizon has some influence in reducing home bias but is significant at the 10% level in this specification only. The last two variables of this group, capturing self-assessment, are not relevant here.

Finally, we have added two variables specifically to explain high domestic investments. Indeed, one can see from our survey, too, that a perceived information advantage leads to more home bias. Another very robust variable is DAX optimism, which also leads to more home bias. These two variables – capturing information/transaction costs and return optimism – are among the best-established determinants of home bias according to earlier studies and it is thus reassuring that they also hold here.¹⁴ This is despite the different method for data compilation, the questionnaire survey, and despite many more control variables that are included here than before.

As robustness checks we test further specifications. First, we leave out four statistically insignificant variables which have had less importance in earlier studies; this does not affect results (Table 5, column 2). Second, due to the focus on professionalism, we run a set of further regressions where the measures of professionalism are considered one after the other. The results presented in columns 3 - 5 in Table 5 show that each of the professionalism measures keeps its

¹³ In order to come closer to a replication of Karlsson and Nordén (2004), we have run a regression explaining individual investors' home bias solely by these personal characteristics. We find that in this case higher age and also investment volume (as a proxy for wealth) significantly reduce home bias.

¹⁴ One may question the meaning of the information advantage variable as it is measured as a subjective assessment and does not necessarily mean that an information advantage exists.

expected sign and significance. The same applies to the main other determinants, whereas some variables of minor importance may lose or gain marginal significance. Third, we include only statistically significant variables in the regression. Column 6 shows that the variable forecasting horizon then loses significance but that all three measures of professionalism remain.

All of these three professionalism variables are also significant in economic terms, as documented in [Appendix 2](#), Panel A. This panel shows marginal effects evaluated at variables' medians for the ordered logit model according to specification (6) in Table 5. As can be seen, being an institutional investor increases the probability of being in the “low home bias” categories ($w \leq 30\%$) – which has an unconditional probability of about 60% – by more than 21%.¹⁵ Increasing the level of experience by e.g. three categories increases the probability of being in the low home bias categories by more than 12% whereas increasing the variance forecast error by one percent decreases the low home bias probability by more than one percent.

Overall, the strong message emerges that professionalism has an unambiguous impact on home bias: more professionalism reduces home bias. This positive consequence for portfolio allocation holds for two ways of being more professional, first in the sense of incorporating more aspects of professionalism (occupation, experience and knowledge) as well as in the sense of commanding a higher degree of professionalism in each aspect (working as institutional investor instead of as investment advisor, being more experienced, giving more precise variance forecasts).

3.2 Results for portfolio churning

Our regressions explaining portfolio turnover are run in parallel to the above presented regressions on home bias. The result regarding professionalism also matches the above finding: all three measures of professionalism robustly keep their significance and indicate that more professional investors are less subject to portfolio churning.

¹⁵ This can be seen by adding the first two entries in the table corresponding to the “institutional investors” variable (i.e. $0.077+0.135 = 0.212 \approx 21\%$).

As the variable portfolio turnover has four categories it can be used directly in an ordered logit approach. [Table 6](#) gives results for various specifications in explaining turnover. We start – as we did in Section 3.1 – with a regression including all possibly relevant variables (column 1). As can be seen, the three professionalism variables have the expected sign and are statistically significant.

Turning to the personal characteristics, two variables are significant here, i.e. age and volume: younger and wealthier investors have higher turnover.

Coming to the group of control variables, we find several significant relations. First, less risk-averse investors have higher turnover. Second, investors with a longer forecasting horizon have lower turnover. Third, confident investors, who believe to perform better in their investment decisions, show higher turnover. If we leave out only the variable “less performance than others” (see column 2) the variable “less information than others” attracts some of the former explanatory power but does not become significant. Interestingly, the disposition effect is not important in explaining portfolio churning. These results are very similar to those found in Dorn and Huberman (2005, Table 9). They also find experience, knowledge (differently defined than here), wealth, risk aversion and overconfidence (in their study: perceived own knowledge relative to others) to explain turnover as we do.¹⁶

As further robustness checks, we leave out three insignificant variables and also only ever include one of the three professionalism measures (columns 3 – 5). Results are not too much affected. In particular, the professionalism measures are always statistically significant. A last regression is presented in column 6, where all insignificant variables are excluded, among them the portfolio volume which has turned insignificant. Again, professionalism keeps its high importance.

¹⁶ They also find men to exhibit more turnover, a variable which cannot be used in our sample, whereas we find occupation and forecasting horizon to be significant, two variables that are not included in Dorn and Huberman (2005). The only variable that comes out somewhat differently is age, which loses significance in Dorn and Huberman (2005) when they use a larger set of controls.

Marginal effects at variables' medians for the last specification (6) in Table 6 are shown in Appendix 2, Panel B. Being an institutional investor increases the probability of being in one of the “low turnover categories” (i.e. $x \leq 25\%$ p.a.) – which has an unconditional probability of about 25% – by 12.5% and raising the experience level by three categories increases the probability of a low turnover by more than 6%. A one percent increase in the variance forecast error lowers the probability of having a low turnover by 0.7%. This again highlights the economic significance of the professionalism variables.

Overall, professionalism has a strong impact on portfolio churning as it reduces the bias. This works, in parallel to the impact on home bias (Section 3.1), in two ways: first, all three aspects of professionalism are helpful (occupation, experience and knowledge) and thus add their impact to each other and, second, higher degrees of professionalism reduce the bias too, such as being more experienced etc.

3.3 Results for reluctance to loss realization

Our regressions explaining reluctance to loss realization are again performed in parallel to the earlier regression in Section 3.1 and 3.2. The result also fits in this line: all three measures of professionalism indicate that more professional investors are less reluctant to realize losses in their portfolios.

The variable “reluctance to loss realization” has six categories and is thus analyzed in an ordered logit approach. [Table 7](#) gives results for similar specification as for the other biases analyzed before. What stands out is that there are less significant variables than in the earlier regressions. Interestingly, the three professionalism variables belong to this group. By contrast, personal characteristics do not seem to be relevant here. Among the control variables, having less disposition effect and a longer forecasting horizon reduce the portfolio bias. This result holds though all six specifications with one slight qualification in specification (5) where the knowledge measure of professionalism marginally falls out of the 5% significance interval.

As the reluctance to loss realization can be seen and is often analyzed as one element of the disposition effect (e.g. Odean, 1998), one may question whether the disposition effect variable is exogenous. However, eliminating it from all regressions does not qualitatively change the picture (this also holds for the regressions in Tables 5 and 6).

Marginal effects for the reluctance to loss realization variable can be found in Appendix 2, Panel C, which is based on the last specification (6) in Table 7. As can be inferred, being an institutional investor decreases the probability of being in one of the three categories of low reluctance by 13.4%. This is clearly of economic significance since these three categories of low reluctance have an unconditional probability of 39%. Similarly, increasing experience by three categories increases the probability of low reluctance by almost 11%. Finally, increasing knowledge (as measured by the variance forecast) by one percent increases the probability of having a low reluctance to loss realization by more than one percent.

In summary, all aspects of professionalism seem to be helpful in also reducing this third and costly portfolio bias analyzed here.

As we have learned about determinants of home bias, of portfolio churning and of the reluctance to loss realization, it seems consistent to ask for possible common factors and differences.

3.4 Comparing the three portfolio biases

A comparative analysis of the determinants of home bias and portfolio churning shows that these are three different problems in investment behavior. However, there is one common lesson: professionalism reduces the biases.

Going through the regressions just discussed in Sections 3.1 to 3.3, the three measures of professionalism are the only variables that are always significant and keep their sign. As all other variables enter either only one or two regressions or change sign (the age variable), we understand that the three portfolio biases are different phenomena. Home bias is – beyond profession-

alism, information advantage and return optimism – driven by higher age and more disposition effect. Age can be understood as proxy of higher risk aversion and the disposition effect (t holding on to losing assets) could be seen as behavior to avoid (wrong) decisions. By contrast, portfolio churning is – beyond professionalism – driven by age, risk aversion, forecasting horizon and a perceived better performance than others. Here, one may recognize a driving force in tentatively overconfident, risk-taking activism. Finally, reluctance to loss realization is – beyond professionalism – only influenced by a higher disposition effect (which is related to the endogenous variable) and by a shorter forecasting horizon. In a sense, the three portfolio biases are thus driven by rather divergent motivations.

This rather divergent origin of home bias, portfolio churning and reluctance to loss realization makes the result on professionalism even more interesting: a relevant professional occupation, investment experience and knowledge about markets all help to improve investment behavior – in the case of home bias professionalism helps to overcome unjustified risk aversion, in the case of portfolio churning professionalism helps to reduce unjustified activism and in the case of reluctance to loss realization professionalism helps to cut losses early.

4 Conclusions

Recent studies have found that professionals do not necessarily perform better on (financial) markets than laymen. Therefore, it is not clear ex ante whether more professional investors show less portfolio biases. Do they diversify their portfolios more internationally than less professional ones, do they abstain from very high portfolio turnover and can they more easily sell loss-making positions? To examine these issues we (have) asked about 500 German investors via a questionnaire survey about objective attributes as well as about their beliefs.

Regarding their preferred international asset allocation, these investors show a clear home bias as they would invest about 30% of a world-wide portfolio in Germany, compared to Germany's share in world capital markets of less than 5%. It seems noteworthy that the preferred

international capital allocation is not hindered by any regulation (e.g. an important restriction for pension funds in Germany) and is thus more informative than simple figures of an actual international investment share.

Regarding their actual portfolio turnover, these investors tend to display portfolio churning as mean turnover is roughly about 50% per year. This is clearly much higher than can be explained by liquidity motives alone and indicates that investors are heavily engaged in speculation.

Regarding their willingness to sell loss positions, these investors show a clear reluctance to loss realization as less than 25% of them do not wait for a price recovery at all before selling loss positions. Obviously, investment decisions of most investors are influenced by historical prices.

We introduce three measures of professionalism: first, occupation is important as institutional investors seem to be more professional (for investment decisions) than investment advisors and individual investors in particular. Second, more experience should improve professional behavior and – third – more accurate variance forecasts might be a useful indicator of professionalism beyond occupation and experience. We find, indeed, that all three measures of professionalism explain lower home bias, lower portfolio churning and less reluctance to loss realization as theoretically expected.

Next, we make use of the comparative advantage of a questionnaire survey by incorporating a wealth of information about investor characteristics and beliefs. We use this information to conduct regressions based on a broad set of control variables. Ordered logit models reveal that only professionalism measures keep their significance and sign in explaining the portfolio biases. Other variables, however, are either not significant in this approach (including wealth of investors), or change sign (the age variable) or are significant in only one or two of the three cases. Home bias is related to more disposition effect (in addition to information advantage and return optimism), portfolio churning is related to less risk aversion, shorter forecasting horizon and more overconfidence and reluctance to loss realization is related to a shorter forecasting horizon.

In summary, there is an unambiguous and statistically very robust answer to our question: yes, professionalism reduces portfolio biases. This holds for three measures of professionalism and it holds against several control variables proposed in the literature. It would be interesting to learn whether this finding is robust to other samples and further biases.

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Table 1. Survey participants' objective attributes

		Responses (in percent)				KW Test
		all	Institutional investors	Investment advisors	Individual investors	
Age	<25 years	4.2	0.0	5.3	4.9	4.23 **(0.00)
	25-35	28.6	39.0	42.1	23.3	
	36-45	34.8	50.6	38.2	30.5	
	46-55	19.7	10.4	11.8	23.5	
	56-65	9.5	0.0	2.6	13.1	
	>65	3.2	0.0	0.0	4.7	
	obs	497	75	78	344	
(Investment) Experience	<4 years	5.1	2.7	0.0	7.0	3.39 **(0.00)
	4-6	20.9	9.5	21.1	23.7	
	7-9	18.0	14.9	11.8	20.3	
	10-12	13.3	21.6	5.3	13.3	
	13-15	9.8	14.9	13.2	7.7	
	>15	32.9	36.5	48.7	28.0	
	obs	497	75	78	344	
University degree (yes)		66.8	62.3	63.5	68.6	0.17 (0.87)
	obs	485	75	76	334	
Gender (Male)		0.98	0.96	0.98	0.96	0.11 (0.92)
	obs	497	75	78	344	
Hierarchy	Junior	16.8	17.6	25.0	13.3	2.83 **(0.01)
	Senior	43.1	52.7	54.7	34.3	
	Head of ...	40.1	29.7	20.3	52.4	
	obs	477	74	74	329	
(Portfolio) Volume in thousand EUR [†]	$0 \leq x \leq 10$	14.62	10.77	12.5	15.89	1.81 (0.07)
	$10 < x \leq 50$	33.87	33.85	31.25	34.44	
	$50 < x \leq 250$	33.41	24.62	45.31	32.78	
	$250 < x \leq 1.000$	10.44	6.15	7.81	11.92	
	$x > 1.000$	7.66	24.62	3.13	4.97	
	obs	491	74	77	340	
Share of equities [‡]	$0 \leq x \leq 20\%$	35.81	32.00	30.77	37.79	0.60 (0.55)
	$20 < x \leq 40\%$	19.52	25.33	16.67	18.90	
	$40 < x \leq 60\%$	16.30	16.00	19.23	15.70	
	$60 < x \leq 80\%$	14.89	10.67	20.51	14.53	
	$80 < x \leq 100\%$	13.48	16.00	12.82	13.08	
	obs	497	75	78	344	

[†] Total investment volume[‡] Share of equities denotes the share of total investment volume that is invested in equities

Table 2. Further survey questions and statements

Item	Question, statement	Categories
1. More home bias	Please allocate an amount of 10,000 € on the following regions so that shares add up to 100 percent. 5 regions: Germany, Europe (ex Germany), USA and Canada, Asia, Emerging Markets.	In percent between 0 and 100.
2. Higher turnover	What is your annual turnover (sum of buy and sell transaction volume) relative to the total volume of your portfolio?	4 categories (1 = <10%, 2 = 10-25%, 3 = 25-50%, 4 = >50%).
3. Less reluctance to loss realization	I generally wait for a price recovery of a loss position, instead of selling this position.	6 categories from "complete approval" (coded as 1) to "complete disapproval" (coded as 6)
4. Worse variance forecast	Please give a range within which the index will fall with a probability of 90%.	Absolute difference between the width of the range divided by the individual forecast and the width of a GARCH(1,1) forecast divided by the point forecast.
5. Less risk averse	Please classify your personal risk taking: With respect to professional investment decisions, I mostly act...	6 categories from "very risk averse" (coded as 1) to "little risk averse" (coded as 6)
6. Less disposition effect	I prefer to take profits when I am confronted with unexpected liquidity demands.	6 categories from "complete approval" (coded as 1) to "complete disapproval" (coded as 6)
7. Longer forecasting horizon	What is your typical personal forecasting horizon when making investment decisions?	5 categories from "Days" (coded as 1), "Weeks", "2-6 Months", "6-12 Months" to "Years" (coded as 5)
8. Less performance than others	How good is your investment performance relative to other investors?	7 categories from "much better" (coded as 1) to "much worse" (coded as 7).
9. Less information than others	How high is the degree of your information relative to other investors?	7 categories from "much better" (coded as 1) to "much worse" (coded as 7).
10. Less domestic information advantage	As a domestic investor I benefit from better information compared to foreign market players.	6 categories from "complete approval" (coded as 1) to "complete disapproval" (coded as 6)
11. Higher Dax optimism	Please estimate the development of the DAX within the next month.	Point forecast (converted into return forecast).

Figure 1. Distribution of the share of investment in domestic stocks

This figure shows the distribution of the share of investment in domestic stocks (w) for all investors in the left panel. Bars show the percentage response (LHS) in a given 5% interval shown on the x-axis. The solid line shows the cumulative percentage response (RHS). The right panel shows percentage responses separately for the three investor groups in a given percentage interval (x-axis).

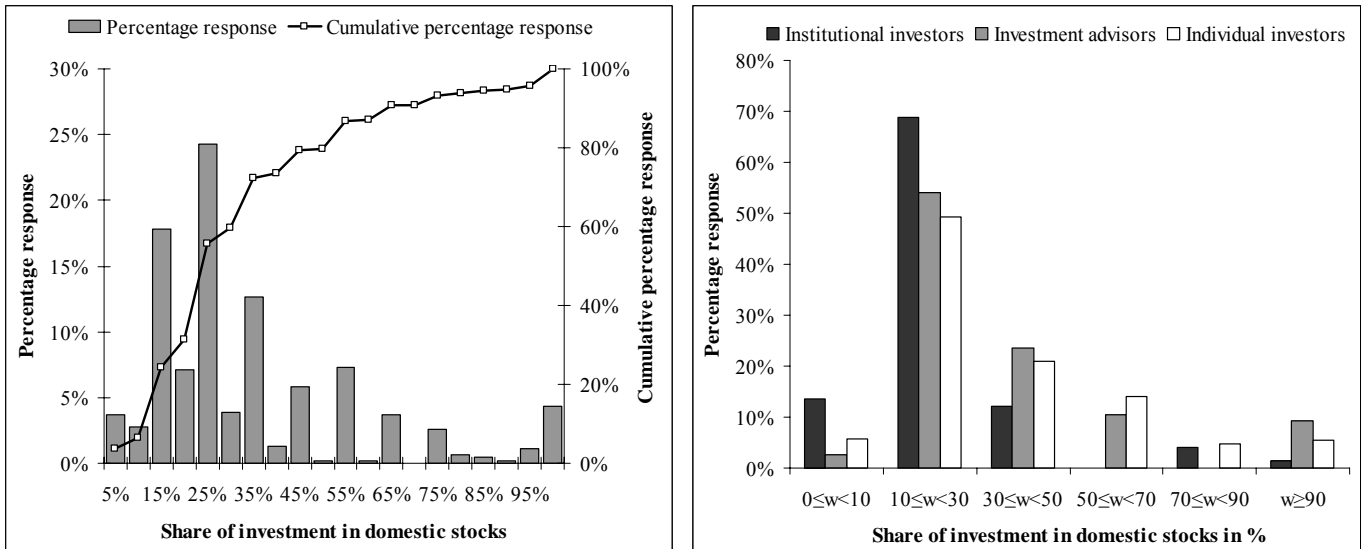


Figure 2. Distribution of annual portfolio turnover

This figure shows the distribution of annual portfolio turnover (x) for all investors in the left panel. Bars show the percentage response (LHS) in a given interval (x -axis). The solid line shows the cumulative percentage response (RHS). The right panel shows percentage responses separately for the three investor groups in a given percentage interval (x -axis).

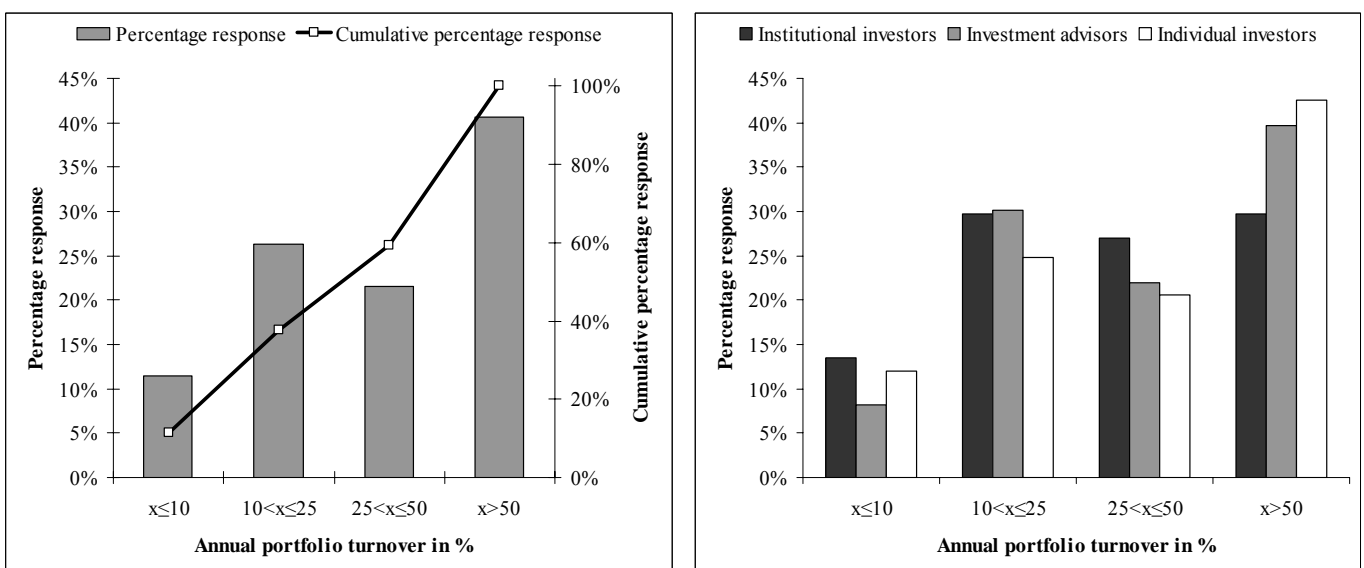
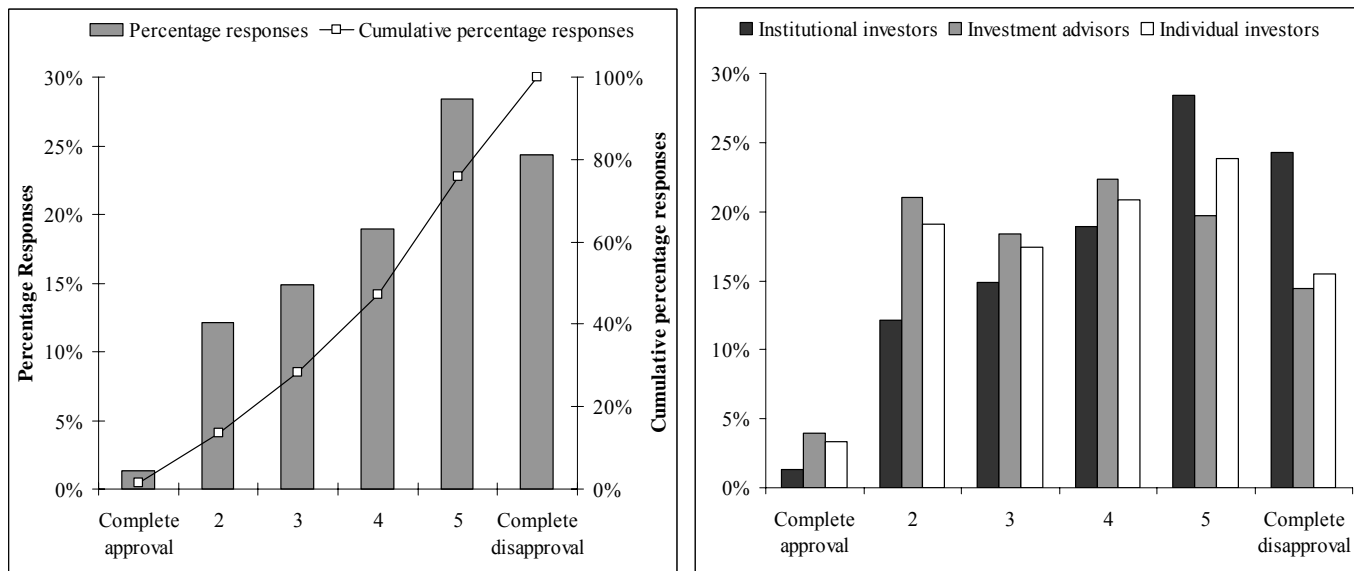


Figure 3. Distribution of the reluctance to loss realization

This figure shows the distribution of the reluctance to loss realization for all investors in the left panel. Bars show the percentage response (LHS) in a given approval category (x-axis). The solid line shows the cumulative percentage response (RHS). The right panel shows percentage responses separately for the three investor groups in a given approval category (x-axis).

**Table 3. Correlation of measures of professionalism**

This table shows rank correlation coefficients of professionalism measures with portfolio biases. Stars refer to a significance level of: **: 0.01, *: 0.05.

	Institutional investors	Investment advisors	More experienced	Worse variance forecast	More Home Bias	Higher turnover
Institutional investors	1.00					
Investment advisors		1.00				
More experienced	0.12 *(0.01)	0.14 **(0.00)	1.00			
Worse variance forecast	-0.02 (0.63)	-0.01 (0.92)	-0.09 (0.06)	1.00		
More Home Bias	-0.22 **(0.00)	0.06 (0.21)	-0.12 *(0.01)	0.07 (0.12)	1.00	
Higher turnover	-0.10 *(0.03)	0.00 (0.95)	-0.23 **(0.00)	0.06 (0.19)	0.07 (0.15)	1.00
Less reluctance to loss realization	0.12 **(0.01)	-0.06 (0.23)	0.18 **(0.00)	-0.14 **(0.00)	-0.02 (0.65)	-0.05 (0.29)

Table 4. Responses in percent and descriptive statistics

Item		all	Institutional investors	Investment advisors	Individual investors	KW Test
4. Worse variance forecast	Mean	6.09	6.16	6.00	6.10	0.28 (0.87)
	Median	5.23	4.83	5.35	5.36	
	Minimum	0.01	0.13	0.01	0.07	
	Maximum	30.15	26.65	28.06	30.15	
	obs	450	74	76	300	
5. Less risk averse	Very risk averse	0.65	0.00	1.32	0.63	0.52 (0.77)
	2	9.68	8.11	7.89	10.48	
	3	15.05	22.97	14.47	13.33	
	4	20.86	21.62	19.74	20.95	
	5	35.27	27.03	38.16	36.51	
	Little risk averse	18.49	20.27	18.42	18.10	
obs	465	74	76	315		
6. Less disposition effect	Complete approval	6.85	1.37	6.49	8.13	0.91 (0.63)
	2	18.88	20.55	18.18	18.67	
	3	24.07	24.66	29.87	22.59	
	4	21.16	26.03	23.38	19.58	
	5	13.90	10.96	9.09	15.66	
	Complete disapproval	15.15	16.44	12.99	15.36	
obs	482	73	77	332		
7. Longer forecasting horizon	Days	14.88	9.33	11.69	16.87	6.41 *(0.04)
	Weeks	22.73	18.67	15.58	25.30	
	2-6 months	31.20	37.33	36.36	28.61	
	6-12 months	18.60	22.67	20.78	17.17	
	Years	12.60	12.00	15.88	12.05	
	obs	484	75	77	332	
8. Less performance than others	Much better	12.63	13.33	19.48	10.91	27.67 **(0.00)
	2	15.07	28.00	22.08	10.62	
	3	25.25	28.00	29.87	23.60	
	4	35.64	25.33	24.68	40.41	
	5	5.91	2.67	2.60	7.37	
	6	3.05	1.33	0.00	4.13	
	Much worse	2.44	1.33	1.30	2.95	
obs	491	75	77	339		
9. Less information than others	Much better	30.55	56.00	49.35	20.65	57.02 **(0.00)
	2	28.31	21.33	32.47	28.91	
	3	17.72	12.00	14.29	19.76	
	4	20.57	10.67	3.90	26.55	
	5	1.22	0.00	0.00	1.77	
	6	1.02	0.00	0.00	1.47	
	Much worse	0.61	0.00	0.00	0.88	
obs	491	75	75	339		
10. Less domestic information advantage	Complete approval	2.70	2.78	3.90	2.40	6.33 *(0.04)
	2	16.80	22.22	20.78	14.71	
	3	26.76	20.83	35.06	26.13	
	4	18.46	25.00	11.69	18.62	
	5	20.95	15.28	19.48	22.52	
	Complete disapproval	14.32	13.89	9.09	15.62	
	obs	482	72	77	333	
11. Higher DAX optimism	Mean	-0.72	-0.25	-0.88	-0.79	1.16 (0.56)
	Standard deviation	4.83	4.50	4.50	4.99	
	Skewness	-0.68	-0.54	-1.06	-0.62	
	Kurtosis	5.53	3.37	6.52	5.63	
	obs	450	74	76	300	

Table 5. Determinants of (more) home bias

Dependent variable: home bias (6 categories [†])						
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional investors	-0.887 (0.003)	-0.882 (0.003)	-1.047 (0.000)			-1.041 (0.000)
Investment advisors	0.345 (0.216)	0.306 (0.251)	0.066 (0.793)			
More experienced	-0.220 (0.002)	-0.202 (0.003)		-0.257 (0.000)		-0.183 (0.002)
Worse variance forecast	5.434 (0.008)	4.923 (0.014)			5.094 (0.011)	4.550 (0.022)
Higher age	0.309 (0.002)	0.271 (0.005)	0.153 (0.077)	0.308 (0.001)	0.203 (0.015)	0.232 (0.010)
University degree	0.073 (0.714)					
More senior	0.109 (0.633)					
Higher share of equities	0.001 (0.654)	0.002 (0.469)	0.003 (0.409)	0.003 (0.345)	0.003 (0.3454)	
More volume	-0.000 (0.996)	0.004 (0.0958)	-0.058 (0.360)	-0.013 (0.843)	-0.078 (0.211)	
Less risk averse	-0.032 (0.703)	-0.039 (0.623)	-0.051 (0.514)	-0.033 (0.675)	-0.050 (0.517)	
Less disposition effect	-0.169 (0.011)	-0.172 (0.007)	-0.180 (0.005)	-0.176 (0.006)	-0.191 (0.003)	-0.174 (0.006)
Longer forecasting horizon	-0.164 (0.057)	-0.148 (0.075)	-0.184 (0.025)	-0.149 (0.072)	-0.184 (0.025)	
Less performance than others	-0.045 (0.630)					
Less information than others	0.046 (0.626)					
Less domestic information advantage	-0.166 (0.020)	-0.166 (0.018)	-0.169 (0.016)	-0.159 (0.022)	-0.155 (0.025)	-0.173 (0.012)
Higher Dax optimism	0.047 (0.021)	0.053 (0.009)	0.052 (0.010)	0.048 (0.017)	0.048 (0.018)	0.055 (0.006)
Constant 1	-4.571	-4.511	-4.745	-4.259	-4.098	-4.146
Constant 2	-1.046	-1.106	-1.385	-0.948	-0.826	-0.794
Constant 3	0.051	-0.023	-0.323	0.113	0.219	0.289
Constant 4	1.015	0.960	0.627	1.090	1.179	1.265
Constant 5	1.693	1.629	1.264	1.756	1.830	1.929
LRT (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.061	0.057	0.044	0.046	0.036	0.053

[†] The variable home bias is measured in categories, ranging from $0 \leq w \leq 10\%$ (coded as 1), $10 < w \leq 30\%$ (coded as 2), ..., $70 < w \leq 90\%$ (coded as 5) to $90 < w \leq 100\%$ (coded as 6). All p-values are based on a bootstrap with 250 replications for the respective specification. Bold numbers represent coefficient estimates that are significant at least on the level of five percent.

Table 6. Determinants of (higher) turnover

Dependent variable: turnover (4 categories)						
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional investors	-0.694 (0.020)	-0.650 (0.026)	-0.782 (0.005)			-0.608 (0.023)
Investment advisors	-0.384 (0.189)	-0.242 (0.388)	-0.515 (0.061)			
More experienced	-0.162 (0.027)	-0.137 (0.065)		-0.195 (0.007)		-0.157 (0.030)
Worse variance forecast	4.749 (0.004)	4.56 (0.004)			4.472 (0.004)	4.241 (0.007)
Higher age	-0.282 (0.002)	-0.309 (0.001)	-0.302 (0.000)	-0.172 (0.040)	-0.259 (0.001)	-0.204 (0.017)
University degree	-0.219 (0.318)	-0.178 (0.412)				
More senior	0.225 (0.308)	0.239 (0.269)				
Higher share of equities	0.004 (0.228)	0.003 (0.342)	0.004 (0.183)	0.004 (0.186)	0.004 (0.214)	
More volume	0.177 (0.019)	0.218 (0.004)	0.104 (0.155)	0.151 (0.053)	0.097 (0.191)	
Less risk averse	0.396 (0.000)	0.379 (0.000)	0.413 (0.000)	0.400 (0.000)	0.388 (0.000)	0.436 (0.000)
Less disposition effect	-0.007 (0.927)	0.064 (0.353)	-0.003 (0.096)	0.002 (0.782)	0.002 (0.975)	
Longer forecasting horizon	-0.562 (0.000)	-0.571 (0.000)	-0.584 (0.000)	-0.564 (0.000)	-0.603 (0.000)	-0.547 (0.000)
Less performance than others	-0.373 (0.000)		-0.345 (0.000)	-0.310 (0.000)	-0.275 (0.001)	-0.347 (0.000)
Less information than others	0.028 (0.775)	-0.138 (0.127)				
Constant 1	-4.711	-3.326	-4.284	-4.138	-3.610	-4.096
Constant 2	-2.836	-1.497	-2.422	-2.280	-1.763	-2.213
Constant 3	-1.656	-0.355	-1.274	-1.128	-0.617	-1.060
LRT (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.133	0.118	0.124	0.121	0.118	0.128

All p-values are based on a bootstrap with 250 replications for the respective specification. Bold numbers represent coefficient estimates that are significant at least on the level of five percent.

Table 7. Determinants of (less) reluctance to loss realization

Dependent variable: reluctance to loss realization (6 categories)						
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional investors	0.618 (0.034)	0.611 (0.021)	0.723 (0.011)			0.616 (0.010)
Investment advisors	-0.138 (0.612)	-0.152 (0.560)	-0.021 (0.929)			
More experienced	0.167 (0.012)	0.166 (0.011)		0.181 (0.006)		0.155 (0.004)
Worse variance forecast	-4.059 (0.042)	-4.043 (0.028)			-4.030 (0.059)	-4.657 (0.023)
Higher age	-0.038 (0.706)	-0.035 (0.764)	0.060 (0.563)	-0.078 (0.424)	0.020 (0.828)	
University degree	0.058 (0.771)	0.055 (0.776)				
More senior	0.278 (0.282)	0.275 (0.289)				
Higher share of equities	0.001 (0.577)	0.002 (0.590)	0.002 (0.538)	0.001 (0.623)	0.001 (0.654)	
More volume	-0.067 (0.270)	-0.070 (0.310)	-0.026 (0.705)	-0.061 (0.359)	-0.020 (0.763)	
Less risk averse	0.087 (0.298)	0.088 (0.275)	0.093 (0.196)	0.074 (0.325)	0.086 (0.267)	
Less disposition effect	0.282 (0.000)	0.276 (0.000)	0.284 (0.000)	0.273 (0.000)	0.288 (0.000)	0.234 (0.000)
Longer forecasting horizon	0.212 (0.012)	0.214 (0.008)	0.242 (0.002)	0.219 (0.004)	0.243 (0.003)	0.201 (0.010)
Less performance than others	0.037 (0.658)					
Less information than others	0.150 (0.089)	0.164 (0.064)	0.117 (0.172)	0.136 (0.088)	0.082 (0.362)	0.165 (0.057)
Constant 1	-0.860	-0.960	-0.839	-0.922	-1.385	-1.354
Constant 2	1.415	1.312	1.399	1.328	0.853	0.884
Constant 3	2.361	2.257	2.321	2.257	1.774	1.798
Constant 4	3.305	3.202	3.248	3.182	2.695	2.726
Constant 5	4.607	0.164	4.536	4.465	3.970	4.019
LRT (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.041	0.040	0.032	0.032	0.029	0.036

All p-values are based on a bootstrap with 250 replications for the respective specification. Bold numbers represent coefficient estimates that are significant at least on the level of five percent.

Appendix 1. Relating our sample to other surveys

	Individual investors			Institutional investors	
	This research (2006)	Dorn and Huberman (2005)	Graham et al. (2005)	This research (2006)	Menkhoff et al. (2006)
Data source	Participants at regular financial online survey	Survey at clients of an online broker	UBS Gallup Investor Survey	Participants at regular financial online survey	Survey of German fund managers
Share of male	96%	88%	59%	96%	92%
Age, median (years)	~ 40	38	48	~40	~35
Wealth, median (thousand EUR)	>50	~80	55 ^(*)	~150	n.a.
College degree	>67%	70%	~60%	>65%	>84%

^(*) Household investment in USD

Appendix 2. Marginal effects at variable medians

This table shows marginal effects for the ordered logit models documented in tables 5 and 6, respectively. Panel A shows marginal effects for the home bias regressions (table 5, specification 6), Panel B shows marginal effects for the turnover regressions (table 6, specification 6) and Panel C marginal effects for the reluctance to loss realization (table 7, specification 6). All marginal effects are evaluated at variable medians.

Panel A: Marginal effects for determinants of home bias						
Variable	Pr($0 \leq w \leq 10$)	Pr($10 < w \leq 30$)	Pr($30 < w \leq 50$)	Pr($50 < w \leq 70$)	Pr($70 < w \leq 90$)	Pr($w > 90$)
Institutional investors	0.077	0.135	-0.099	-0.062	-0.023	-0.028
More experienced	0.008	0.036	-0.016	-0.015	-0.006	-0.008
Worse variance forecast	-0.002	-0.009	0.004	0.004	0.002	0.002
Higher age	-0.011	-0.045	0.020	0.018	0.008	0.010
Less disposition effect	0.008	0.034	-0.015	-0.014	-0.006	-0.007
Less domestic information advantage	0.008	0.034	-0.015	-0.014	-0.006	-0.007
Higher Dax optimism	-0.003	-0.011	0.005	0.004	0.002	0.002
unconditional probability	0.048	0.543	0.219	0.109	0.038	0.043

Panel B: Marginal effects for determinants of turnover				
Variable	Pr($x \leq 10$)	Pr($10 < x \leq 25$)	Pr($25 < x \leq 50$)	Pr($x > 50$)
Institutional investors	0.035	0.090	0.018	-0.144
More experienced	0.005	0.016	0.007	-0.028
Worse variance forecast	-0.002	-0.005	-0.002	0.009
Higher age	0.008	0.026	0.012	-0.046
Less risk averse	-0.019	-0.060	-0.028	0.108
Longer forecasting horizon	0.024	0.075	0.034	-0.133
Less performance than others	0.017	0.053	0.024	-0.094
unconditional probability	0.047	0.199	0.261	0.493

Appendix 2. (continued)

Panel C: Marginal effects for determinants of reluctance to loss realization

Variable	Complete approval	2	3	4	5	Complete disapproval
Institutional Investors	-0.012	-0.070	-0.051	-0.018	0.058	0.094
More experienced	-0.004	-0.021	-0.012	0.000	0.017	0.019
Worse variance forecast	0.001	0.006	0.004	-0.000	-0.005	-0.006
Longer forecasting horizon	-0.005	-0.027	-0.015	0.000	0.023	0.025
Less disposition effect	-0.006	-0.032	-0.018	0.000	0.026	0.029
Less information than others	-0.004	-0.023	-0.012	0.000	0.019	0.020
unconditional probability	0.027	0.177	0.186	0.228	0.237	0.145