The Role of Financial Advice for Individual Decision Making

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Dissertation

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As the recent financial crisis illustrates, consumers who can make informed decisions about financial products and services not only serve their own best interests, but, collectively, they also help promote broader economic stability. Ben Bernanke, 2012

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Introduction

The analysis of household finance poses three major challenges to a researcher. First, households have difficulties in expressing their preferences, if they know them at all. Second, households do not necessarily decide on their own, but often contact others, such as financial advisors, before making their decision. The reasoning of this third person has to be included in order to capture the economics of the underlying decision making process, which makes household finance more difficult to evaluate. Third, data on household behavior is hard to obtain. The usage of survey data has its drawbacks: responses may not be representative, may lack granularity, and may suffer from inaccurate responses.[1]

The existing literature suggests that the behavior of some households deviates from what would be in their best interests: They do not participate in the stock market as much as they should, and if they do, they invest too heavily in stocks of their own employer or of the region they stem from. Both puts substantial correlation risk into their portfolio. Also, households have difficulties in understanding how financial service providers are paid (Woodward and Hall (2012), Woodward and Hall (2010)), what information they are given (Choi, Laibson and Madrian (2010)) or are confused by their presentation (Bertrand and Morse (2011)). Their limited financial knowledge (Van Rooij, Lusardi and Alessie (2011)) can only partly explain these findings. A more likely reason is that their behavior is influenced by cognitive biases. For instance, investors overlook or underestimate the impact of fees, especially when it comes to annual expenses (Barber, Odean and Zheng (2005)). Behavioral finance analyzes how individuals are affected in their decision making by these anomalies.

Financial innovation is often unable to fully address these issues. On the one hand, strict regulation of the issuance of new products makes timely responses impossible. On the other hand, it is not profitable for many companies to replace products that are inappropriate for some of their customers. Naive consumers

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[1]See Campbell (2006) for an excellent discussion of these problems.

who fall for these products cross-subsidize the usage of these products for knowledgeable clients who know how to circumvent the drawbacks of such products.[2]

The financial market crisis since 2008 accelerated the efforts of regulators to improve individual financial decision making. In the US, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 has seen a number of new provisions trying to enhance transparency and the creation of new agencies, including a Bureau of Consumer Financial Protection. In contrast, the EU parliament and the EU commission have discussed a general revision of the Markets of Financial Instruments Directive (MiFID) to increase consumer protection.

It is the task of an economist to give advice to the legislators on whether regulation is achieving its targets. Optimally, such research is undertaken as long as provisions are still in the discussion phase, so that unintended effects can be alleviated prior to becoming law. A laboratory experiment offers a suitable environment for such research since the information content can be fully controlled and varied across treatment groups.

There is no closed theory on the relationship between a financial advisor and the advised investor. As a consequence, there are no normative benchmarks against which observed behavior can be tested. Instead, I evaluate different explanations in an exploratory manner. More precisely, I investigated the effects of two regulation efforts in the field of household finance. Both approaches are likely to dramatically influence the way in which private investors choose financial products. The first concerns the provision of information. Since 2011, the providers of mutual funds in the US and in the European Union have been obligated to publish an information sheet, which discloses the product's main characteristics in a simplified way. In the European Union, such simplified information disclosure is mainly structured into information about costs, past

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[2]See Gabaix and Laibson (2006) for a theoretical model.

performance and risk. I am investigating in how the information is used, and whether it helps investors to make better decisions.

The second regulatory effort is still under discussion; however, it is likely that upcoming financial market regulation will see an extended disclosure of the commissions a financial advisor earns if his recommendation is followed. The reasoning behind this regulation is that the consumer is presumed to be more likely to detect a potential conflict of interest which might influence the advisor's suggestion. The question I research here is how the consumer reacts to disclosure and how he uses the disclosure of information in conjunction with the financial information he receives. Both efforts were investigated using an experimental environment, where subjects decided on how to invest a hypothetical investment sum.

Private investors are unlikely to make decisions on their own, and tend to seek additional help, e.g., from a professional advisor, when trying to reach an investment decision. Thus, in the simplified information experiment, the information search and usage of subjects was compared between a situation with no advisor and one where an advisor was available. Likewise, in the commission disclosure experiment, two advisors were available, whereas the second advisor changed in terms of how much commission he received relative to the first. However, his recommendation was always better than that of the first advisor. Adding the possibility of requesting a recommendation makes the experimental testing of regulation more realistic. But which kind of help do private investors seek during their search and decision process? To answer this question, the experiments were preceded by another laboratory investigation.

In this first experiment, I researched whether investors were able to rationally choose a fund without a clear-cut product recommendation. More specifically, the advice was varied between two treatment groups. While the funds offered were the same, one treatment group received advice with a precise product rec-

ommendation (e.g., Take fund X!), whereas the second group did not receive a clear recommendation, but rather an explanation of how to deduce the correct fund on their own. The results indicate that investors prefer product-recommending advice, independent of the level of financial literacy.[3] They do not seek help to improve their own reasoning, but rather want a clear-cut message on which product to select. This is especially true for male investors. After having answered the question of what kind of advice investors prefer, the remaining two experiments tested the aforementioned regulatory changes in conjunction with financial advice.

The second experiment was designed to investigate the usage and usefulness of simplified information when used with financial advice. While the offered funds were identical and there was exactly one strictly better choice among them, the recommendation of the advisor varied across four treatment groups. There were two main findings. First, the higher the financial knowledge of the respective investor, the more likely he is to read the simplified information completely prior to purchasing a financial product. This suggests that the information sheet is read primarily by investors for whom the sheet was not intended - those who have a higher level of financial literacy. Further, I found that usefulness is limited as soon as the advisor recommends a product which is inferior based on its return/risk structure. This implies that investors widely independent of their respective level of knowledge tend to follow an advisor's recommendation, even if the available information stands in contrast to it. Especially less-educated participants could benefit from reading the simplified information completely; however, this is the group least likely to do that.

The last experiment tested the proposed disclosure of the commissions of financial advisors, and two advisors were available. While the recommendation was the same in all treatment groups, the disclosed renumeration structure varied among two groups. In the first group, the second advisor earned a lower commission than

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[3]Throughout the dissertation I use the terms financial literacy and financial education interchangeably.

the first advisor if his advice was followed, and vice versa in a second group. However, the recommendation of the second advisor was better in both groups, i.e., it was the rational choice to follow that advisor's recommendation irrespective of the commission structure. Surprisingly, I found that investors align their decision with respect to the commission structure. They base their search behavior on the commission structure and tend to follow the advisor who earns a higher commission, irrespective of the product he proposes. A second finding is that the sequence of information matters. Investors are significantly less likely to behave irrationally if they have to choose explicitly between free but possibly biased advice and paid advice that is unrelated to commissions as compared to a situation where they receive a free recommendation instantaneously and by default.

What is the ideal that private investors should strive towards when making a financial decision? Neither they nor their advisors can perfectly foresee what the outcome of their investment will be. Thus, it is important to make the best decision given the information they have ex ante, i.e., before the investment begins. I investigated in this thesis whether deviations from that rational benchmark are influenced by regulation-inspired treatments and whether they follow a pattern. Such a pattern could serve to illuminate the way in which regulations could be changed to improve financial decision making.

Overall, there are three lessons learned. First, most private investors are unlikely to select a financial product on their own, i.e., without the guidance of others. Especially the influence and motivation of professional advisors have to be incorporated when designing regulations in order to understand the reasoning that private investors employ during their search and decision process. Even those participants who are more highly educated are at risk of disregarding their knowledge and previous decisions when told by a financial advisor to do so. Thus, spending more resources on increasing financial literacy is not necessarily helpful in improving

financial decision making. An experimental evaluation of regulation design can help tremendously to improve, tailor and target upcoming rules, since the behavior of the advisor can be controlled. Second, if subjects do not have to explicitly state their preferences before starting their search process, or if they are unable to do so, they may get easily confused when having to compare product characteristics. Even when they are given all of the information they need, they may fail to select a suitable product. Thus, increasing financial literacy is not necessarily helpful in improving investor's ability to compare products.

Finally, there is a reasonable amount of laziness among private investors in regard to getting involved with financial matters. The results of the first experiment testing different forms of advice showed a preference for a short, guiding forms of advice instead of longer texts to read. This observation was supported by the second experiment. There were two mutual fund choices to make, and the second one was more likely to be selected for later payment. Nonetheless, subjects spent significantly less time reading the simplified information during the second choice, although there was no learning possible during the first choice. Finally in the last experiment, subjects had the option to pay for an unbiased recommendation which was unrelated to commissions. Although the price for this advisor and all information available about him was the same across all treatment groups, the propensity to seek this kind of advice was significantly higher in the group where subjects could pay for this recommendation instead of free advice, as compared to participants who could buy this advice in addition to free advice. The laziness is especially pronounced for less-educated participants, resulting in an increased probability of falling for inferior advice. Thus, investors are reluctant to gather information on their own, and often stop their search earlier than would be rational.

It is the task of a financial advisor to guide private investors when it comes to their financial planning. Nonetheless, the client

should still check whether the advice is appropriate. The financial crisis has seen a number of new provisions in financial market regulation. These might have effects that were not intended by lawmakers, precisely they could increase the mistrust financial customers have towards their advisors, even when their behavior has been fair before. Private investors could assume that regulation discloses misbehavior on side of the advisor they were not aware of. However, not every inferior investment decision made is due to an advisors influence. Often private investors have unrealistic expectations when it comes to returns, and lean towards products which risks or costs they do not fully understand, even when they state otherwise towards their financial advisor. Thus, regulation should target these situations in particular, instead of focussing on new provisions advisors have to meet. For example, products which are too complex to understand for an average private investors could be prohibited from being purchased by these investors.

What else can be done to improve financial decision making? As far as the search process is concerned, customers should become aware of the drawbacks of abandoning a search too early. Although it is the prior responsibility of investors to search more intensively, the Internet has the potential to dramatically simplify such searching. Financial innovation can target these issues, so there is no direct need for tighter regulation. When it comes to the decision process, there is a considerable influence that a financial advisor can exert on the investor. Regardless of how attractive his renumeration scheme or its disclosure seems, the optimal solution for the customer might not be the advisor's main focus. Therefore, the need for advice should be reduced. One solution might be to simplify the offering of new structured, comparable and easy-to-understand products.

The remainder of this dissertation is structured as follows. Chapter 2 presents the advice experiment, related literature, design, results and implications. In a similar vein, Chapter 3 outlines

the simplified information experiment and Chapter 4 contains the commission disclosure experiment. The appendix contains the experimental instructions, the decision situations and used variables for the experiments.[4]

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[4]All experiments were conducted in German and were translated for the writing of this dissertation.

Chapter 2

Experiment 1
Paternalistic Advice

2.1 Introduction

Private investors are increasingly being expected to take over responsibility for their financial well-being. The shift is most apparent in retirement savings regulation. Laibson et al. (2011) report that since 2007 there have been more active participants in defined contribution programs than in defined benefit plans. Defined contribution plans require more active decision making, such as deciding about asset allocation and savings rates. Germany plans to decrease the coverage rate in its public retirement system, and encourages individuals to additionally save for themselves (e.g., in the "Riester"- scheme, see Börsch-Supan, Reil-Held and Schunk (2008)). As a result, private investors are obligated to a greater extent to make active decisions, e.g., deciding when and how to save for retirement.

The financial crisis has accelerated this development. Regulators counteract the reduced confidence towards financial markets with rules that increase transparency. For instance, mutual fund providers in the US and the EU are obligated to publish a summary prospectus containing the key information of every product with respect to risk, costs and past performance. This action is supposed to help investors to make an "informed decision" (Securities and Exchange Commission (2010)).

But are investors able to actively decide in their own interest? Previous research implies that this is not the case. For retirement planning, Benartzi and Thaler (2007) summarize several heuristics that investors use in their retirement saving decisions. Private investors are reluctant to join 401(k) plans on their own (Madrian and Shea (2001)), their asset choice depends on the funds offered (Benartzi and Thaler (2001)), and they select funds which have been framed as the middle choice between two extreme alternatives (Benartzi and Thaler (2002)).

A simple way to test whether investors can decide on their own is to analyze a mutual fund choice where advice is available. In an experiment, advice can be varied to test different ways a policymaker can influence financial decision making. He could just "nudge" investors into the right direction (e.g., recommended, but opt-in enrollment in retirement saving) or he could tell them in a straightforward manner what to do (e.g., automatic enrollment and a default savings rate / fund allocation).

The procedure used in this study has several advantages over the studies mentioned above. First, a mutual fund choice should be much easier to handle than a retirement saving where assumptions about work lifetime, appropriate discounting rates and availability of additional coverage by company or public plans are necessary. In this experiment, subjects just had to select an investment horizon and one of three funds. As a result, I am better able to detect the basic effects of different kinds of advice. One of the three funds was superior to the alternatives due to its low fees and minimal tracking error, for every investment horizon available. Choosing this fund was equal to maximizing payoffs, i.e., to making a rational decision.

Second, where previous research investigates the decision over time (i.e., before/after a policy change), this paper directly investigates the ability to make an active decision by splitting subjects into two treatment groups. Through random assignment to both groups, there is an equal distribution with respect to individual characteristics such as gender, risk attitude and financial knowledge.

Finally, where existing retirement saving plans have their loopholes, a laboratory environment offers a suitable way to study a benchmark case, where help in the form of truthful advice is available as an option and at no cost. Basically, there are three ways in which advice could be designed given the increased accountability of private investors. First, a libertarian view is that individuals

should decide on their own what is in their best interest. This implies that financial advice must not be forced on them but should only be available as an option. In contrast, a second, paternalistic approach assumes that people are unable to make active decisions because they are clinging to a status quo (Samuelson and Zeckhauser (1988)), reluctant to decide at all (Akerlof (1991)), and have unstable preferences (Benartzi and Thaler (2002)). As a consequence, private investors would need to be told exactly what to do when taking advice, i.e., in the form of a clear-cut product recommendation. A third way is to acknowledge that individuals have difficulties making active decisions, but to leave them the freedom of choice while nudging them in the right direction. Thaler and Sunstein (2003) have called this type of guidance "libertarian paternalism".

This study reports the results of a mutual fund choice experiment, where advice is optional (*libertarian*) and available for free. Participants were randomly assigned to two treatment groups, differing only in the advice given. In both groups, advice was equal with respect to the informative content. Both types of advice pointed to the rational decision, i.e., the fee-minimizing fund: however, participants were either given a clear-cut product recommendation (*paternalistic*, henceforth called *default* advice) or an explanation on how to deduce the right fund (*libertarian-paternalistic*, henceforth called *active* advice) on their own.

There are two main results. First, an overwhelming majority (85%) of participants requested advice, and a longer investment horizon and higher age were associated with a higher demand for a recommendation. Second, active advice did not necessarily lead to better decisions. Participants struggle with this form of aid: they spend more time than participants with default advice and are less likely to make a rational decision, i.e., to choose the fee-minimizing fund. Also, a gender effect was found: Male subjects performed significantly better than females when told in a straightforward way which product to choose. One reason might be that female

subjects exhibited a lower level of financial literacy and needed advice in order to fill the gaps in their knowledge, thus struggling when they are not told why to select a specific product.

The remainder of the chapter is organized as follows. Section 2 reviews relevant literature to predict how participants will request and use advice. Section 3 describes the experimental design.[1] Section 4 presents the results and Section 5 concludes.

2.2   Literature

As outlined in the following section, participants did not know the type of advice that was available until they requested it. Hence, the literature analysis and derivation of the hypothesis is split into the request and the processing of financial advice.

Financial knowledge may influence whether an offer of free and truthful advice, as it is available in the experiment used in this study, is requested. For example Bhattacharya et al. (2012) analyze the response to a broker's offer of "free and unbiased advice" to their clients. They find that customers with more investment experience, which they use as a proxy for knowledge, are more likely to take the aid compared to less experienced investors. Van Rooij, Lusardi and Alessie (2011) report for a Dutch household panel that the usage of professional advice is determined by the level of financial sophistication, and that low-educated people prefer to get information from more informal sources. Bucher-Koenen and Koenen (2011) as well as Calcagno and Monticone (2011) develop an analytical framework before testing it against empirical data. Both studies find that a higher level of knowledge is positively related to the demand for financial advice.

Hypothesis 1: *There is a positive relationship between the level of financial knowledge and the propensity to seek advice.*

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[1]The appendix contains the translated instructions, decision situation and used variables.

The inability to make rational financial decisions without a clear-cut product recommendation is well-documented. For instance, Choi, Laibson and Madrian (2010) find that subjects in an experiment were unable to select the fee-minimizing index fund; in another experiment Beshears et al. (2009) find that participants failed to avoid front-end loads; Bailey, Kumar and Ng (2010) use brokerage data to investigate behavioral biases shown by retail investors.

There is a substantial amount of research devoted to people's ability of financial decision making in retirement saving decisions. Retirement saving decision are more complex than mutual fund choices, still decision makers can make similar mistakes due to framing and default. Madrian and Shea (2001) compare 401(k) participation rates and saving behavior before and after the introduction of automatic enrollment. They find that participation rates are significantly higher under automatic enrollment and that workers stick to default saving rates and default investment allocations, even though the latter had not been chosen by the majority before the introduction of automatic enrollment. The authors conjecture that participants perceive default saving rates and default fund selections as implicit investment advice and conclude that individuals' choices are strongly influenced by the default of the program design. This and other 401(k) plan changes are reported by Choi et al. (2002), who discuss plan improvements like automatic contribution rate increases (as proposed by Thaler and Benartzi (2004)), employer matching and financial education training as ways to overcome inertia among savers.

Carroll et al. (2009) report a similar 401(k) case with the difference that the company which was being investigated switched from a required enrollment to an opt-in enrollment. They report that enrollment rates significantly dropped from 69% to 41%. They also find that the contribution rate (defined as the fraction of annual income saved for retirement) decreases significantly from 4.8 to 3.6%.

Whereas 401(k) plans are an additional coverage in individual retirement saving and are restricted to a company's work force, Engstrom and Westerberg (2003) investigate the impact of a pension reform in Sweden. They have access to the investment behavior of 4.4 million individuals and report that previous experience in financial markets increases the likelihood of active decisions being made instead of sticking with the default option. Moreover, women are more likely to deviate from the default option than men.

In summary, active advice should be more challenging. In contrast to default advice, where one simply has to decide whether or not to follow a clear-cut recommendation, one's own deductive reasoning is needed in order to reach a conclusion. Hence, I expect active advice to be more successfully used by participants with a higher level of financial literacy.

Hypothesis 2: *Participants with a higher level of financial knowledge are relatively more likely to select the fee-minimizing fund after hearing active advice than subjects with a lower level of financial literacy.*

The following section describes the experimental setting used to test the hypothesis.

2.3   Experimental Design

Participants were randomly assigned to two treatment groups, differing only in the form of advice given (which itself was optional, available for free, and labeled as independent). Table 3.3 shows the exact wording for active advice (on the left-hand side) and default advice (on the right-hand side).

Table 2.1: Advice

Active Advice	Default Advice
Please keep in mind that historical returns are not necessarily representative of future performance. Also, costs have to be incorporated when interpreting past performance. The same is true for future investments: in addition to annual costs, one-time fees should be taken into account (e.g., loads). The load reduces your initial investment sum. The relative importance of the load declines as the investment horizon increases.	Based on all relevant measures, fund X is to be favored.

Note: The table shows the wording of advice in the respective treatments. The left-hand side displays advice for participants in the first treatment seeing the active (i.e., libertarian-paternalistic) form of advice. The right-hand side shows advice given to participants in the second treatment, who saw default (i.e., paternalistic) advice.

In a short introduction, participants were informed that they would have to choose an investment period of two, five or ten years to allocate a hypothetical sum of EUR 10,000 to exactly one of three mutual funds. This sum is more than seven times the average monthly net income in Germany (EUR 1,345 RWI (2012)). Since I used university student subjects, the sum ought to be large but still imaginable from the view of a student. Since they were unable to split the money, subjects did not have to think about possible diversification effects, which made the task easier.

Subjects were furthermore told in the instructions, as well as remembered during the fund choice, that a total of about 10 participants would be randomly selected for payment of 0.1% or 1% of their portfolio end value, at the end of the chosen investment horizon. The future performance was simulated using a ten-year sample out of 30,000 normally distributed annual returns based on the past performance of the DAX and its correlation with the respective fund.

Additionally, the subjects were randomly split into two treat-
ment groups, which differed in the percentage of portfolio end
value they could receive. While the expected payment was the
same in both cases, 1% of participants were eligible to receive 1%
of their portfolio end value, while 10% could receive 0.1% of the
portfolio end value. The maximum payment was varied in order
to investigate influences on the request and usage of advice. Since
I could not find any significant differences, the subjects were not
split with respect to the maximum payment possible throughout
the analysis.

In the mutual fund choice itself, subjects were told that all
funds used the German blue-chip index DAX as a benchmark. No
further information was given about investment strategies, i.e.,
whether the fund followed an active or passive management ideol-
ogy. The fund data available followed the so-called "Key Investor
Information Document" (KIID), which has been a legal require-
ment in the European Union since July 1, 2011 European Union
(2010). The information provided in the KIID has been designed
to reduce confusion among customers, and to provide them with a
clear and concise picture of the funds' characteristics. I used the
KIID information structure to ensure an objective presentation of
the key characteristics of the respective product. Moreover, the
information about all funds was highlighted equally so that no
part of the information was easier to access than another. The
details were split into performance, cost and risk information. All
funds used had the same risk-return indicator following the Com-
mittee of European Securities Regulators (2010). These suggest
the calculation of a synthetic risk and reward indicator based on
the funds' annualized volatility over the previous five years. Since
all funds used had an annual volatility larger than 25 %, they were
grouped into the highest, i.e., the riskiest of seven risk categories.

Two of the three funds were real-world funds:[2] one load-charging
actively managed fund[3] and a passively managed index fund (exchange-

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[2] All names were changed to avoid a familiarity bias.
[3] DWS Deutschland, ISIN: DE0008490962.

traded, ETF).[4] Both funds tried to beat or replicate the DAX, respectively. A third fund was introduced which inherited the performance of the ETF, with no loads, but charging the relatively higher management fee of the actively managed fund. Since the tracking error was lowest for the cheapest index fund, the rational choice was to select this product. The choice of the investment horizon was subject to the individual's degree of risk aversion. A more risk-averse participant was likely to select a longer period to mitigate the effects of intermediate price movements; however, the cheapest index fund was superior to every other alternative within every investment horizon. Selecting this fund resulted in maximizing payoffs within every selected horizon.

The mutual fund choice was preceded by an elicitation of risk attitudes, financial knowledge and a self-assessment of the latter. The self-assessment was obtained on an 11-point-scale before the financial literacy quiz in order to eliminate a bias with respect to perceived performance during the quiz. A self-assessment was necessary to capture possible over- or underestimation of knowledge.

The risk attitudes were elicited to obtain a control variable for further analysis, especially to disentangle knowledge and risk aversion in explaining the demand for advice. A high risk aversion could be associated with an increased demand for advice because risk-averse participants may be more likely to make sure that all information available was seen before making a decision. The risk elicitation consisted of the low-payment lottery choice task by Holt and Laury (2002), where participants were confronted with ten lottery choices. Each choice consisted of two lotteries, A and B, with payoffs of either EUR 2.00 or EUR 1.60 and EUR 3.85 or EUR 0.10, respectively. In the first pair, the probability for both lotteries was 10%, such that a risk-neutral individual would vote for A. The remaining lotteries came with a 10%-increase in the probability for the higher payoff so that a risk-neutral decision maker would choose A four times before switching to B. The risk

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[4]iShares DAX (DE), ISIN: DE0005933931.

measurement elicited from this task was the number of decisions
for lottery A. Following Dohmen et al. (2005), two questions di-
rectly related to risk attitude were added. Participants had to
state their willingness to take risks in general and with respect to
their financial behavior. Both measures were obtained using an
11-point-scale with 0 indicating high risk aversion to 10 indicat-
ing no risk aversion. To avoid confusion, these two questions were
asked on different pages. The risk attitudes were elicited before
the mutual fund choice in order to isolate it from any influence by
the presentation of fund information.

Ten questions were asked to capture the level of financial knowl-
edge.[5] When eliciting the level of knowledge through a quiz, there
is no need for a proxy for financial sophistication like trading ex-
perience or product familiarity. The questions are partly based on
Van Rooij, Lusardi and Alessie (2011), evoking knowledge with
regard to compounding, inflation, percentage calculation, macroe-
conomic relationships and the effect of diversification. I added
questions about the influence of correlation and fund costs. For
each question, three answers were available in addition to "Don't
know" and "Skip question".

Before making the fund choice, participants had to select an
investment horizon of two, five or ten years. These were chosen to
reflect short-, medium- and long-term investment horizons.

The remainder of the experiment involved follow-up questions.
These mainly included questions on why advice was (not) re-
quested, and, if it was seen, why it has (not) been followed. The
experiment was closed by obtaining demographic data like gender,
age, years studied and major subject of study.

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[5]The questions can be found in Tables A.7 and A.8 in the appendix.

2.4 Results

2.4.1 Descriptive Results

I conducted the experiment described above over the Internet at the University of Hamburg, Germany in August 2011. Participating students were recruited via an announcement sent to a standing subject pool. To avoid multiple participation, a cookie was placed on the participant's computer and students had to enter their pre-registered email address before they could be admitted to the experiment.

Table 2.2: Descriptive Results

Variable	Mean	SD	Median	Min	Max
age	24.0833	3.1561	23	18	35
fl	5.5769	1.7562	6	1	9
fl_{self}	4.1218	2.3646	4	0	9
$risk_g$	4.6154	2.1804	5	0	10
$risk_f$	3.6539	2.1301	3	0	9
$risk_l$	5.1859	1.9069	5	0	10
$horizon$	6.4359	2.9252	5	2	10
$advice$	85.26%				
$rational_{none}$	39.13%				
$rational_{seen}$	68.42%				

Note: This table shows descriptive results for all participants (N=156). age measures the age of the participant, fl is the number of correctly answered financial literacy questions (up to 10), fl_{self} is the self-assessed financial literacy (0 = no knowledge, 10 = very high knowledge), $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), $horizon$ is the selected investment horizon (2, 5, 10 years), $advice$ is the proportion of participants who requested advice. $rational_{none(seen)}$ is the proportion of participants who successfully selected the fee-minimizing fund without (with) advice seeking beforehand.

Table 2.2 provides descriptive results. A total of 179 students participated, but 23 students were excluded from the analysis and the possibility of payment because they did not complete the experiment. Of the remaining 156 participants, 80 were female (48.72%) and 86 were undergraduates (55.12%). The median age was 23. Advice was requested by more than 85% of participants. Nearly 40% of participants without advice managed to select the

cheapest fund. In contrast, 68% of participants with advice made
the rational decision. Thus, the taking of advice improved deci-
sion making.

Additionally, I tested whether the participants in both treat-
ment groups (active vs. default advice) differed with respect to
gender, age, length of study, level of financial literacy, self-assessment
of financial knowledge, risk attitudes, choice of investment hori-
zon, propensity to seek advice, and making of the rational choice
using Wilcoxon rank-sum (Mann-Whitney) tests. Only the last
test revealed that the treatment group (type of advice) matters;
more specifically, participants in the group with default advice
were significantly more likely to make the rational choice as com-
pared to the group with active advice (z-value=-1.917, p<0.1).
This observation is discussed in greater detail below. The results
are shown in Table 2.3.

Table 2.3: Significance of Treatment Differences

Variable	Mean Active Advice	Mean Default Advice	z-value
age	23.7595	24.4156	-0.860
fl	5.7089	5.4416	1.075
fl_{self}	4.0000	4.2468	-0.723
$risk_g$	4.6456	4.5844	0.263
$risk_f$	3.7468	3.5584	0.518
$risk_l$	5.2911	5.0779	0.069
$horizon$	6.4937	6.3766	0.140
$advice$	83.54%	87.01%	-0.609
$rational_{seen}$	60.61%	76.12%	- 1.917*

Significance levels :   ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Note: This table shows the mean and z-values of Wilcoxon rank- sum (Mann-Whitney)
tests with the null hypothesis that the respective value is statistically not significant between
participants randomly assigned to active (N= 66) and default advice (N= 67). *age* measures
the age of the participant, fl is the number of correctly answered financial literacy questions
(up to 10), fl_{self} is the self-assessed financial literacy (0 = no knowledge, 10 = very high
knowledge), $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude
of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), *horizon* is the
selected investment horizon (2, 5, 10 years), *advice* is the proportion of participants who
requested advice. $rational_{seen}$ is the proportion of participants who successfully selected
the fee-minimizing fund with advice seeking beforehand.

Table 2.4 reports the financial knowledge of participants for each question, ordered by the percentage rate of correct answers. Notice that both questions related to fund costs (8 and 10) were answered correctly by less than 30% of participants. Graduate students possessed higher financial literacy than undergraduates, the mean is 5.85 as compared to 5.34; and the difference is statistically significant from zero at a level below 5% using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value = 1.988, N = 156). Six of the questions were taken from Van Rooij, Lusardi and Alessie (2011): These are all questions except for (3), (8), (9) and (10). In my sample, these questions were on average answered correctly by 72.54% as compared to 65.54% in the household panel used in their study. Four of these six questions (all, except for (4) and (5)) were also used in a representative study by the US Department of the Treasury and the President's Advisory Council on Financial Literacy (FINRA Investor Education Foundation (2013)). In their survey of 25,000 US residents, 53% correctly answered these four questions compared to 74.39% in this study. The differences from the representative samples might hint to a positive selection bias on financial literacy in the subject pool.

Table 2.4: Financial Literacy by Question

Question	Percentage	N
(1) Interest Compounding	97.44%	152
(2) Inflation	89.74%	140
(3) Percentage Calculation	78.21%	122
(4) Time Value Money	71.15%	111
(5) Role Equity Holder	70.51%	110
(6) Effect Diversification	69.87%	109
(7) Key Interest Rate	36.54%	57
(8) Frequency of Loads	28.85%	45
(9) Effect Correlation Coefficient	8.97%	14
(10) Calculation Management Fee	6.41%	10

Note: This table displays the percentage rate and absolute number of participants who correctly answered the respective literacy question, ordered from the easiest to the most difficult question according to the results.

2.4.2   Request for Advice

Advice was solicited by the vast majority of participants (85.26%). This confirms the results of Chater, Huck and Inderst (2010) who present the results of a consumer study with 6,000 participants across eight EU countries. In their study, 14% of the respondents indicated that they had no contact with advisors. In the follow-up questions subsequent to the mutual fund choice in my experiment, participants stated the main reason for their decision (not) to request advice. Table 2.5 gives the answers of participants who requested advice and those who refrained from it. While positive experiences with advisors in the past are only mentioned by 9.02% as the main reason for advice-takers, negative experiences account for 34.78% of participants who chose not to take advice. This is surprising for two reasons. First, with a median age of 23, one would expect participants to have only limited experience with advice in the past. Second, the information was available at no cost during the experiment. Yet, these negative experiences must have been so negative that they kept these individuals from even looking at advice. 37 of 49 participants taking advice and clicking "other" specified that they sought confirmation of their own opinions or that they were interested in getting a second opinion for free.

Table 2.5: Reasons (not) to Request Advice

Factor	Advice		No Advice	
I've had good (bad) experiences with the recommendations of financial advisors	12	9.02%	8	34.78%
I (did not) need(ed) a recommendation	56	42.11%	7	30.43%
To save time	16	12.03%	4	17.39%
I forgot it	n.a.	n.a.	1	4.35%
Other	49	36.84%	3	13.04%
Total	133		23	

Note: This table displays the absolute number and percentage of participants who stated the respective factor as the main reason for (not) requesting advice. *n.a* indicates that the answer was not available in the case of the respective decision.

To investigate the determinants of the demand for advice in more detail I ran a probit regression, where the dependent variable was a dummy that turned one if advice had been solicited, and zero otherwise. Explaining variables are financial literacy (number of correctly answered questions), self-assessment of it, risk attitudes, age and gender. Table 2.6 shows the results. I find that choosing a ten-year investment horizon influences the propensity to seek advice, and the coefficient is significantly different from zero (z-value=2.20). The margin is 13.44% and equal to the economic significance, since the explaining variable was a dummy. That is, a participant choosing 10 years as his investment horizon has a roughly 13% higher probability to ask for advice. Also, older participants are more likely to seek advice. The coefficient is statistically significant and different from zero at a level of 10% (z=1.86), and the economic significance is 0.10%, indicating a 0.10%- rise in the propensity to seek advice by this figure for a one standard deviation change in age. The result with regard to age confirms is the finding of Bhattacharya et al. (2012), who report that older clients in their German bank sample were more likely to accept the offer of free advice. The remaining variables, including financial literacy, self- assessment, risk attitudes and gender have no statistically significant influence.

That the level of financial literacy as measured through the number of correctly answered questions is unable to explain variations in advice demand is surprising. Thus, the first hypothesis concerning the positive relationship between knowledge and the propensity to seek advice has to be rejected for this sample. A major reason for this lack of significance might be that advice was equally and easily available and at no cost. As far as the investment horizon is concerned, participants choosing a longer period may want to make sure they make the right decision; more than participants with a shorter investment horizon. A higher risk aversion of these participants would support this view. In fact, participants choosing an investment horizon of ten years have a general risk aversion (mean) of 4.20 as compared to 5.00 of other partic-

ipants.[6]   The difference is significant at a level below 5% using
a two-sample Wilcoxon rank-sum (Mann-Whitney) test (N=156,
z-value=2.140). This comparison only included participants who
also requested advice. Subjects with a longer investment horizon
also have an increased risk aversion when the two other risk mea-
sures are used (financial and lottery risk aversion); however the
difference is not significant.

2.4.3   Usefulness of Advice

The second hypothesis stated that participants with a higher level
of financial literacy are more likely to select the fee-minimizing
fund after hearing active advice. Before investigating that, though,
I checked whether the type of advice influenced the decision. As
Table 2.2 showed, 68.4% (N=91) of participants who saw advice
chose the fee-minimizing fund afterwards. For default advice, this
task was easily done by just following the recommendation. In
contrast, one had to deduce the correct fund by oneself after hav-
ing read active advice. Participants reacted differently to each
type of advice. This can be seen by looking at the usefulness, i.e.,
the rate of participants selecting the fee-minimizing fund within
each advice type. Whereas 60.6% (40 of 66) of participants seeing
active advice managed to deduce the right fund, 76.12% (51 of 67)
of subjects with default advice followed the recommendation. The
difference in usefulness between both forms of advice differs signif-
icantly on a 5% level using a Wilcoxon rank-sum (Mann-Whitney)
test (z-value=-1.917). Thus, there is a clear treatment effect, i.e.,
participants made better decisions when they encountered default
advice. That both treatment groups did not differ significantly
with respect to knowledge, gender or risk attitude is shown in Ta-
ble 2.2. Accordingly, for the further analysis on the determinants
of usefulness, I will split the results by type of advice.

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[6](0 = high risk aversion, 10 = no risk aversion).

Table 2.6: Probit Regression Advice Demand

	β SE	Mfx Efx
hor_d	0.6786**	0.1344
	(0.3085)	13.44%
age	0.0957*	0.0190
	(0.0506)	0.10 %
fl	0.0825	0.0163
	(0.0918)	0.15 %
fl_{self}	-0.0060	-0.0012
	(0.0725)	0.00 %
$risk_g$	0.1124	0.0223
	(0.1006)	0.22 %
$risk_f$	-0.1453	-0.0288
	(0.1065)	-0.31 %
$risk_l$	-0.0480	-0.0095
	(0.0698)	-0.06 %
$gender$	0.0729	0.0144
	(0.3161)	0.46%
Constant	-1.5841	
	(1.2860)	

Observations = 156, Pseudo R^2 = 0.1135

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$
Note: This table reports probit coefficients, standard errors (in parentheses), margins (Mfx) and economic significances (Efx) for the full sample (N=156). Economic significance is the average change in probability for a one standard deviation change for a continuous independent variable or for the change from zero to one for a dummy variable. The dependent variable takes the value of one if a participant clicked on the link showing advice, and zero otherwise. The following explanatory variables are included: hor_d is a dummy variable, which is one if the participant has selected an investment horizon of 10 years, and zero if a horizon of 2 or 5 years has been selected, age measures the age of the participant, fl is the number of correctly answered financial literacy questions (up to 10), fl_{self} is the self-assessed financial literacy (0 = no knowledge, 10 = very high knowledge), $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), sem is the number of semesters studied by the participant, and $gender$ is a dummy variable, which turns one if the participant is male, and zero otherwise.

Table 2.7 shows the probit coefficients of two regressions. The first regression (1) includes participants who were randomly assigned to the group where active advice was available and requested the recommendation, whereas the second regression (2) contains the group where default advice was available and seen. The dependent variable is a dummy which equals one if the partic-

ipant has selected the fee-minimizing fund afterwards, i.e., made
the rational choice. I use the same explaining variables as in the
previous section, where the first hypothesis regarding the demand
of advice has been tested.

There are two main results. First, financial literacy as measured
by the questions raised during the experiment is not helpful in
making a rational choice, even after having seen advice. For both
regressions, the coefficient is statistically not significantly different
from zero. One reason for this lack of significance may be that the
questions are not suitable to detect the abilities needed for active
advice. Another possibility might be that even those participants
who were more literate were over-constrained in the task of select-
ing the fee-minimizing fund. Thus, the second hypothesis cannot
be confirmed, at least with the measurement of financial literacy
used in this study. As for default advice, the lack of significance
is not surprising, since making the rational choice was the same
as following the recommendation of the advisor. Here, no special
knowledge was required in order to select the fee-minimizing fund.

The second result refers to the coefficients in the regression with
default advice. Male participants are significantly more likely to
select the fee-minimizing fund after having seen default advice as
compared to female subjects. The coefficient is statistically sig-
nificantly different from zero at a level of 5% (z-value=2.54). The
marginal effect is 31.52%, indicating that male subjects have a
32% higher probability of making the rational choice with default
advice than female subjects. This result is unrelated to the degree
of knowledge. Also, a longer investment horizon is negatively as-
sociated with following this kind of advice (z-value=-1.67, p<0.1).
Subjects choosing the longer investment period had a 21% reduced
probability of following the recommendation. Due to their higher
risk-aversion, they might have been more suspicious than other
participants and surprised by the straightforward product recom-
mendation they heard, and thus refrained from following it.

Table 2.7: Probit Regression Rational Choice

	Active Advice (1)		Default Advice (2)	
	β SE	Mfx Efx	β SE	Mfx Efx
gender	-0.2859 (0.4212)	-0.1093 -10.93%	1.126** (0.4435)	0.3152 31.52%
hor_d	0.2742 (0.3356)	0.1048 10.48%	-0.7486* (0.4459)	-0.2096 -20.96%
fl	0.0304 (0.1060)	0.0116 0.12%	-0.1109 (0.1347)	-0.0311 -0.42%
fl_{self}	-0.0108 (0.0923)	-0.0041 -0.04%	-0.1790 (0.1109)	-0.0501 - 0.56%
$risk_g$	-0.0623 (0.1314)	-0.0238 -0.31%	-0.1443 (0.1404)	-0.0404 -0.56%
$risk_f$	0.2099 (0.1396)	0.0802 1.12%	0.2352 (0.1487)	0.0659 0.98%
$risk_l$	0.0830 (0.0992)	0.0317 0.31%	0.0832 (0.1221)	0.0233 0.28%
age	0.0205 (0.0588)	0.0078 0.05%	0.0145 (0.0643)	0.0041 0.03%
Constant	-1.2549 (1.5276)		0.9947 (1.801)	
	Observations = 66	Pseudo R^2 = 0.0671	Observations = 67	Pseudo R^2 = 0.1653

Significance levels :   ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Note: This table reports probit coefficients, standard errors (in parentheses), margins (Mfx) and economic significances (Efx) for the participants requesting active advice (N=66) and default advice (N=67). Economic significance is the average change in probability for a one standard deviation change for a continuous independent variable or for the change from zero to one for a dummy variable. The dependent variable takes the value of one if a participant chose the fee-minimizing fund after seeing advice, and zero otherwise. The following explanatory variables are included: *gender* is a dummy variable, which turns one if the participant is male, and zero otherwise, hor_d is a dummy variable, which is one if the participant has selected an investment horizon of 10 years and zero, if a horizon of 2 or 5 years has been selected, fl_{self} is the self-assessed financial literacy (0 = no knowledge, 10 = very high knowledge), *fl* is the number of correctly answered financial literacy questions (up to 10), $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), and *age* measures the age of the participant.

The result regarding the effect of gender is a novelty to the literature on how investors use advice. Slovic (1972) argues that people prefer information which tells them clearly what to do and leaves no room for interpretation or need for transformation. Çe-

len, Kariv and Schotter (2010) confirm this view experimentally. They find that participants prefer to receive advice from their predecessor on how they should decide depending on their signal, instead of simply seeing their actions: however, the information content was the same regardless of whether it was given in the form of advice or by showing the participants the actions of their predecessors. The authors conclude that participants prefer clear-cut advice instead of information, which requires additional reasoning by the respondent; however, no study has linked the preference for one kind of information to gender. Note that the results presented here do not imply that men decided better than women, but only that men were more likely to follow default advice then women. One reason might be that women need more information or explanations during the advice before they are able to follow the recommendation. This should be especially true when they need advice to fill gaps in their knowledge. In fact, female participants in this study have a significantly lower level of financial literacy. While female participants answered 4.94 questions correctly (Median=5, N=80), male subjects correctly answered 6.25 questions (Median=6, N=76). The difference was statistically significantly different from zero at a level below 1% using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=-4.452). This result does not imply that knowledge is the cause of the observed gender effect. In fact, it was shown in Table 2.7 that this is not the case; however it gives an idea as to why females might have had difficulties in following default advice.

How does advice influence the usage of fund information (risk, return and cost information)? It could be the case that participants seeing default advice substitute advice for the usage of fund information since no own reasoning was necessary. I recorded whether a participant clicked on all available fund information before making a choice. While 73.42% of participants using active advice clicked on all fund information, only 58.44% did so after default advice. The difference is statistically significant from zero at a level below 5% using a two-sample Wilcoxon rank-sum

(Mann-Whitney) test (z-value=1.968, N=156). This implies that participants who receive default advice tend not to evaluate the recommendation by gathering their own information, but instead directly make their own choice. Following the advice without checking its validity did not harm the participants in this experiment, since it was truthful; however situations are possible, where the interests of the advisor and the client are not fully aligned and the recommendation is misleading. In such cases, following the recommendation directly instead of using one's own information in addition would make the investor worse off.

What kind of recommendation should financial advisors give? For the subjects in this experiment, active advice was not a suitable alternative compared to the type of advice they are used to. Their decisions were worse on average, and they spent significantly more time before making a choice. During the experiment the time spent browsing fund information before making a choice was recorded. Following active advice, participants spent an average of 75 seconds reviewing the fund information before making a choice, as compared to 25 seconds for participants using default advice. The difference between both is statistically significant at a level below 5% using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=1.981). Recognizing this waste of time, participants are clearly better off when they are given a clear-cut product recommendation than when they are helped to figure out the correct fund for themselves.

2.5   Conclusion

This study compares decision making abilities in a mutual fund choice experiment between two forms of help: a default, paternalistic form of advice that gave a clear-cut product recommendation, and a libertarian-paternalistic form where an explanation on how to deduce the right fund was given.

First, it was found that a clear majority of participants welcomes help. In total, 85% of all subjects requested advice, where a longer investment horizon and a higher age led to an increased demand. In contrast to earlier research, the level of knowledge was found to be unrelated to the demand for advice. This might be due to the fact that advice was easily accessible during the experiment. Further research should critically assess the reasons for requesting advice with varying degrees of advice availability.

Second, the usefulness of active advice, which tries to "nudge" investors in the right direction, is clearly limited. Irrespective of knowledge, participants seemed overstrained with this type of advice. They spent more time browsing fund information after having seen this kind of advice and made worse decisions afterwards. There is also a gender effect in the usefulness of the advice types: especially male participants preferred to get a clear-cut recommendation which told them clearly which product to choose. That is, female participants might need more explanations during the advice in order to be able to follow it.

The sample used in the study was slightly better in terms of financial literacy than an average panel. Nevertheless only 60% of participants successfully completed a simple investment task without a clear product recommendation. Further regulation should be two-sided: for those interested in financial markets, transparency should be increased, especially with respect to the importance of loads. On the other hand, for individuals suffering from inertia and sticking to a status quo, plan designs should ensure that the

default choice or recommendation corresponds to what is optimal for most of them.

The mutual fund choice used in this setting was relatively simple. Also, the advice available was truthful in such a way that it enabled the addressee to make a rational decision. Further research should investigate the usefulness of advice which interacts with biases on the side of the investor, such as a preference for actively managed funds or the inability to correctly incorporate fees.

Chapter 3

Experiment 2
Mutual Fund Choice with Advice and Simplified Information

3.1 Introduction

Field evidence suggests that private investors often struggle with financial decision making (Bailey, Kumar and Ng (2010)). As a result of these shortcomings the Securities and Exchange Commission (SEC) as well as the European Union (EU) has obligated providers of mutual funds to publish a simplified abstract of key information concerning their products, effective January 1, 2011 (SEC) and July 1, 2011 (European Union (2010)). This key information "should be specific enough to ensure that investors receive the information they need" (European Union (2010)) and to enable an "informed decision" (Securities and Exchange Commission (2010)).

Even though the simplified product information is accessible on a stand-alone basis most private investors are likely to seek advice.[1] Thus the question arises as to how the simplified information is used and utilized in the context of financial advice.

The results of this study are based on an incentive-compatible fund choice experiment that was conducted at the University of Hamburg to investigate the usage and usefulness of simplified information. This involved two subsequent mutual fund choices, with advice available in the second one.

This study is the first to embed simplified product information into advice. While simplified information is constructed so that all product features are highlighted equally, a recommendation may focus on a single feature, e.g., low fees or relatively good past performance. Past research has shown that investors' buying behavior is influenced by high media coverage (Barber and Odean (2008)) or marketing efforts (Sirri and Tufano (1998)). Choosing to follow these stimuli is not necessarily irrational, since it can lower search costs for the decision maker. In a similar way, financial advisors

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[1] According to a cross-country study across eight EU countries (Chater, Huck and Inderst (2010)) more than 85% of consumers usually request professional advice before making an investment decision.

could draw investors' attention to a single product feature. Alternatively, an advisor could decide not to mention a feature that is beneficial to the investor but detrimental to his own earnings. This study will shed light on how much a recommendation which focuses either on past performance or relatively low fees interacts with the (non-) usage of simplified information.

Investors could come to inferior decisions if they were to ignore potential product drawbacks or suitable alternatives because of advice. This effect is likely to be reinforced if the advice addresses a bias on the side of the investor, such as a tendency to extrapolate past performance into the future. A laboratory environment offers a suitable way to investigate the impact and to vary the content of the advice.

There are two main results. First, there is a significant and positive correlation between financial knowledge and usage of information. This is critical because the political goal behind the introduction of simplified information disclosure is to improve financial decision making (for the EU: Financial Times (2011), for the US: Wall Street Journal (2008)). These efforts will have limited effects if the information sheet is not used by less-educated investors.

Second, the usefulness of the information is reduced if participants additionally request financial advice prior to their decision. Depending on the content of the advice, which was varied across four treatments, participants do not need the information in order to make a good decision (i.e., to avoid loads and/or minimize fees) or make inferior decisions (i.e., pay loads and/or not minimize fees) despite having seen the information completely.

Inferior decisions especially follow the exposition to advice recommending actively managed funds. Given that kickbacks and commissions for advisors are usually awarded for selling actively managed funds (Georgarakos and Inderst (2011)), the experimen-

tal setting is likely to replicate a real-world situation. The usefulness of having read all information is higher for participants with low financial literacy. This implies that participants with low financial literacy could benefit more from information coverage than those with higher literacy.

The remainder of this chapter is structured as follows. Section 2 gives background information with regard on legislation and reviews several studies comparable to mine. Section 3 describes the experimental design,[2] Section 4 presents the results and Section 5 concludes.

3.2 Literature

Since January 1, 2011, the SEC has obliged mutual fund providers to include a summary of mutual fund characteristics at the front of their prospectus. The section is supposed to contain key information with regard to the risks, costs, performance, objectives and strategies of the respective fund.

Providers of mutual funds are regulated within the European Union under the UCITS directive.[3] As part of a 2008 revision of the latter, the so-called "Key Investor Information Documents" were introduced, effective July 1, 2011. These documents have to be provided to retail investors for every fund offered and must contain all relevant information with respect to that fund. This includes information on the fund's investment policy, risks, costs and past performance.

So far, two studies have examined the effect of simplified information on financial investors. Kozup, Howlett and Pagano (2008) use a panel study to elicit willingness to buy a financial product. They test several forms of presentations and find that a graphical

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[2]The appendix contains the translated instructions, decision situation and used variables.
[3]UCTIS stands for Undertakings for Collective Investment in Transferable Securities Directives.

and text-based presentation of past performance interacts with an individual's bias to pursue a hot hand fallacy.[4] In contrast to this study, they do not monitor real financial decisions but only ask for attitudes and perceptions of different forms of information displays that cover fictional investment funds. They find that investors tend to underestimate risk if the display of previous performance is supplemented by graphical representations of the return history.

Beshears et al. (2009) conduct an experiment to investigate the influence of the SEC summary prospectus on mutual fund decisions. They find no significant changes with respect to realized returns or paid fees in comparison to groups where the summary prospectus was replaced by more complex information. My paper differs from their study in an important way: I elicit the financial knowledge of participants to investigate the usage of simplified information, and I link this usage to the usefulness of the summary prospectus. Also, I do not test several forms of information but use the major information required by European law only.

None of the studies mentioned above considered the question of how structured information is used by its addressees or whether it helps them when financial advice is additionally available. The former is important because it sheds light on whether the information provided is meaningful in making a financial decision. The latter is interesting because it reveals whether regulation achieved its goals, i.e., to improve the decision making of retail investors. Also, the studies mentioned above do not address the question of how financial knowledge is linked to the usage and usefulness of the information sheet. Differences in usage and usefulness depending on financial literacy raise the question of whether simplified information is the right instrument to improve the decision making of less-educated investors. In addition, many private investors are prone to biases that could affect their decision making.[5] Financial advice is likely to interact with existing biases. In a large field

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[4]The hot hand fallacy refers to the tendency of decision makers to underestimate the effect of chance, see Gilovich, Vallone and Tversky (1985) for an overview.

[5]For an overview, see Kahneman and Riepe (1998).

study using mystery shoppers for visits in Boston area banks, Mullainathan, Nöth and Schoar (2011) find that financial advisors, if anything, try to exploit such biases. Within the experimental design, I focus on the bias of the hot hand fallacy. The remainder of this section motivates this choice.

The "hot hand" refers to the tendency to underestimate the effect of randomness. It was first described by Gilovich, Vallone and Tversky (1985) in the domain of basketball. It refers to the erroneous belief that an above-average performance by a particular player is likely to continue, even though the shots are independently distributed. People prone to this bias ignore the fact that the events they observe are drawn from a small sample and extrapolate a (non-existing) trend too far in the future. Tversky and Kahneman (1975) have called the underlying reasoning a representativeness heuristic. Another consequence of the representativeness heuristic is the gambler's fallacy in which decision makers underestimate the persistence and magnitude of random events, thus expecting a mean-reversion, where the underlying process is in fact independent and identically distributed (*i.i.d.*).

The relation of both biases has been examined by Rabin and Vayanos (2010) who develop a theoretical model that is applicable to financial markets. In their model, the returns of mutual funds serve as signals and consist of the fund manager's ability and a noise term. That the latter is *i.i.d.* is ignored by investors who have fallen for the gambler's fallacy. These biased investors believe that luck should revert, thus underestimating the probability that over- or underperformance relative to a benchmark can endure. Rabin and Vayanos (2010) predict that after a relatively longer absence of mean-return the gambler's fallacy can turn into a hot hand fallacy. They interpret their result as one explanation for why people buy actively managed funds: If, contradicting efficient markets Fama (1991), past performance is an unbiased predictor of future performance, then investors might view the analysis of past returns as the main task of a fund manager. Since these ef-

forts are obviously not undertaken by index funds, one could argue
that higher fees of actively managed funds are justified.[6]

Aside from paying too much fees, investors could be mislead by
the presentation of previous performance. The simplified informa-
tion has to require a section on how past performance should be
presented. Namely, it must contain a disclaimer that past returns
are no indication of future events: however, the returns presented
are only corrected for annual fees. Correcting for loads is diffi-
cult since it requires assumptions about holding periods. Thus,
the long-term effects of loads are not incorporated into the perfor-
mance display. Accordingly, if the advisor does not point to the
danger of extrapolating past performance information into the fu-
ture, then an investor could make an inferior decision by paying
a higher-than-justified load; however, do subjects pay attention
to such warnings, depending on which product is recommended
in the end? In the experimental design, this issue is addressed
by varying the final recommendation that an advisor gives during
his talk. In one group, he will recommend the fund with above-
average performance despite having warned of extrapolating past
performance into the future. In the other group, he will advise to
take another fund because of the hot hand fallacy.

In addition, the simplified information should enable investors
to realize the impact of fees. Actively managed funds typically
charge loads to cover their sales costs (Georgarakos and Inderst
(2011), Sirri and Tufano (1998)). Empirical evidence however sug-
gests that most actively managed funds have no superior stock-
picking abilities, and therefore fail in achieving an excess return
relative to the market (for a recent study see Fama and French
(2010)). Barber, Odean and Zheng (2005) report that investors
are aware that they should avoid loads; however, they often un-
derestimate the importance of ongoing annual fees, e.g., the effect
of a management fee. Thus, a rational decision within the experi-
ment will involve both avoiding loads and minimizing annual fees,

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[6]Rabin and Vayanos (2010).

irrespective of the actual investment style.

The key question of the underlying experiment is how partici-
pants use simplified information in conjunction with financial ad-
vice. The empirical evidence suggests that advice makes a differ-
ence in financial decision making; indeed, most US mutual funds
are sold through brokers, who offer advice for their customers as
an additional service (Bergstresser, Chalmers and Tufano (2009)).
Using a sample of a large German bank, Hackethal, Inderst and
Meyer (2011) show that clients who state that they rely more on
advice also trade more by up to 20% than other clients. They also
report that customers are more likely to rely on advice when they
consider themselves to be less informed or are certain of the ad-
visor's expertise. A similar result is reported by Bucher-Koenen
and Koenen (2011) and Calcagno and Monticone (2011). The
authors of the first study make use of panel data with a special
focus on a German pension scheme and report that clients with
a higher level of financial literacy are more likely to consult an
advisor but less likely to follow the recommendation afterwards.
Calcagno and Monticone (2011) analyze the results of a survey
among customers of a large Italian bank and find that an increased
level of financial knowledge reduces the propensity to delegate fi-
nancial decisions completely to an advisor, whereas it increases
to tendency to request a recommendation in the first place. The
finding, that financial advice is no substitute for one's own knowl-
edge, but rather a complement for an existing level of literacy, is
confirmed by Collins (2012) who reports the results of representa-
tive survey among 1,500 US residents. The findings suggests, that
participants will differ in how they combine advice and simplified
information. The level of financial education seems to be a key
driver of the decision whether to follow advice or to gather own
information instead. Therefore, I hypothesize that participants
with a lower level of financial literacy are more likely to follow the
recommendation, irrespective of its content, and will rely less on
simplified information.

3.3 Experimental Design

The experiment was designed to investigate how the simplified information is used and whether it helped participants to select the fee-minimizing fund from three funds available. All subjects were given a hypothetical investment sum of EUR 10,000.[7] They had to make two subsequent investment decisions, and advice was available for the second one. The design aimed to determine whether the usage of an advisor changes the way simplified information is used. The funds in both decisions were the same, however, their names where changed in order to eliminate learning effects. In both decisions, all subjects had all of the simplified information available with the exception of the funds investment policy. This mostly contains a verbal description of the funds' objectives and strategies; however, the decision making process, as well as the measurement of the subjects' behavior was expected to be easier, when the participants had numerical facts to process. The categories (risk and return profile, previous performance and costs) were displayed randomly in order to avoid ordering effects.

The rational choice was to select the fund with the lowest tracking error net of costs; the incentive setting was created in such a way that load avoidance and fee minimization would be rewarded, whereas the length of the investment horizon should not matter. Subjects were informed by the instructions that the return on their investment would depend on their fund selection. They were told that with a probability of $1/3$ $(2/3)$ the first (second) mutual fund decision would be drawn for payment after the experiment. This was done to increase subject effort in the decision, where advice was additionally available. However, as it will be shown in the following section, the choices made then were worse compared to the first decision, e.g. the different renumeration for each choice did not create an experimental demand effect. Future performance of the selected fund was based on a random ten-year sample out of 30,000 normally distributed annual returns of their benchmark

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[7]This sum is about seven times the average monthly net income in Germany (EUR 1,345 RWI (2012)), but still an amount college student subjects can realistically imagine.

DAX as well as the funds' past correlation with the stock index. The DAX is the German blue-chip index and is also featured very often in general media, so it should be well-known to subjects even if they are not concerned with financial matters on a regular basis.

Subjects were further informed that there would be a specific portfolio end value for every fund within every investment horizon. Participants selecting the first (second, third) best fund within their investment horizon would be paid EUR 90 (50, 10). In addition, subjects were informed that about 10% of them would be randomly selected for payment. Only participants correctly answering a comprehension question about the payment structure were admitted to the experiment in order to make sure, that every participant was aware of the incentive structure. Subjects could try to answer the question as often as they wanted; however the figures used in the question changed every time the site was reloaded.[8]

There were four possible recommendations and subjects were randomly assigned to one treatment group. There were two treatments where the actively (1) (passively (3)) managed fund was recommended at the end, although this fund had an above-average historical performance. In the two other treatments, the recommendation was replaced by the passively (2) and actively (4) managed fund, respectively. Due to the number of advice treatments, there were five different funds used over all treatments: two load-funds (Fund $\overline{B}$ in treatments 1 and 2, Fund $\underline{B}$ in treatments 3 and 4) and three no-load funds, with one (Fund C in every treatment) having lower per annum (p.a.) fees than the other two funds (Fund $\overline{A}$ in treatment 1 and 2, Fund $\underline{A}$ in treatments 3 and 4). For the sake of readability, I will use the fund names without accent marks where a statement refers to all treatments.

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[8]It was not recorded how many participants were not admitted to the experiment because they failed to answer the question.

Table 3.1: Experimental Design

Treatment	Mutual Fund Choice 1	Mutual Fund Choice 2	Advice (optional)
1	Performance: $\overline{B} > C = \overline{A}$; p.a. Fee: $C < \overline{B} = \overline{A}$; Load: $\overline{B}$	Performance: $\overline{B} > C = \overline{A}$; p.a. Fee: $C < \overline{B} = \overline{A}$; Load: $\overline{B}$	Expl.: $\overline{B}$ Recom.: $\overline{B}$
2			Expl.: $\overline{B}$ Recom.: C
3	Performance: $C = \underline{A} > \underline{B}$; p.a. Fee: $C < \underline{B} = \underline{A}$; Load: $\underline{B}$	Performance: $C = \underline{A} > \underline{B}$; p.a. Fee: $C < \underline{B} = \underline{A}$; Load: $\underline{B}$	Expl.: C Recom.: C
4			Expl.: C Recom.: $\underline{B}$

Spanning box (left, all treatments): Financial Knowledge Self-Assessment / Risk Attitudes

Spanning box (center, all treatments): Financial Knowledge Quiz

Spanning box (right, all treatments): Reasons Behavior / Demographics

The funds offered were selected in such a way that at least one fund performed better than at least one alternative in six of the past ten years. This makes the funds distinguishable and could also induce participants to focus on the previous performance instead of the tracking error of the fund with its benchmark. The experimental results of Rapoport and Budescu (1997) suggest that an above-average performance of more than six years induces participants to expect mean-reversion, i.e., they might fall for the gambler's fallacy instead of the hot hand fallacy. This experiment was designed to investigate the hot hand fallacy, therefore, a possible gambler's fallacy was sought to be reduced.

Two of the three funds offered at each choice were real-world funds, which makes the results more credible. Among the choices

was one actively managed fund (load-charging, B) and one passively managed fund (no loads, lowest annual fees, C), that try to beat or replicate the DAX index, respectively. Table 3.1 shows an overview of the advice treatments 1 to 4 and the sequence of events.

The simplified information includes information on the benchmark's performance. Thus, all relevant information needed to make a rational choice was available to every subject. The passively managed fund C was the best choice in every treatment due to its lowest tracking error with its benchmark. Even participants who were not fully aware of the return generating process could use a rule of thumb by simply selecting the cheapest (by load and annual fees) product, which again was fund C in every treatment. The third fund (A) inherited the performance of the passively managed fund but charged annual fees equal to the actively managed fund and no loads. This fund was constructed to offer subjects a third alternative to subjects, and create a more realistic situation. All funds shared the same (and highest) risk-return indicator according to the simplified information provided.

The risk categorization followed the rules proposed by the Committee of European Securities Regulators (2010). These suggest the calculation of a synthetic risk and reward indicator based on the fund's annualized volatility. The latter is based on weekly returns over the previous five years. An annual volatility larger than 25 % puts the fund into the highest (i.e., riskiest) of seven categories. Since all funds were categorized into this highest risk segment, it was easier for subjects to compare their options, since risk was equal for all options. Table 3.2 gives an overview of the funds used in the experiment.

The first decision was preceded by a self-assessment of financial knowledge as well as an elicitation of risk attitudes. The former was obtained to examine the possible influence of a better-than-

average-effect[9] when compared to actual knowledge. The latter were elicited to test whether risk-averse participants had an intensified information usage in order not to mistakenly overlook information that might factor importantly in the decision.

Table 3.2: Funds

Fund	$\overline{A}$	$\underline{A}$	$\overline{B}$	$\underline{B}$	C
Real Name	n.a.	n.a.	Fondak A (EUR)	Concentra A (EUR)	iShares DAX®
Asset Management Company	n.a.	n.a.	Allianz Global Investors	Allianz Global Investors	BlackRock Asset Mgt.
ISIN	n.a.	n.a.	DE0008475005	DE0008471012	DE0005933931
Style	n.a.	n.a.	Active	Active	Passive
Benchmark	DAX®	DAX®	DAX®	DAX®	DAX®
Load	n.a.	n.a.	5.00%	6.00%	n.a.
Fee (p.a.)	1.40 %	1.76 %	1.40 %	1.76 %	0.17 %
Risk-Return-Indicator (1 = very low risk, 7 = very high risk)	7	7	7	7	7
Treatments	1,2	3,4	1,2	3,4	1,2,3,4

Note: All figures as of June 1, 2012. Funds $\overline{A}$ and $\underline{A}$ were created synthetically, using the performance of funds $\overline{B}$ and $\underline{B}$ and the annual fee of fund C.

Between both investment decisions, ten questions were raised to test participants' financial knowledge.[10] These questions were asked between the decisions in order to reduce possible spill-over effects between the fund choices. Subjects were explicitly told to treat both decisions independently. As mentioned above, there were two subsequent investment choices in order to investigate the impact of financial advice on usage and the usefulness of simplified information. This treatment effect could have been distorted if subjects did not treat the investment tasks separately. To make the distinctiveness of both decisions more obvious, the fund names were changed between investment decisions.

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[9]See Alicke et al. (1995) for an overview.
[10]The questions can be found in Tables A.7 and A.8 in the appendix.

Six of the questions were taken from Van Rooij, Lusardi and Alessie (2011) which allows to directly compare the experiment sample with the representative household panel used in their study. Four questions were added to elicit knowledge about fees and diversification. In addition, the calculated level of financial literacy on a scale from 0 (no questions correct) to 10 (all questions correct) could be directly compared to the initial self-assessment to detect any potential over- or underestimation of financial knowledge and its impact on the research question.

For each fund choice, participants had to select an investment horizon of two, five or ten years, which reflected short-, medium- and long-term periods, respectively. Subjects may have difficulties in evaluating investment outcomes which are in the very distant future, thus ten years seems as a reasonable choice for a maximum period; however, as outlined above, the rational fund choice within each investment horizon was the same, and the choice of investment length also did not influence the possible payment.

The financial advice in the second fund decision could be requested as many times as participants wanted. Note, though, that subjects were randomly assigned to one of four advice treatments; thus, a repeated request for advice did not change its content. Since it was crucial for the analysis to capture the impact of different recommendations, the possibility to review the advice was introduced in order to leave no room for potential misunderstandings on the side of the subjects. The recommendation could be seen by clicking on a link and was available at no cost. Table 3.3 shows the exact wording for treatment 1 (left-hand side) and treatment 3 (right-hand side). Treatments 2 and 4 are in square brackets.

The experiment concluded with questions to analyze the reasons for behavior and demographic questions.

Table 3.3: Advice

Fund B is a mutual fund following an active management strategy, i.e. the fund's manager decides for himself (actively) about the fund's portfolio. He bases his decisions about which securities to buy, hold or sell on analyst reports, forecasts and evaluations. Fund managers of actively managed funds do not believe in efficient markets, e.g., that it is possible to identify mispriced securities, thus exceeding the performance of the market. In contrast, passively managed funds try to replicate a market's performance (e.g., fund C). The actively managed fund B has performed better than the passively managed fund C in six of the past ten years. However, past returns are no direct indication of future performance. **I recommend fund B [C]**.	**Fund C is a mutual fund following a passive management strategy**, i.e., the fund's manager replicates the market's performance as precisely as possible. Passively managed funds are based on the theory of efficient markets, e.g., that it is not possible to identify mispriced securities, thus exceeding the performance of the market. Hence, analyst reports, forecasts and assessments which securities to buy, hold or sell are useless. In contrast, actively managed funds try to beat a market's performance with a selection of securities (e.g., fund B). The passively managed fund C has performed better than the actively managed fund B in six of the past ten years. However, past returns are no direct indication of future performance. **I recommend fund C [B]**.

3.4   Results

3.4.1   Descriptive Results

I conducted the above-described experiment over the Internet at the University of Hamburg, Germany. Initially, 241 students of all majors participated, but 38 participants were excluded from the analysis for not finishing the experiment. This left a total number of 203 participants, 138 of whom where undergraduates (67.98%). The percentage of female participants was 39.9% (N = 81) and the median age was 24. The median risk attitude (on an 11-point-scale with increasing level of risk-willingness) was 5 for general risk attitude (mean 5.1, SD 2.25) and 4 for risk attitude in the domain of personal finance (mean 4.01, SD 2.25). The lottery choices according to Holt and Laury (2002) revealed a median risk

attitude of 5 as well (mean 5.03, SD 1.80). The median of correctly answered financial literacy questions was 6 (mean 6.13, SD 1.79), and the difference in knowledge between undergraduate and graduate students was insignificant (Two-sample Wilcoxon rank-sum (Mann-Whitney) test, z-value=-0.192). The six questions that were taken from Van Rooij, Lusardi and Alessie (2011) were answered correctly by 74% as compared to the 63.45% in their study. The four questions that were also asked in a representative US study were correctly answered by 71% of the subjects as compared to 53% in the US data (FINRA Investor Education Foundation (2013)). Accordingly, participants in the experiment exhibit a slightly higher financial knowledge than one could assume for a representative population. The median investment length is 5 years in both investment decisions. Finally, advice was requested by a majority of subjects (70.4%). Table 4.3 gives an overview of the descriptive results.

Table 3.4: Descriptive Results

Variable	Mean	SD	Median	Min	Max	N
fl	6.14	1.79	6	1	10	203
age	24.35	4.04	24	18	45	203
$risk\_g$	5.10	2.26	5	0	9	203
$risk\_f$	4.02	2.25	4	0	9	203
$risk\_l$	5.03	1.81	5	0	10	203
$horizon_1$	6.77	2.74	5	2	10	203
$horizon_2$	6.65	2.88	5	2	10	203
$advice\_seen$	70.44%					203

Note: This table shows descriptive results for all participants (N=203). fl is the number of correctly answered financial literacy questions (up to 10), age measures the age of the participant, $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), $horizon_i$ is the investment horizon selected (2, 5, 10 years) in decision i ($i = 1, 2$), $advice$ is the proportion of participants who requested advice.

3.4.2   Usage of Simplified Information

Do participants use the simplified information they are given? The simplified information contains information regarding risk, cost and past performance for each of the funds offered. In total, nine

information sections (i.e., risk, cost and past performance for three funds) had to be accessed in order to get all of the information necessary to make a rational choice. In the following analysis, I use cov_i as a dummy variable. It equals one if the participant has looked up every single information section (i.e., complete coverage) before making the mutual fund choice in decision i, and zero otherwise.

Before making the first mutual fund choice, about 93% of all participants accessed all available information. The relationship between cov_i and financial literacy is evaluated using Spearman's rank correlation coefficient, since the Spearman rank does not require the variables to have a linear relationship nor a specific distribution of the variables. The Spearman rank correlation coefficient (ρ) between cov_1 and fl, which measures financial literacy continuously from 0 to 10 (10 = very high knowledge) is 0.173, which is different from zero at a statistically significant level of 5%. Hence, there is a strong and positive relationship between knowledge and usage of simplified information. The question of whether less-educated participants could benefit more from reading the information is discussed below.

The analysis for the second decision is divided according to whether participants requested advice, and if so, which advice treatment they were assigned to. Among participants who saw advice in treatment 1 (2, 3, 4) 83.34% (75.76%, 73.68%, 75.76%) looked up all information before making their choice. To exclude the possibility that the type of advice makes a difference in whether all information was accessed, I conducted a Kruskal-Wallis equality-of-populations rank test. This revealed no significant differences in coverage between advice treatments (p with(out) ties = 0.6936 (0.8521)). This indicates that the null hypothesis - namely, that the type of advice does not make a difference in whether all simplified information is accessed - cannot be rejected. This is not surprising, since advice was available on the same site, but below the simplified information in the second decision.

The coverage rate (i.e., the rate of participants who saw all simplified information) decreased compared to the first decision. This means that fewer participants looked up all of the information before making their choice. Two Wilcoxon signed-rank tests with the null hypothesis that $cov_1 = cov_2$ can be rejected for participants seeing advice and those refusing at a significance level of 1% (t-values: 5.477 and 2.921, respectively). This indicates that the decline in coverage rate between fund choices is robust and independent of the availability of advice. That the rate is decreasing at all is surprising because there should not have been any learning effects, since the fund names were changed.

For participants who saw advice during the second decision, the Spearman rank correlation coefficient measuring the relationship between usage of information and knowledge is statistically significantly different from zero for participants in treatments 2-4, i.e., not in the advice treatment where the actively managed fund was explained and recommended at the end. Here, usage is unrelated to financial knowledge. The correlation is also not statically significantly different from zero for participants refusing advice and is also lowest for all cohorts (advice treatments and no advice seen). This may be due to some form of laziness among those participants. Table 3.5 provides an overview.

The decrease in coverage between both decisions is more pronounced for participants with lower financial literacy. I find that 71 of 203 participants (35%) performed worse than the median (6) in the financial literacy quiz. From this group, 90.14% (N=64) accessed all information during the first decision, compared to 94.70% (N=125) in the group with more highly literate subjects. The difference is statistically not significant (Wilcoxon rank-sum (Mann-Whitney) test, z-value=1.219, p=0.2230). In contrast, preceding the second decision, 56.33% (N=40) of the less-literate participants saw all information, as compared to 78.03% (N=103) for the other group. Here, the difference is significant at a level be-

low 5% (Wilcoxon rank-sum (Mann-Whitney) test, z-value=3.222, p=0.0013).

Table 3.5: Usage of Simplified Information

	1. Decision	2. Decision				
		(T1)	(T2)	(T3)	(T4)	(no advice)
cov_i	93.10%	83.34%	75.76%	73.68%	75.76%	56.66%
N (total = 203)	189	30	25	28	25	34
ρ_{corr}:cov_i, fl	0.1730**	0.2398	0.3254*	0.4301**	0.3932**	0.1457

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$
Note: This table shows descriptive and prescriptive results on usage of information. The first column shows the participants for the first mutual fund choice, (T1), (T2), (T3) and (T4) shows the participants in the respective treatment groups (1,2,3,4), if they saw advice. The last column shows participants who opted out of advice. cov_i (N) denotes the rate (absolute number) of participants who looked up all of the simplified information before making a decision in mutual fund choice i. The last rows shows the Spearman rank correlation coefficients between cov_i and the level of financial knowledge, fl. fl is the number of correctly answered financial literacy questions (up to 10). The null hypothesis is that cov_i and fl are independent of each other.

I conducted a robustness check for the influence of financial literacy for information usage between decisions using a Kruskal-Wallis equality-of-populations rank test. The first test investigates the role of financial literacy during the first decision, i.e., the null hypothesis is that the level of literacy does not have an influence in the propensity to access all information. The Kruskal-Wallis tests results in a probability with(out) ties of 0.0716 (0.9699), while the respective tests for the second decision yields a probability with(out) ties of 0.0014 (0.0529). Thus, irrespective of whether ties are used, the relative importance of the literacy level increases from the first to the second mutual fund decision.

Do participants with less financial knowledge use advice in place of information coverage? A Wilcoxon rank-sum (Mann-Whitney) test with the null hypothesis - namely, that knowing less than the median (6) does not matter for complete usage if advice has been seen - can be rejected at a significance level below 1% (z-

value=2.731). This confirms the above-stated hypothesis that participants with a lower level of financial literacy will tend to use advice instead of simplified information. This observation is remarkable and has not been investigated in previous research. The following section analyzes whether complete coverage - used in conjunction with, or instead of advice - was helpful in making a rational fund choice.

3.4.3 Usefulness of Simplified Information

For the analysis on whether complete information coverage benefits the decision, I distinguish between loads and ongoing expenses. Barber, Odean and Zheng (2005) find that sales loads are negatively associated with fund inflows, probably because they are more salient to investors, whereas no relationship is found between ongoing fees (annual mutual fund fees) and flows.

As described in the previous section, avoiding loads was equal to selecting fund A or fund C, since these funds did not charge a load. The fund with the lowest annual fees was fund C in every treatment. Note that if a participant chose fund C, he was thus avoiding loads and minimizing fees simultaneously. Table 3.6 shows how much complete coverage contributes in achieving these goals, i.e. avoiding loads and/or minimizing fees. The subjects are divided according to their decision (first and second), and (for the second decision) whether they saw advice, and the respective treatment to which they were randomly assigned. τ denotes the respective objective (avoiding loads and minimizing fees), μ shows the proportion of participants who succeeded in the respective goal, and N shows the absolute number. The last row displays z-values for Wilcoxon rank-sum (Mann-Whitney) tests with the null hypothesis that complete coverage is not helpful, i.e., the mean of successful participants is unrelated to complete information coverage, denoted by $cov_i = 1$.

The main result across both decisions and all treatments is, that the usefulness of complete coverage depends on whether subjects

saw advice and which recommendations subjects encountered. In
the first decision (columns (1) and (2)), 75% of participants man-
aged to avoid loads (i.e., chose fund A or C), and 57% minimized
fees (i.e., chose fund C). The usefulness of complete coverage for
minimizing fees is significant at the 10% level, but it has no statisti-
cal impact for preventing loads. Thus, when no advice is available,
having read all of the information is useful for minimizing annual
fees but has no statistically significant influence on avoiding loads.

The remaining columns contain strong evidence that the con-
sumption of advice distorts the potential benefits that complete
coverage can have on realizing the respective objectives. Having
read all available information is only slightly beneficial. The only
exception is treatment 3, where the passively managed fund was
explained and recommend. Here, following the recommendation
was equal to making a rational choice. Therefore, it is not surpris-
ing that having read all information in addition is not beneficial
compared to refraining from it and focussing on advice instead.
Reading the simplified information is beneficial, if the advice con-
tains the actively managed fund. There is a statistically significant
influence on the 10% level if the actively managed fund is recom-
mended at the end (treatment 2). One reason for this might be
that participants combine the warning not to extrapolate past per-
formance into the future with the simplified information and thus
refrain from following the recommendation. An exemption is in
treatment 4, where the actively managed fund was recommended.
Here, the usefulness of simplified information for minimizing fees
is statistically significant at the 1% level. Again, the warning not
to extrapolate past performance combined with the simplified in-
formation positively influenced the decision making. In summary,
if the advisor mentions the actively managed fund in his recom-
mendation, then participants are better off reading all simplified
information; however the statistical significance is weak.

The picture changes when one looks at decision makers who opt
out of advice (columns (11),(12)), where complete usage of sim-

plified information is statistically significant on a 1% (load avoidance) and 5% (fee minimization) level. A Wilcoxon rank-sum test further reveals that the financial literacy of participants who saw advice and those who did not actually does not differ significantly (z-value: -1.436). This suggests that it is the exposition of advice that limits the usefulness of the simplified information.

The limited number of observations implies that caution should be taken not to generalize the implications of this result; however, there is still no clear indication of usefulness of simplified information. A robustness check for the significance of the correlation between coverage and usefulness should be conducted by repeating the experiment with a larger number of observations.

3.4.4   Financial Literacy and Usefulness of Information

The following observation from the data illustrates why it is worth investigating the link between the level of literacy and the usefulness of information in greater detail: 35 participants selected fund C in the first decision, thus minimizing fees. However, after seeing advice in the second decision, they changed their minds and irrationally altered their fund choice to A or, worse, to B. That is, advice can harm decision making even in a stylized laboratory setting. This result is remarkable, given that in a real-life situation there are other factors that can influence the decision making process additionally (e.g., the physical appearance of the advisor or potential intimidation of the client during the advising). Looking at their individual characteristics, I find that their financial knowledge is significantly lower (below the 10% level using a Wilcoxon rank-sum test, z-value=1.845) and that they also are significantly less likely to read all information in the second decision (1% level using a Wilcoxon rank-sum test, z-value=2.703), as compared to other decision makers.

Table 3.6: Usefulness of Simplified Information

Dec./Adv. Treatment	(1)		(2/T1)		(2/T2)		(2/T3)		(2/T4)		(2/·)	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
τ	no load	min fee	no load	min fee	no load	min fee	no load	min fee	no load	min fee	no load	min fee
μ	75.86%	57.14%	41.67%	30.56%	75.76%	75.76%	92.10%	86.84%	58.34%	50.00%	60.00%	50.00%
N (total = 203)	154	116	15	11	25	25	35	33	21	18	36	30
$H_0:\mu^\tau_{cov_2=1}=\mu^\tau_{cov_2=0}$	-1.046	1.675*	-1.342	1.755*	1.810*	1.810*	1.064	1.415	-1.364	2.935**	3.480***	3.100**

Significance levels :   * : 10%   ** : 5%   *** : 1%

Note: This table shows descriptive and prescriptive results on the usefulness of information coverage. τ denotes load avoidance and fee minimization, respectively. μ (N) stands for the proportion (absolute number) of participants who managed load avoidance and fee minimization, respectively. Columns denoted with T, followed by the treatment number only contain participants in the respective treatment who saw advice. The last rows shows the results of two-sample Wilcoxon rank-sum (Mann-Whitney) tests. Displayed is the z-value on the null hypothesis that complete information coverage ($c_i = 1$) is not helpful in achieving load avoidance and fee minimization, respectively.

One could argue that, given the simple design of the invest-
ment task, persons with a higher level of literacy could make a
rational fund choice irrespective of their level of information cov-
erage. In contrast, less-educated participants could benefit from
complete coverage in making a rational fund choice. A regression
shows that this is the case. Table 3.7 shows the coefficients of pro-
bit regressions with fee minimization as the dependent variable
(one if the participant has successfully minimized fees, and zero
otherwise). The explaining variable is complete coverage in the
respective decision. Gender, age and risk attitudes are included
as control variables.[11]

The null hypothesis that the level of knowledge does not mat-
ter for a rational fund choice can not be rejected for more highly
literate persons. In contrast (columns (2) and (4)), the coefficient
is larger and statistically significant for participants with a lower
levels of financial literacy. The z-value of the coefficient of cover-
age is 1.69 ($p < 0.1$) for the first decision and 1.85 ($p < 0.1$) for
the second decision, respectively. The marginal effects and eco-
nomic significance is 34.90% and 23.14%, respectively, indicating
that coverage increases the probability of minimizing fees by that
percentage. Whereas success cannot be explained through cov-
erage for more highly literate participants, relatively less-literate
subjects would benefit from reading the product information com-
pletely. Although there is no direct link between reading the in-
formation and understanding it, there is a connection between
coverage and the ability to minimize fees. That is, if anything,
less-educated participants could have profited from complete cov-
erage; however, as seen above, this group is significantly less likely
to use it, at least when the simplified information is accessed to-
gether with advice.

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[11] The coefficient of general risk attitude is weakly significant at a level of 10% (z-value=-
1.70) for participants with a higher level of financial literacy. This implies a negative
influence of a higher general risk aversion on the propensity to minimize fees for these
participants; however, the remaining risk measures are not significant neither for this group,
nor for the other groups used in this regression. Therefore, I refrain from investigating this
link in greater detail.

Table 3.7: Probit Regression Information Utility

	(1) β / SE	(1) Mfx / Efx	(2) β / SE	(2) Mfx / Efx	(3) β / SE	(3) Mfx / Efx	(4) β / SE	(4) Mfx / Efx
cov_i	0.4613	0.1822	0.9111*	0.3490	0.2859	0.1088	0.5780*	0.2314
	(0.5201)	18.22%	(0.5390)	34.90%	(0.2808)	10.88%	(0.3143)	23.14%
$gender$	0.3912	0.1545	0.3496	0.1339	-	-	-	-
					0.2673	0.1017	0.2182	0.0870
	(0.2520)	15.45%	(0.3290)	13.39%	(-0.2597)	-	(0.3213)	-8.70%
						10.17%		
age	0.0041	0.0016	-	-	0.3810	0.0145	-	-
			0.0444	0.0170			0.0558	0.0223
	(0.0265)	0.00%	(0.0537)	-0.10%	(0.0282)	0.04%	(0.0511)	0.11%
$risk_g$	-	-	0.0355	0.0136	-	-	-	-
	0.1290*	0.0509			0.1095	0.0416	0.0670	0.0267
	(0.0757)	-0.39%	(0.0887)	0.12%	(0.0761)	-0.32%	(0.0865)	-0,23%
$risk_f$	0.0031	0.0012	0.0719	0.0275	0.0051	0.0019	0.01016	0.0405
	(0.0723)	0.01%	(0.0965)	0.27%	(0.0717)	0.01%	(0.0941)	0.38%
$risk_l$	0.0924	0.0365	0.0169	0.0065	-	-	0.0797	0.0318
					0.0112	0.0042		
	(0.0740)	0.27%	(0.1001)	0.07%	(0.0748)	-0.03%	(0.0955)	0.30%
Constant	-		-		-		0.6479	
	0.4595		0.1556		0.0658			
	(1.0467)		(1.5085)		(0.8974)		(1.3528)	
Obs./ Pseudo R^2	132	0.0701	71	0.0776	132	0.0531	71	0.0649

Significance levels : $*:10\%$ $**:5\%$ $***:1\%$

Note: This table reports probit coefficients, standard errors (in parentheses), margins (Mfx) and economic significances (Efx) for the all participants, divided by their level of financial knowledge. Economic significance is the average change in probability for a one standard deviation change for a continuous independent variable or for the change from zero to one for a dummy variable. The dependent variable takes the value of one if the participant has minimized fees by selecting fund C, and zero otherwise. The following explanatory variables are included: cov_i is a dummy variable, which is one if the participant has seen all information before making the mutual fund choice in the respective decision (1,2), and zero otherwise. *gender* is a dummy variable, which turns one if the participant is male, and zero otherwise, *age* measures the age of the participant, and $risk_g$, $risk_f$ and $risk_l$ measure the general, financial and lottery risk attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion). (1) shows the coefficients on the dependent variable for the first decision for participants with a financial knowledge of six or more. (2) shows the coefficients on the dependent variable for the first decision for participants with a financial knowledge of less than six. (3) shows the coefficients on the dependent variable for the second decision for participants with a financial knowledge of six or more. (4) shows the coefficients on the dependent variable for the second decision for participants with a financial knowledge of less than six.

3.5 Conclusion

This paper investigates the usage and usefulness of simplified information disclosure when advice is also available in addition. The analysis shows the usefulness of evaluating policy proposals in an experimental context. I find that there is a positive and statistically significant correlation between the level of financial literacy and information coverage. More highly literate persons are much more likely to read simplified information completely. The observation that information coverage is lower in the second decision, and statistically more significant for people not seeking advice, although the incentives stood against it, points to a possible inertia in processing financial information, which merits further research.

The benefit of complete information coverage in avoiding loads and minimizing fees depends on whether and which type of recommendation participants additionally encounter. Especially, loads should be more salient within the simplified information. People who have less financial education are more likely to use advice in place of simplified information, which makes the content of the recommendation the determinant of a rational decision. In sum, this is the dilemma: simplified information is meant for the less-educated. Even though it could help them more, they are the least likely to use it completely.

Chapter 4

Experiment 3
Using Advice with Disclosed Incentives

4.1   Introduction

When faced with a financial decision, clients can collect sufficient information to decide for themselves, visit a financial advisor, or use a combination of these options. Previous research indicates that the usage of financial advice depends on one's own actual or perceived financial capabilities. Most financial advisors offer their recommendations for free and are paid a commission by the product provider if their recommendations are followed. The fact that financial advice is mostly available at no upfront cost makes their usage by investors even more likely; however, advice can be misleading due to conflicts of interest between the advisor and the client. Regulations seek to reduce such conflicts of interest by requiring advisors to disclose the commissions they receive.

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 required the Securities and Exchange Commission (SEC) to conduct a study to identify ways to increase the transparency in the case of conflicts of interest between retail investors and financial intermediaries (Section 917 (4)). In the study published in August 2012, the SEC proposed methods that "disclose whether a financial intermediary [...] stands to profit if a client invests in certain types of products; whether the financial intermediary would earn more for selling certain specific products instead of other comparable products; and whether the financial intermediary might benefit from selling financial products issued by an affiliated company" (Staff of the US Securities and Exchange Commission (2012)). Thus, it is likely that future regulation will further strengthen the disclosure of possible conflicts of interest. In contrast to self-directed investments, such conflicts of interests can arise when an investor seeks a recommendation from a third person whose interests are not fully aligned with those of his client. This conflict stems from the fact that the advisor earns money by selling products of financial product providers, while at the same time is expected to find a suitable product for his client.[1]

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[1]Inderst and Ottaviani (2009) develop a theoretical model on this conflict of interest to find the optimal payment scheme for a financial advisor.

To date, no study has investigated the influence of disclosure
on clients' behavior when facing a financial decision, i.e., whether
they rely more or less on advice due to disclosure, or whether they
use more or less of their own information instead, or a combination
of these. Earlier studies on disclosure use typical credence goods,
i.e. goods whose utility is difficult to asses. In the context of dis-
closure, this implies that the receiver of the disclosure information
is unable to evaluate the recommendation he receives, and relies
on disclosure information to assign credibility to it. For example,
Cain, Loewenstein and Moore (2005) use a jar of coins and let
advisors examine them before they make an estimate (= advice)
to their clients on how many coins are in the jar. They vary the
payment that the advisors receive. In one treatment, they are
getting paid more when their clients' estimates are closer to their
suggestions, and in the treatment with conflicts of interest, they
are rewarded more when clients follow their inflated estimates.
The authors found that clients failed to fully discount potential
conflicts of interest. Although this study is important as a way to
gain a first insight into how clients react to disclosure, financial
advice is fundamentally different from estimating how many coins
are in a jar.

I argue that a financial product is not a typical credence good.
Many investors have difficulties in assessing whether a financial
product suits their needs, but not all of them. A professional
advisor can help by evaluating the clients' risk assessment, their
saving goals, etc. to come up with a suitable product proposition.
At that point of the decision, the clients' problem is no longer to
assess whether the products fits but whether the recommendation
is truthful, i.e., how much they can rely on the advisor's recom-
mendation; however, clients will differ in terms of how much they
rely on advice. Some clients are able to assess whether a finan-
cial product is suitable for them, if they possess sufficient financial
knowledge or if they are able to correctly process the information
they receive. In that case, their decision will not depend on their

evaluation of financial advice. This study investigates whether disclosure affects client behavior, i.e., whether and how they substitute advice with their own information gathering.

To address this question, I use a mutual fund choice experiment. After the experiment, a randomly drawn portion of the subjects were paid a fraction of their simulated end portfolio value. In the first of two phases, participants chose one of out of five portfolios out of mutual funds. Although they were pre-selected by an advisor (advisor 1), there was no clear-cut product recommendation; thus, they had to decide for themselves. This decision constituted phase 1. In phase 2, a second advisor (advisor 2) suggested another portfolio, and participants had to decide whether to follow advisor 2, or stick with their decision from phase 1. Also, the commissions of advisors 1 and 2 were disclosed. The main variable of interest is the percentage of participants who chose to follow advisor 2. There are basically four possibilities to model how the recommendation of advisor 2 differed from what participants selected in phase 1. The recommendation could be worse; however, the commission of advisor 2 could be higher (1) or lower (2) than that to advisor 1. Or, the recommendation could be better and the commission lower (3) or higher (4). In this study, I use the latter two situations, i.e., the recommendation of advisor 2 is better in terms of lower risk at equal return net of costs or higher return net of costs at equal risk, but the commission which this advisor earns differs across treatments. That is, he earns a lower or higher commission compared to advisor 1, although participants should follow his recommendation in either case. I perceive these two treatments as more challenging for an experimental investigation than the former two since they imply a better choice for the client, i.e., more goodwill on side of the advisor; however, if I find detrimental effects in this situation, i.e., if participants do not follow a better recommendation because they misinterpret disclosure information, there might be even worse effects when clients encounter a recommendation that is inferior to the previous one. Thus, there is no conflict of interest in either of the treatments used in this

study, and I will investigate how the variation in commission af-
fects the clients' decision to follow the advice or use their own
information instead. Participants could make an irrational choice
by not following advisor 2. This will happen if they evaluate the
recommendation based only on the disclosure information they re-
ceive instead of using their own information in addition.

There are two ways to measure the reaction to disclosure. The
first, and more obvious one is the percentage of participants who
follow advisor 2, based on the commission structure. The second
measurement is based on the idea that if subjects need the disclo-
sure in order to evaluate whether they should follow the advice or
not, then they might be willing to pay for another recommenda-
tion which is not influenced by the commissions. A second opinion
which is not affected by possible conflicts of interest might ease
the decision for a portfolio (for a discussion see Loewenstein, Sah
and Cain (2012)). This was made possible in phase 2, and the
variable of interest here is the share of participants who were will-
ing to pay for advice. To investigate whether this willingness to
pay stemmed from disclosure, a control group in phase 2 did not
receive the recommendation of advisor 2 instantaneously but had
to explicitly choose between seeing the recommendation of advi-
sor 2 or paying for a recommendation that was independent of the
commissions.

There are two major results. First, I find that disclosure of
commission has a strong influence on the usage of the provided
fund information. If advisor 2 receives a lower commission than
advisor 1, then subjects are far less likely to use their financial
information, and tend to rely on advice instead. The difference is
statistically significant below the level of 1%. This indicates that
subjects tend to substitute their own information search with ad-
vice, based on the commission structure. Moreover, this result is
widely unrelated to the level of financial literacy. Second, par-
ticipants who are unable to select a correct fund in phase 1, i.e.,
without the help of a clear-cut product recommendation, are more

likely to assign credibility to the disclosure information, that is, they are more likely to align their information usage to the commission structure and - consequently - tend to follow whichever advisor earns a higher commission. The results imply that the pure disclosure of the commission information is unlikely to improve financial decision making for a large part of its addressees.

This paper contributes to two fields of research. On the one hand, it extends the literature on strategic information transmission for those cases when disclosure does not contain any new information but should be ignored from a rational point of view. On the other hand, it also contributes to the literature on credence goods. I argue that the degree to which a financial product is a credence goods depends on the investors' perspective. If he perceives his own financial capability as low, then he is more likely to rely on financial advice in his decision, while more highly literate investors see advice simply as additional information, which does not necessarily alter their decision making.

The remainder of this chapter is structured as follows. The second section relates this study to earlier research. The third section describes the experimental setting. The results are presented and discussed in the fourth section, and the fifth section concludes and points out directions for further research.

4.2 Literature

Research related to the question of whether disclosure information influences the decision between relying on advice and using one's own information instead can be grouped into three areas. The first includes studies that discuss who requests financial advice and who relies on it. The second field is the connection between trust and financial decision making. The last area consists of literature on how receivers of disclosure information react to the new information.

   The empirical evidence suggests that advice matters in financial
decision making: Most US mutual funds are sold through brokers,
who offer advice to their clients (Bergstresser, Chalmers and Tu-
fano (2009)). Hackethal, Inderst and Meyer (2011) show, using a
sample from a large German bank, that clients who state that they
"rely heavily on advice" trade up to 20% more than other clients.
These clients are also more likely to rely on advice when they
are certain of their counselor's expertise or consider themselves to
be less informed. In addition, investors with a university degree
are less likely to rely on advice. A similar result is reported by
Calcagno and Monticone (2011) and Bucher-Koenen and Koenen
(2011). The first study analyzes the results of a survey of clients
of a large Italian bank. They find that a higher financial literacy
reduces the probability of delegating financial decisions completely
to an advisor, while it increases that of seeking advice in the first
place. Bucher-Koenen and Koenen (2011) use panel data with a
special focus on a German pension scheme, and report that in-
vestors with a higher level of financial literacy are more likely to
consult an advisor but less likely to follow the recommendation.
The finding that financial advice is no substitute for one's own
knowledge but rather as a complement to one's existing level of
literacy is confirmed by Collins (2012) who reports the results of
a representative survey among 1,500 US residents. Finally, Bach-
mann and Hens (2013) report the results of a representative online
survey among Swiss residents. They find that people with a lower
investment competence (i.e., lack of knowledge or inability to ap-
ply knowledge effectively) and investors with a higher reliance on
their own judgment are less likely to consult a financial advisor
than other groups. In summary the empirical evidence suggests
that investors differ in regard to whether they contact an advisor
and whether they rely on him afterwards. While more highly ed-
ucated investors are more likely to seek advice, there is another
group that is more likely to rely on it because they are less edu-
cated, they perceive themselves to be less knowledgeable, or they
overestimate their abilities.

The usage of analyst information is related to financial advice, since analysts issue stock recommendation to guide investors. Malmendier and Shanthikumar (2007) analyze the US stock market to assess how small and large investors differ in their reactions to analyst recommendations that exhibit an upward bias. While larger investors - as measured by trading size - tend to adjust their trade reactions according to the type of recommendation (i.e., strong buy, buy, hold, sell, strong sell) and to whether the analyst has an underwriter affiliation with the firm whose stock he is covering, smaller investors do neither. In fact, these investors tend to follow the analysts' recommendations literally instead of discounting the recommendations they receive. While information-acquiring costs do not explain the former finding, it might be too costly for small investors to detect affiliations between analysts and companies. The disclosure of the commissions could potentially help investors to detect potential conflicts of interests by making that information easily available; however, if (small) investors take that disclosure information at face value (like they are used to process analyst recommendation in the study of Malmendier and Shanthikumar (2007)) and use it to evaluate the soundness of the recommendation, then the disclosure can be misleading if the recommendation itself is correct but not understood by the investor.

There is a limited amount of studies that investigate how trust is related to the holding of risky securities. Guiso, Sapienza and Zingales (2008) model how trust in relationship with others influences the propensity to hold risky assets. They use data from a Dutch household panel and a survey among Italian bank customers to verify their model and find that general trust as well as trust towards bankers significantly influences the likelihood to invest in stocks and the proportion of wealth invested in risky assets. The authors also find that risk tolerance and loss aversion are not proxies for trust and thus have to be analyzed separately. Georgarakos and Inderst (2011) present a model on the question of how financial capability, perception of legal protection, and trust in advice interact to explain stock market participation. Their models

predicts that trust into advice only matters for participation in
the stock market if the perceived financial capability is low. In
contrast, for investors with a higher level of perceived capability,
it is the perception of legal protection that affects their holding
of risky securities. Thus, I expect for my study that participants
with a lower level of financial literacy will rely more on advice,
and, consequently, are more likely to use the disclosure informa-
tion to assess the credibility of the recommendation.

This study also extends the literature on disclosure. The in-
teraction between advisor and client can be modeled as a game
of strategic information transmission. Crawford and Sobel (1982)
develop a model in which a sender decides how much to reveal of
his private information about the realization of a variable m by
sending a signal n to a receiver. All other information is com-
mon knowledge. The parameter b - unrelated to m - captures how
much the interests of sender and receiver are aligned. $b = 0$ im-
plies that the interests of both are perfectly aligned. The payoff
of both is related to the action that the receiver takes upon the
signal. Under their assumptions, which include perfectly rational
agents maximizing their expected utility, receivers will always re-
act optimally to the signal received by using Bayes' rule to update
their prior. As long as $b > 0$ all equilibria are uninformative, i.e.,
the sender includes noise in his signal about the true value of m.
Consequently, every signal should be discounted by the receiver as
long as $b > 0$.

A crucial difference between the standard model and the exper-
imental setting of this study is that the parameter that captures
diverging interests b is not known to the investor. I argue that this
is a more realistic case, when one tries to capture the economics
of financial advice. The investor cannot assess whether his inter-
ests and those of his advisor are aligned. Again, investors with a
higher financial literacy do not need to evaluate b since they do
not rely on the recommendation. Furthermore, if regulations try
to shed light on the magnitude of b, then the informativeness of

the disclosure is questionable since a higher the commission does not necessarily mean that interests are aligned, and vice versa. The experiment is designed to test how investors react to these two cases of disclosure content.

A similar approach to the underlying experiment has been done by Inderst, Rajko and Ockenfels (2010); however, in their study, the behavior of the advisor is not exogenously fixed. They experimentally investigate the impact of different degrees of transparency on sender (= investor) and receiver (= client) behavior and compare three treatments. In the first treatment, receivers are explicitly told the realization of b, while in a second treatment, participants know that there might be a conflict of interest with a probability of 50%. In the third treatment receivers are not told anything about the realization of b. They report that receivers insufficiently disclose biased signals, irrespective of the degree of transparency. That receivers may not fully encompass the conflict of interest and may fail to adequately discount the recommendation / signal they receive has also been documented by Cain, Loewenstein and Moore (2005) and Koch and Schmidt (2010). Recall that sender behavior is fixed in the experimental design of this study, as I am interested in how much informativeness investors assign to different disclosure content, relative to their reliance on (fixed) advice (= signal).

There is an ongoing discussion on why receivers of disclosure information are unable to process it correctly. One reason may be information overload: Lacko and Pappalardo (2004) report the results of a consumer choice experiment conducted by the US Federal Trade Commission in 2002. They find that consumers are significantly less likely to identify a cheaper loan when the commissions are disclosed. They assume that decision makers were confused by the disclosed information and thus took more expensive loans by mistake. In contrast about 90% of participants were able to correctly identify the cheapest loan in a control group without disclosure. This is critical, since a loan is far less risky than a

financial investment in risky assets, where uncertainty is involved. In contrast, a loan should be far easier to understand for the borrower since interest and repayment are fixed. If a relatively easy product is more confusing when it comes with disclosed commissions, then an investment in mutual funds as in my experiment is likely to induce even greater harm to investors, which increases the usefulness of this study.

Disclosure can also change the confidence that decision makers have in their own reasoning: In a study conducted for the UK Financial Services Authority, De Meza, Irlenbusch and Reyniers (2007) tested whether the disclosure of incentives paid to brokers influenced the demand for an insurance product. Besides the result that disclosure reduces the demand for the insurance product, they report that disclosing the commissions makes decision makers less confident in their decisions. Insurance is comparable to the underlying problem, since both decisions come with a substantial amount of uncertainty (e.g., how the investment will develop, how likely the insurance will be needed, etc.) on side of the client, which could be partly offset by a truthful recommendation: however, it is questionable whether participants who rely on advice are able to detect its truthfulness, which makes their reaction to varying recommendation structures even more interesting.

In summary, experimental evidence on disclosure can have harmful effects on receivers' welfare. If anything, receivers react naively to the disclosure and insufficiently discount the message, which makes them worse off. I test whether receivers of disclosure information react differently to advice depending on how much they rely on the signal (i.e., the advice). That advisors are capable of making recommendations independent of the commission structure, e.g., because they do not want to lose a customer to a competitor, has recently been shown by in a field study on the Indian insurance market. Anagol, Cole and Sarkar (2012) report, that advisors gave different recommendations based on different signals of competition that they received from their clients (who were mys-

tery shoppers hired by the authors). In one treatment, the mystery shoppers stated that they had already talked to another insurance agent, while in the other treatment they just mentioned that they had talked to a friend about the products. Those stating that they had already spoken to another insurance agent were significantly less likely to be offered unsuitable products, although such behavior was inconsistent with the underlying incentive structure. In fact, the agents should have given a different product recommendation if they had wanted to maximize their commission earnings.

In regard to the trade-off between relying on advice and using one's own information instead, I hypothesize that the commission structure has an influence on whether participants use advice or rely on their own information instead (Hypothesis 1). However it is difficult to predict the direction of it, i.e., whether participants would search more in the case where advisor 2 earns more than advisor 1. It may be the case, that participants assess a higher credibility to a recommendation where an advisor earns more. The signaling effect on information search should be especially pronounced for participants who are unable to select a correct fund without a clear-cut product recommendation in phase 1, since they lack the financial capabilities to do so (Hypothesis 2a). Furthermore, I expect that these participants will be more willing to pay for an additional opinion, knowing that these opinions are not influenced by commissions (Hypothesis 2b).

4.3   Experimental Design

As noted above, subjects had to make a mutual fund decision in phase 1, selecting between five risky portfolios and a risk-free alternative, all of which had been proposed by advisor 1. This decision could be revisited in phase 2, with the help of advisor 2. Both advisor 1 and advisor 2 received a commission, which was not disclosed until phase 2. Participants in one group had the possibility of paying for a recommendation uninfluenced by commissions (ad-

visor 3) in addition to the recommendations of advisors 1 and 2, while participants in a control group had to explicitly decide between the free recommendation of advisor 2 and paying for the recommendation of advisor 3, who received no commission. Subjects were randomly assigned to both groups and treatments.

Participants were told that they had a hypothetical investment sum of EUR 70,000 in cash and an additional mutual fund portfolio worth EUR 30,000. This corresponds to the average asset allocation in Germany from 2003 to 2012, where about one third of assets was invested into securities and two thirds into cash, bank deposits or overnight money (Deutsche Bundesbank (2013)). Since the majority of the money did not earn any return at the time, participants were additionally motivated to take investment action (a risk-free investment was offered, see below). The recommendation of advisor 3 was charged at EUR 1,000 and reduced the investment amount directly. There are only few banks who charge their clients for advice. In Germany, the Quirin Bank charges a one-time fee of around 5% of the investment sum Quirin Bank AG (2013), while the Comdirect Bank bills 0.6% per year for advice as well as additional transaction fees Comdirect Bank AG (2013). As I was interested in how investors react to a recommendation that is not related to the commissions as a benchmark, I refrained from setting the price of advisor 3 at a realistic level. In fact, that would have rendered the creation of a benchmark case impossible.

The subjects were informed that they had sought advice on how to invest or restructure the portfolio for the following five years. The duration of five years was chosen because it reflects as medium investment horizon. Sirri and Tufano (1998) report an average holding period for mutual funds of seven years; however, it is easier to calculate fees over five years. The subjects were also informed that approximately 10% of them would receive 0.25% of the portfolio end value in cash. The portfolio end value would be simulated by randomly drawing one of 10.000 normally distributed returns based on the previous performance of the respective fund.

The portfolio consisted of three funds that were the only ones available to choose from during the experiment. The three funds were labeled A, B and C to mitigate familiarity effects. The risk and return data was taken from three real-world funds offered to German customers. I changed the load of fund B from 4.71% to 5.00% and I unified annual fees at 15% to ease the calculation for participants. Although this is unrealistic in practice, I wanted to create a setting where participants could focus on the costs they incurred at the beginning of an investment. This makes it possible to research the basic effects when investors are confronted with disclosure. Table 4.1 gives an overview.

Table 4.1: Funds

Fund	A	B	C
Real Name*	DWS Euro Reserve	DWS Ring International	DWS Mandarin
AuM (million EUR)*	150	145	118
ISIN*	LU0011254512	DE0008474297	LU0045554143
Style	Fixed Income	Stocks/Fixed Income Varied	Emerging Markets Asia (ex Japan)
Load	1.00%	4.00%	5.00%
Fee (p.a.)	0.15 %	0.15 %	0.15 %
Risk-Return- Indicator (1 = very low risk, 7 = very high risk)	1	5	7

Note: AuM figures as of May, 6, 2013. All other figures as of December 1, 2012. Figures marked with asterik were not visible to subjects.

The experiment started with a self-evaluation of financial knowledge on a scale from 0 (very low knowledge) to 10 (very high knowledge). This was done to evaluate whether a potential over- or undervaluation of knowledge could explain the reliance on advice or interpretation of disclosure. Also, the risk attitude in general and within financial matters was elicited on an 11-point scale with decreasing risk aversion. This was done to elicit a control variable for possible reasons to rely on advice and to check for successful randomization between treatment groups.

The experiment proceeded with the evaluation of specific port-

folio and general financial knowledge.[2] Besides checking for random distribution of treatments, this was done to investigate how financial knowledge influences the ability to process information disclosure, which is a novelty to the literature on disclosure. Six questions were taken from Van Rooij, Lusardi and Alessie (2011) and four questions were added to elicit knowledge about fees and the effect of diversification.

   In phase 1 of the investment task, the subjects received recommendations from advisor 1 about six alternatives (see Table 4.2). Alternative 1 was equal to investing the cash according to the initial portfolio, which was constructed using the risk and return data from the above-mentioned funds. Alternatives 2-5 involved different ways of selling the current portfolio and reinvesting the whole amount according to the proposed split-up. Alternatives were constructed such as that they clearly differed with respect to risk and return. Alternative 6 was risk-free, i.e., selling the funds and putting the whole amount of EUR 100,000 into a risk-free bond. This was a stylized alternative with zero cost to give an alternative to subjects who did not want to incur any risk. In phase 1, advisor 1 did not recommend any specific portfolio but gave a range of possible alternatives without favoring any. In phase 1, subjects knew that the recommendation was free of charge but also that the advisor would earn an (undisclosed) commission based on their choice. The risk, return and cost structure of each portfolio was hidden behind a link. Subjects had to explicitly click on that link to reveal the information. The system recorded whether subjects retrieved all information.

   When participants do not want to avoid any risk (alternative 6) but are risk-averse, alternatives 4 and 5 strictly dominate over alternatives 1-3. They either offer a lower risk at equal expected returns (4) or a higher expected return for the same level of risk (alternative 5). Moreover, they offer these advantages without charging higher fees (in fact, they cost less).

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[2]The questions can be found in Tables A.7, A.8 and A.9 in the appendix.

Table 4.2: Portfolios

Fund	Fund A Share	Fund B Share	Fund C Share	Exp. Return p.a.	Volatility p.a.	Total Costs incl. annual fees EUR	Commission EUR*
Alternative							
1	38%	27%	36%	4.50%	14.60%	2,247	1,131.20
2	13%	49%	38%	4.50%	17.70%	3,102	1,427.20
3	23%	48%	29%	3.80%	14.60%	2,772	1,131.20
4	45%	21%	34%	4.50%	13.60%	2,114	1,069.60
4+*	48%	18%	34%	4.50%	13.30%	2,060	1,052.80
5	43%	20%	37%	4.80%	14.60%	2,201	1,172
5+*	45%	17%	38%	4.90%	14.60%	2,187	1,195.20
6	0	0	0	1.00%	0	0	0
7*	48%	13%	39%	5.00%	14.60%	1,000	0

Note: The table shows the portfolios from which the participants chose in the first stage (1, 2, 3, 4, 5, 6) and the second stage (4+, 5+, 7). The last column shows the commissions associated with choosing the respective alternative. Information marked with * was not displayed until the second stage.

In phase 2, subjects were able to change their decision based on the recommendations of up to two other advisors: however, they were not forced to do so. They could easily skip this phase and stick with their choice. In the literature, there is a dearth of empirical evidence on how many advisors are contacted before a decision is made. Bucher-Koenen and Koenen (2011) report that 40% of their panel subjects contacted more than one financial advisor before signing up for a pension scheme. Besides, given the inertia that people exhibit in financial decision making, it seems unlikely that they would find a longer search useful.

In phase 2, advisor 2 suggested a superior alternative irrespective of the choice made in phase 1. If the participant had chosen alternative 4 previously, a portfolio was proposed with a lower risk but identical expected return (4+). Likewise, if he had chosen alternative 5, he received an alternative with a higher expected return and identical risk (5+). If he had chosen neither 4 nor 5, he was randomly presented either 4+ or 5+. Subjects were informed that advisor 2 - like advisor 1 before - would give a recommendation for free but that he would earn a commission based on their choice of alternative. This time, however, the amount of the commission of both was disclosed. Based on whether 4+ or 5+ were recommended, advisor 2 either earned a lower or higher commission than advisor 1. The proposition of advisor 2 was directly compared to the previous decision in terms of fund shares, expected return, risk and the commissions paid. It was made clear that the commission was not to be paid directly by the participant, but would be financed through the load that the participant was paying. As in phase 1, the risk, return and cost structure was hidden behind a link and subjects had to make the information visible by clicking on it. Again, it was recorded whether a subject had seen all information before making his decision. Note that the information about the different commissions that advisors would receive was instantaneously available, i.e., subjects did not have to request that information explicitly.

To test whether some participants were willing to pay for another recommendation unassociated with a commission, advisor 3 was made available in the phase 2. He charged a fee of EUR 1,000 for his recommendation: however, loads would be waived. Before being able to see his advice, participants had to click on an extra button and were reminded that the money would be withdrawn from the amount they could invest. This way, the key difference from the indirect payment of the commissions was made obvious to participants. The proposal of advisor 3 was better than every other alternative.

The willingness to pay for a second opinion is likely to be path-dependent. If some advice is already available, one's willingness to pay for another recommendation might be lower than if one had to explicitly choose between free and paid advice. If participants are myopic or lazy in their search process, they might refrain from accessing a second opinion when they have already received one. To control for that, about half of participants in phase 2 were randomly placed in a control group, where they had to explicitly decide between getting the recommendation of advisor 2 or paying for advisor 3. Once they selected one advice option, this decision could not be undone to prevent subjects in the control group from getting recommendations from more than one advisor in phase 2.

The experiment concluded with questions to evaluate participants' confidence into their decision and whether the information provided was sufficient to make a decision. Lastly, demographic data (gender, age, aspired degree and length of study) was elicited.

4.4   Results

4.4.1   Descriptive Results

The experiment was conducted over the Internet at the University of Hamburg, Germany in December, 2012.[3] A total of 210 students completed the experiment and were thus eligible for payment. Among them were 97 female students (46.19%), and 124 undergraduates (59%).[4] At the end of the experiment, 18 students were randomly drawn for payment.

Table 4.3 shows the descriptive results. In the table, the participants are already divided into groups for further analysis. For groups 1 and 2 the recommendation of advisor 2 was instantaneously available. Group 2 contains participants who requested paid advice from advisor 3 after having seen the recommendation of advisor 2. The control group contained participants who explicitly requested either the recommendation of advisor 2 only (group 3), or the paid recommendation of advisor 3 (group 4). Lastly, group 5 contains participants who selected no advice in phase 2. They do not contribute to the question how participants react to disclosure and thus are excluded from further analysis.

The participants exhibited a higher financial knowledge than a representative panel; the six questions that were taken from Van Rooij, Lusardi and Alessie (2011) were answered correctly by 66.27% as compared to 63.45% in the panel study by the authors. The four questions which were also answered by 25,000 US residents (53% correctly) were correctly answered by 64% of the subjects (FINRA Investor Education Foundation (2013)). Undergraduates were found to have a significantly lower level of financial literacy (mean 5.12 compared to 5.91), using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=3.142, N=210). The difference is significant at a level below 5%.

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[3]The appendix contains the translated instructions, decision situation and used variables.
[4]For one participant, the aspired academic degree has not been recorded.

Table 4.3: Descriptive Results

Group Advisors used in phase 2	1 2	2 2+3	3 2	4 3	5 none	Total
N	76	25	37	42	30	210
Rationality Phase 1	73.68%	72.00%	67.57%	78.57%	80.00%	74.29%
Information Usage Phase 1	68.42%	72.00%	64.86%	76.19%	76.67%	70.95%
Rationality Phase 2	48.68%	72.00%	64.86%	52.38%	.	59.48%
Information Usage Phase 2	63.15%	68.00%	64.86%	.	.	65.34%
Financial Literacy	5.76(6)	5.24(5)	5.46(6)	4.98(5)	5.5(5)	5.45(5)
Risk (General)	4.83(5)	4.84(5)	4.81(5)	5.43(5)	4.9(5)	4.96(5)
Risk (Financial)	3.51(3)	3.76(4)	3.59(4)	3.81(4)	3.57(4)	3.62(4)
Age	24.43(24)	22.96(23)	24.86(24)	24.05(23)	26.3(25)	24.52(23)

Note: This table shows descriptive results. N is the number of participants in the respective group. Rationality Phase 1 (Phase 2) is the percentage rate of participants who selected an efficient portfolio in phase 1 (phase 2) of the investment task. Information Usage Phase 1 (Phase 2) is the percentage rate of participants who retrieved all fund information before making a decision. fl is the number of correctly answered financial literacy questions (up to 10), $risk_g$ and $risk_f$ measure the general and financial attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), age measures the age of the participant. For the last four variables, the mean (and median) are given.

In the investment setting, the rational choice for a risk-averse participant was to select a higher expected return portfolio at equal risk or a lower risk portfolio at equal expected return, given that participants are risk-averse. The assumption of risk aversion is supported by the data. On an 11-point scale, with decreasing general (financial) risk aversion (0 = very high risk aversion), 57% (79%) ticked 5 or less, the median was 5 (4). A chi-square test to detect a relationship between group and risk attitude reveals that risk attitudes do not differ between groups (p = 0.976 (0.817) for general (financial) risk).

Given the risk aversion of participants, the rational benchmark for decisions in both phases of the experiment is obvious. In phase 1 (undisclosed commissions), one should select either alternative 4 or 5.[5] In phase 2 (disclosed commissions), the best choice was

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[5]Likewise, a risk-seeking participant should have taken alternative 2 in phase 1, I do not investigate the case of risk-seeking investors further, since their existence seems unrealistic for private investors.

to follow advisor 2, or 3 (alternatives 4+, 5+ or 7).[6]

Overall, participants decided better without the disclosure than with it. A Wilcoxon signed-rank test between the total rate of rational answers with the null hypothesis that these do not differ shows a statistically significant difference (N=210, z-value=3.969, p<0.01). Subjects may overestimate the information contained in the disclosure information, i.e., they may have overestimated its informativeness.

As far as information usage is concerned, about two-thirds of all participants request all information before making a choice. Since the comparison between both advisors in terms of commissions, risk, return and costs of their suggested portfolios was missing in group 4, where subjects received advice from a paid advisor only, the information usage was not recorded for these participants (and obviously not for participants in group 5, who skipped phase 2). The overall rate is found to be decreasing between both decisions; however, the difference is not found to be significant using a Wilcoxon signed-rank test (N=138, z-value = 1.508). In contrast to group 2 (N=25, z-value=0.5637), there is a statistically significant change in group 1, where the rate of subjects seeing all information decreased from 68 to 63%. The difference is significant at a level below 5% (N=76, t-value=2.000). It is likely that the treatment effect of varying commission structure is strongest in groups 1 and 3, since participants did not request advice from advisor 3 in these groups; however, the decrease is not significant in group 3, where subjects explicitly requested the recommendation of advisor 2 (N=37, z-value=0.000). This difference in behavior between an explicit choice and an instant recommendation is discussed in greater detail below.

The lowest rate of rationality is observed in group 1, where

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[6]I coded those selecting the risk-free option in phase 1 (alternative 6) as having made the rational decision in phase 2 if they stuck to their decision. These subjects want to avoid any risk and thus should not select a risky portfolio if they refrained from doing so in phase 1.

subjects received free advice by default and did not request paid advice. Here, only about 48% of the subjects managed to select the utility-maximizing portfolio for a risk-averse investor. The difference from the other groups is significant at a 10% level using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=1.712, N=180) with a dummy variable that equals one if the respective subject is in group 1, and zero otherwise.[7]

One could argue, that participants were unable to cope with disclosure of commissions and advice at the same time. One limit of the experimental design is that these effects cannot be disentangled; however, splitting participants into those who requested paid advice only (group 4) and those who saw the recommendation of advisor 2 only or in conjunction with the paid advice (group 1 to 3) shows that participants in the former group actually performed slightly worse (52.38% vs. 57.24%); however, the difference is not significant using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=0.555, N=180). The same is true when participants in group 2, who saw the commission disclosure of advisor 2 and requested advisor 3 afterwards, are compared with participants in group 4 (z-value=1.572, N=67). In sum, there is no clear indication that the simultaneous disclosure of commission information and the availability of additional advice is responsible for the decline in performance. The following section is dedicated to researching the ways in which information search affects rational decision making and how the treatment variations influence the choice between relying on one's own information and following advice.

4.4.2 Determinants of Rationality in the Case of Disclosure

How does information gathering, i.e., reading all fund information before making a choice, influences a rational decision in the case of

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[7]Excluded are participants in group 5, i.e., participants who did not request advice in phase 2.

disclosed commissions? To answer this question, I ran a probit regression with a dummy variable as the dependent variable, which turned one, if the subject followed the recommendation in phase 2, which was the rational choice in every treatment, and zero otherwise. This regression only includes participants in groups 1 to 3, where information search was recorded. The explaining variable is a dummy variable ($info$) which is one, if that subject has seen all information in phase 2, and zero otherwise. Control variables included are the treatment variable $prov$, which turns one if the subject was randomly assigned to the treatment where advisor 2 earned more if his advice was followed, and zero if advisor 2 earned less than advisor 1, respectively. Further controls are the level of financial literacy (as measured by the number of correctly answered questions), the risk attitude in general and in the financial area specifically, age, whether the subject is enrolled in an economic major ($econ$), and a gender dummy that turns one if the subject is male, and zero otherwise. Table 4.4 shows the results.

The results clearly show that information gathering is a major determinant of a rational decision in phase 2. The coefficient of 1.379 is statistically significant at a level below 1% (z-value=5.26). The marginal effect and economic significance is 54.81% indicating that participants who saw all fund information had a 55% higher probability to act rationally than other participants in the subset. Interestingly, all other control variables, including the level of financial literacy, have no influence on the probability of a rational choice. The results do not change if the variable for financial literacy is replaced by a control for each of the financial literacy questions, which equals one if that answer has been answered correctly, and zero otherwise. However, the correlation between financial literacy and $info$ is significant using Spearmans rank correlation coefficient (ρ=0.2213, p=0.0091). Also, the treatment variation has no direct effect on the probability of making a rational choice; however, if one investigates the determinants of looking up all information before making a decision, the picture changes.

Table 4.4: Probit Rational Decision (Phase 2)

	β SE	Mfx Efx
$info$	1.3789***	0.5381
	(0.2623)	53.81%
$prov$	0.5733	0.0224
	(0.2551)	2.24%
fl	0.0716	0.0280
	(0.0750)	0.21%
$risk_g$	-0.0718	-0.0280
	(0.0840)	-0.24%
$risk_f$	0.0221	0.0086
	(0.0865)	0.07%
age	-0.0167	-0.0065
	(0.0310)	-0.02%
$gender$	0.4064	0.1586
	(0.2632)	15.86%
$econ$	-0.1386	-0.0541
	(0.2844)	-5.41%
Constant	-0.5806	(0.7711)

Observations = 138, Pseudo R^2 = 0.2313

Significance levels : $*: 10\%$ $**: 5\%$ $***: 1\%$

Note: This table reports probit coefficients, standard errors (in parentheses), margins (Mfx) and economic significances (Efx) for the participants requesting the recommendation of advisor 2 (groups 1 to 3, N=138). Economic significance is the average change in probability for a one standard deviation change for a continuous independent variable or for the change from zero to one for a dummy variable. The dependent variable takes the value of one if the participant has acted rationally in the phase 2 of the experiment, and zero otherwise. The following explanatory variables are included: $info$ is a dummy variable which equals one if the participant has retrieved all fund information before making a choice in phase 2, and zero otherwise. $prov$ is a dummy variable which equals one if the participant was randomly assigned to the treatment where advisor 2 earned a higher commission, and zero if he was in the treatment where this advisor earned a lower commission. fl measures financial literacy on a scale from 0 to 10 (correctly answered questions). $risk_g$ and $risk_f$ measure the general and financial attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), age measures the age of the participant, $gender$ is a dummy variable, which turns one if the participant is male, and zero otherwise, and $econ$ is a dummy variable that equals one if the participant is enrolled in an economic major, and zero otherwise.

Table 4.5 shows the results of a probit regression with the dependent variable $info$. Included is also a dummy variable $phase_1$, which equals one if the participant was able to correctly select a fund in phase 1, and zero otherwise. As Hypothesis 2a stated, subjects who fail to behave rationally in phase 1 should be more

likely to use the recommendation instead of acquiring their own information, based on the commission structure. The subset of participants is identical (N=138).

The results imply that the performance in phase 1 and the commission structure are the main determinants of information search behavior across all three groups. The coefficient of 0.4822 is statistically significant from zero at a level below 10% (z-value=1.84). The marginal effect and economic significance is 17.41%, which implies that participants who were randomly assigned to the treatment where advisor 2 earns a higher provision have a 17% higher probability of accessing all of the fund information. Hence, the treatment effect with varying commissions does not affect the rational choice directly but indirectly through a different search behavior of subjects; however, the significance of the coefficient is driven by group 1. The null hypothesis that search behavior is not different between treatment groups can only be rejected for this group using a two-sample Wilcoxon rank-sum (Mann-Whitney) test (z-value=-3.123, p=0.0018). That is, participants in group 1 are significantly more likely to refrain from using their own information if advisor 2 earns a lower provision than advisor 1. The implication of this result is that subjects tend to align their search behavior with the commission structure with which they are confronted: when they learn in phase 2 that advisor 1 earns a higher the commission than advisor 2, 50% of participants stop seeking fund information. They might irrationally see no sense in investing more time in the search, since the disclosure about the commission already pointed to the (wrong) conclusion. By contrast, if advisor 2 earns a higher commission, almost 90% of participants look at all fund information in phase 2 before making their choice. Recall that this effect diminishes as soon as they get another, paid recommendation (group 2) or explicitly request the recommendation of advisor 2 only (group 3). Thus, additional information or an explicit choice between a paid and a possibly commission-influenced recommendation can help in processing disclosure information. Thus, Hypothesis 1, that the commission structure

matters for information search behavior, can be confirmed but only for the subset of participants who received the recommendation of advisor 2 instantaneously, and did not pay for advisor 3 (group 1).

Table 4.5: Probit Information Search (Phase 2)

	β SE	Mfx Efx
$phase_1$	1.1403***	0.4117
	(0.2667)	41.17%
$prov$	0.4822*	0.1741
	(0.2615)	17.41%
fl	0.0923	0.0333
	(0.0777)	0.26%
$risk_g$	0.0521	0.0188
	(0.0821)	0.15%
$risk_f$	-0.1307	-0.0472
	(0.0848)	-0.40%
age	0.0150	0.0054
	(0.0313)	0.02%
$gender$	0.4004	0.1446
	(0.2654)	14.46%
$econ$	0.1377	0.0497
	(0.2900)	4.97%
Constant	-1.5058*	
	(0.8298)	

Observations = 138, Pseudo R^2 = 0.2152

Significance levels : ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%
Note: This table reports probit coefficients, standard errors (in parentheses), margins (Mfx) and economic significances (Efx) for the participants requesting the recommendation of advisor 2 (groups 1 to 3, N=138). Economic significance is the average change in probability for a one standard deviation change for a continuous independent variable or for the change from zero to one for a dummy variable. The dependent variable takes the value of one if the participant has retrieved all fund information retrieved all fund information before making a choice in phase 2, and zero otherwise. The following explanatory variables are included: $phase_1$ is a dummy variable which is one if the participant has acted rationally in phase 1, and zero otherwise. $prov$ is a dummy variable which is one if the participant was randomly assigned to the treatment where advisor 2 earned a higher commission, and zero if he was in the treatment where this advisor earned a lower commission, fl is the number of correctly answered financial literacy questions (up to 10), $risk_g$ and $risk_f$ measure the general and financial attitude of subjects, respectively (0 = high risk aversion, 10 = no risk aversion), age measures the age of the participant, $gender$ is a dummy variable, which turns one if the participant is male, and zero otherwise, and $econ$ is a dummy variable that equals one if the participant is enrolled in an economic major, and zero otherwise.

Hypothesis 2a can also be confirmed. The coefficient of 1.14 is statistically significant at a level below 1% (z-value=4.28). This implies that the ability to correctly select a fund without a clear-cut product recommendation strongly influences the information search behavior while controlling for the commission structure. Participants who are unable to succeed in phase 1 are more likely to align their information acquisition to the commission structure.

Subjects are not willing to pay for additional advice based on the commission structure. Using a two-sample Wilcoxon rank-sum (Mann-Whitney) test, I find that the portion of participants who are willing to pay for advisor 3 after having seen advisor 2 is statistically not different between treatments (N=101, z-value=1.218). It is also not the case that participants who are unable to correctly select a fund in phase 1 are more willing to pay for advice (Hypothesis 2b). A Wilcoxon rank-sum (Mann-Whitney) test reveals that the difference between those able to correctly select a fund in phase 1 and those who are not is statistically not significant with regard to the probability of paying for advisor 3 (N=101, z-value=0.164). It is difficult to assess the reasons for this behavior. One explanation might be that the confidence which participants assign to the advisor they are about to follow is so strong that subjects felt no need for a third opinion.

As noted above, the confidence in the decision ($conf$) on a scale from 0 (no confidence at all) to 10 (very much confidence), as well as the perceived sufficiency of the fund information provided ($sffc$) on a scale from 0 (not sufficient at all) to 10 (very sufficient) was elicited following the investment task. The answers to these question for groups 1-3 are shown in Table 4.6 and shed additional light on behavior. The figures are split between the commission treatment, where 0 (1) stands for the treatment where advisor 2 earned less (more) than advisor 1. Also, the difference between participants requesting all information (1, 0 otherwise) is measured using a Wilcoxon rank-sum (Mann-Whitney) test with the null hypothesis that the difference is not statistically different

from zero. The results show that the confidence in the decision is significantly larger when all information has been accessed, irrespective of the commission treatment. The results imply that participants who do not see all information before making a choice show statistically significantly less confidence in their decision.

Table 4.6: Confidence in Decision and Perceived Information Quality

info	*conf* lower	*conf* higher	*sffc* lower	*sffc* higher
0	5.00	4.38	5.03	3.69
1	6.02	5.97	5.18	5.41
z-value	-1.842*	-2.183**	-0.124	-2.238**
N	86	52	86	52

Note: This table shows the mean confidence that participants in groups 1 - 3 (N=138) assigned to their decision (*conf*) on a scale from 0 (no confidence at all) to 10 (very much confidence) and the mean for the answer whether the fund information provided was sufficient to make an informed decision (*scc*) on a scale from (0 not sufficient at all) to 10 (very sufficient). The difference variable is a dummy variable which is one if the participant has seen all information before making a decision, and zero otherwise. The third row contains z-values of Wilcoxon rank-sum (Mann-Whitney) tests with the null hypothesis that the difference of means is not statistically different from zero. *lower* (*higher*) is a dummy variable which is one if the participant was randomly assigned to the treatment where advisor 2 earned a lower (higher) commission, and zero otherwise.

However, when it comes to assessing the sufficiency of information, the picture changes. Whereas the difference between seeing all information and refraining from doing so is still statistically significant for participants in the higher commission treatment at a level below 5% (z-value=-2.238), there is no statistically significant difference for participants in the lower commission treatment (column 4). The perceived sufficiency of the information is only slightly higher for participants who saw all information (5.18) than for those who did not (5.03). Yet, participants in the latter group assign almost the same level of sufficiency to it, although most of them did not review the fund information needed. Also puzzling is a comparison between the last two columns in the first row, i.e., the information sufficiency between those who did not see all information and were in the lower commission treatment

($prov = 0$). The difference between the value of 5.03 differs from what participants in the higher treatment without all information assign (3.69) at a statistically significant level below 10% using a Wilcoxon rank-sum (Mann-Whitney) test (z-value=1.913). The varying commission causes a statistically significant effect on the level of fund information sufficiency. Obviously, participants assigned a higher level of information sufficiency to the same fund information based on the disclosure information they saw, although the disclosure information and the fund information were completely independent from each other.

The results imply that participants tend to overweigh the disclosure information they receive. They draw a conclusion from the advisors' incentives about the soundness of the proposed portfolio where none exists, since the recommendation of advisor 2 was better in all the commission treatments. When advisor 2 earns less than advisor 1, participants refrain from seeking fund information and follow advisor 1 instead. Still, they exhibit a higher confidence in their decision and attribute a higher level of sufficiency to the information they consume. As an extension to Loewenstein, Cain and Sah (2011), who conclude that recipients fail to fully discount biased advice when conflicts of interest are disclosed, this result points to a different problem: subjects may misunderstand disclosure information, use it to assess the credibility of advice, and reduce their search efforts in response to it.

4.5   Conclusion

The regulation of disclosure aims to improve financial decision making, and to increase the ability to detect potential conflicts of interest. However, a recommendation can be truthful even when the commission structure seems to speak against it. The purpose of this experiment was to detect how investors react to differences in the commissions as measured by their propensity to follow a recommendation or to use their own information instead.

The results of the experiment suggest that the pure disclosure of conflicts of interest is not helpful in improving financial decision making. There is strong evidence that subjects who have difficulties identifying the right portfolio without disclosure struggle even more when the commissions are disclosed. This is detrimental since regulatory efforts to improve financial decision making target those groups in particular. Even more remarkable is the fact that financial literacy is obviously limited in its ability to help participants to understand what has been disclosed.

The results also show what can happen if investors do not fully understand what they see. They could mistake the information they receive, overestimate the disclosure information, and discount sound recommendations. These investors may interpret a higher commission as a sign of greater trustworthiness irrespective of what the portfolio looks like, and align their information usage accordingly.

The findings have two silver linings: First, getting a paid opinion independent of commission helps; however, the propensity to request it is low, probably because free advice is already available. So, how can providers of unbiased, pre-paid advice emerge on the market if participants are unwilling to pay for it?

Second, the context of the disclosure matters. Participants who explicitly requested a possibly biased recommendation did better than subjects who could access such advice instantaneously. Thus, whether advice is available by default or only after an explicit choice plays an important role in investors' ability to process disclosure information correctly. Therefore, it may be valuable to inform investors beforehand on how commissions can influence the recommendation they receive: namely, by splitting up advice into information about commissions, and the recommendation itself. In the experiment, this was done by informing subjects that the renumeration of advisors is influenced by their decisions before showing them the recommendation.

Further research should vary the truthfulness of the recommen-
dation. It would be worth investigating how participants react if
they have chosen a correct portfolio at first but then get a worse
recommendation with commissions disclosed. In addition, the
marginal effects of the commission structure should be examined in
greater detail, e.g., the difference between two commissions could
be varied to see if participants have a certain reservation value up
to which they follow a better or worse recommendation as com-
pared to their first decision. This study was designed to examine
the basic effects of the disclosure of commissions on the propensity
to follow financial advice and to gather one's own information.

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Appendices

A   Experimental Methods

A.1   Overview of the Experiments

Experiment 1

Instructions Self-Assessment Financial Literacy Risk (General) Risk (Lotteries)	Financial Literacy Risk (Financial)	Information / Choice of Payment Choice of Investment Horizon	Fund Choice Motivation Reasons Behavior (MC) Confidence Advisor	Demographics

Experiment 2

Instructions Cognitive Ability Self-Assessment Financial Literacy	Risk (General) Risk (Lotteries) Risk (Financial Fund Choice 1	Financial Literacy	Fund Choice 2 Reasons Behavior (MC) Confidence Advisor Influence Advisor	Demographics

Experiment 3

Instructions Self-Assessment Financial Literacy Risk (General) Risk (Financial)	Portfolio Knowledge Financial Literacy 1	Fund Choice	Reasons Behavior (Text) Confidence Decision Information Quality	Financial Literacy 2 Demographics

Figure A.1: Timeline Experiments 1-3

A.2   Experiment 1 - Instructions / Situation

Instructions

During the experiment you will be asked to choose a fund and an investment horizon of two, five or ten years. For this you are

granted a hypothetical investment sum of EUR 10,000. 30,000 normally distributed annual return realizations were drawn for every fund based on the actual performance of the respective fund in the years 2001-2010. From these realizations, a sample of ten returns has been drawn to improvise the performance of the respective fund. As a result, there is a certain fund end value for every fund and investment horizon. Deviating from the usual pay rules at ORSEE[8], eleven randomly selected participants will earn 0.1 and 1% of their end value at the end of the experiment.

Situation

Note: Fund X was called fund Ixion in the experiment.

In the course of the investment decision on the next site you will have to select one out of three funds. You will be asked to imagine that you inherited EUR 10,000, which you now want to invest. You can further choose between an investment horizon of two, five and ten years.

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Imagine you inherited EUR 10,000, which you want to invest in **one** fund. You can choose from the three funds below. All funds use the DAX as a benchmark. You receive additional information with regard to the funds by clicking on the respective link. In addition, you have the possibility of receiving a recommendation from an independent advisor for free. You'll find more information about that below the fund information. *The fund information was*

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[8]Experimental recruitment pool at the University of Hamburg.

displayed in a random order.

Table A.1: Fund Information

Eris	Ixion	Varuna
Risk and Return Profile (1)	Risk and Return Profile (1)	Risk and Return Profile (1)
Previous Performance (2)	Previous Performance (3)	Previous Performance (4)
Costs (5)	Costs (6)	Costs (7)
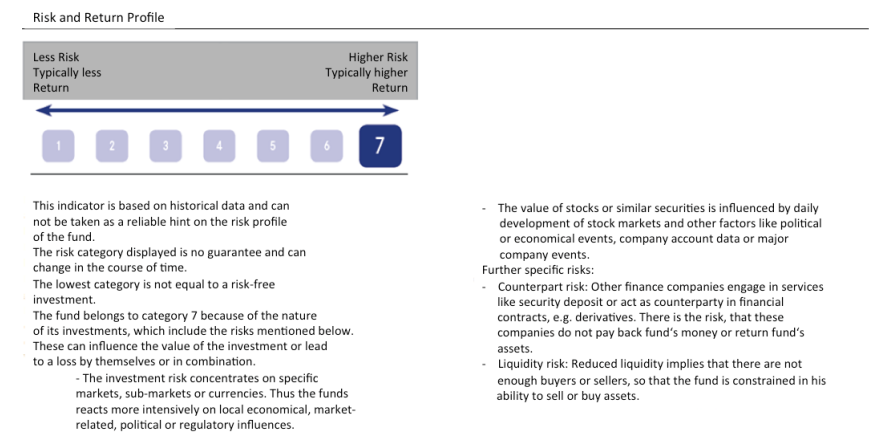
Figure A.2: Risk and Return Profile - All Funds (1)

Previous Performance

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time
displayed in the graph. It is expressed
as the percentage change of net asset value at year end. The fund was incepted at December 31st, 2000. The value of the fund is EUR.

Current expenses were

Historical performance until December, 31st 2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fund	-21,19	-45,34	35,68	5,94	20,62	20,58	20,89	-41,77	22,45	14,66
Benchmark Index DAX®	-19,79	-43,94	37,08	7,34	27,07	21,98	22,29	-40,37	23,85	16,06

Figure A.3: Previous Performance Fund Eris (2)

Previous Performance

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time
displayed in the graph. It is expressed
as the percentage change of net asset value at year end. The fund was incepted at December 31st, 2000. The value of the fund is EUR.

Current expenses were

Historical performance until December, 31st 2010

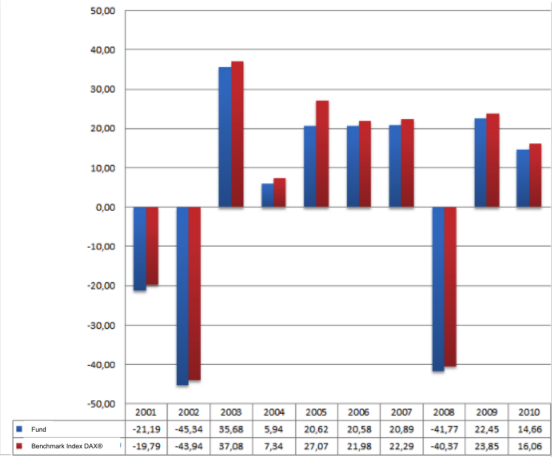|	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fund	-19,47	-44,61	36,39	6,03	26,04	22,02	20,80	-40,86	22,59	15,14
Benchmark Index DAX®	-19,79	-43,94	37,08	7,34	27,07	21,98	22,29	-40,37	23,85	16,06
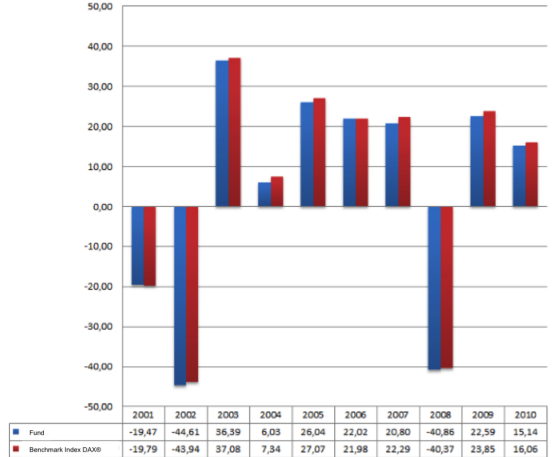
Figure A.4: Previous Performance Fund Ixion (3)

Previous Performance

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time displayed in the graph. It is expressed as the percentage change of net asset value at year end. The fund was incepted at December 31st, 2000. The value of the fund is EUR.

Current expenses were

Historical performance until December, 31st 2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fund	-28,79	-44,82	40,62	5,35	26,90	20,99	19,70	-36,35	31,74	25,12
Benchmark Index DAX®	-19,79	-43,94	37,08	7,34	27,07	21,98	22,29	-40,37	23,85	16,06

Figure A.5: Previous Performance Fund Varuna (4)

Costs

*Costs paid by investor limit the potential investment upside.

†Constant since fund inception, remain unchanged until end of selected investment horizon.

One time costs before and after investment	
Front-end load	5% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your investment sum before the investment or from your return before payout.

Costs deducted from fund during the year	
Operating costs	1,40% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.6: Costs Fund Eris (5)

Costs

*Costs paid by investor limit the potential investment upside.

†Constant since fund inception, remain unchanged until end of selected investment horizon.

One time costs before and after investment	
Front-end load	0% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your investment sum before the investment or from your return before payout.

Costs deducted from fund during the year	
Operating costs	0,17% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.7: Costs Fund Ixion (6)

Costs

*Costs paid by investor limit the
potential investment upside.

  †Constant since fund inception, remain
unchanged until end of selected investment
horizon.

One time costs before and after investment	
Front-end load	0% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your
investment sum before the investment or from your return
before payout.

Costs deducted from fund during the year	
Operating costs	1,40% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.8: Costs Fund Varuna (7)

Potential Payment

If selected, you will receive a payment of 0.1% (*Control Group :
1%*) of your net asset value at the end of the investment horizon
of (2/5/10) years (*choice displayed*).

Basis: Randomly drawn return out of 30,000 normally distributed
realizations
on the basis of the performance of the selected fund in the years
2001- 2010.

Financial advisor

You have the opportunity to receive the recommendation of an
independent financial advisor for free.
If you want to do so, just click on the link below.

Recommendation Financial Advisor

> Please keep in mind that historical returns are not neces-
> sarily representative of future performance. Also, costs
> have to be incorporated when interpreting past perfor-
> mance. The same is true for future investments: in ad-
> dition to annual costs, one-time fees should be taken
> into account (e.g., loads). The load reduces your initial
> investment sum. The relative importance of the load
> declines as the investment horizon increases.

Figure A.9: Active Advice

Based on all relevant measures, fund Ixion is to be favored.

Figure A.10: Default Advice

——————————**Choice of one fund** ——————————

A.3   Experiment 2 - Instructions / Situation

Instructions

During the experiment, you have to make **two** independent investment decisions. In each decision, you have to choose **one out of three** funds and an investment horizon. For this, you are granted a hypothetical investment sum of EUR 10,000. Based on the performance history of the funds in the years 2002-2011, 30,000 normally distributed annual return realizations were drawn. From these realizations, a sample of ten returns has been drawn to model the performance of the respective fund. As a result, there is a certain fund end value for every decision (fund and investment horizon).

At the close of the experiment, 10% of participants will be randomly drawn for payment. The payment will be determined as follows:

- A fair die determines which investment decision is the basis for the payment. At 3 and 5, the first decision is decisive, for every other number, the second decision is decisive. The probability that the first (second) decision is the basis for the payment is thus 1/3 (2/3).

- Based on the selected fund and investment horizon, there

will be a certain portfolio end value for every fund. For every investment horizon, there are - depending on the fund - three different portfolio end values: for the highest portfolio end value within an investment horizon, EUR 90 will be paid; for the medium portfolio end value within an investment horizon, EUR 50 will be paid; and for the lowest portfolio end value within an investment horizon EUR 10 will be paid.

Situation

Note: The three funds used in fund choice 1 were identical to those used in fund choice 2, but the names were changed: Okeanos = Eris [= A], Phoibe = Varuna [=B], Tethys = Ixion [= C].

Fund choice 1

Imagine you inherited EUR 10,000, which you want to invest in **one** fund. Three funds are available. All funds use the DAX as a benchmark. The DAX displays the market value development of the 30 biggest listed companies in Germany ranked by market capitalization. More details regarding the funds are mentioned below.

Subjects were able to order the categories risk and return, previous performance, and costs. The fund information was displayed in their previously selected ordering. Fund information is shown below with fund choice 2.

Potential Payment

If you are selected for payment, your decision here is decisive for your payment with a probability of 1/3.

Please select an investment horizon (choice of 2, 5, 10 years)

──────────────Choice of one fund ──────────────

Fund choice 2

Imagine you inherited EUR 10,000, which you want to invest in **one** fund. Three funds are available. All funds use the DAX as a benchmark. The DAX displays the market value development of the 30 biggest listed companies in Germany ranked by market capitalization. You can receive additional information regarding the funds by clicking on the respective link.

In addition, you have the possibility of receiving a recommendation from an independent advisor for free. You will find more information about that below the fund information.

Table A.2: Fund Information

Categories	Ixion	Eris	Varuna
Risk and Return	Risk and Return (1)	Risk and Return (1)	Risk and Return (1)
Previous Performance	Previous Performance (2)	Previous Performance (3)	Previous Performance (4)
Costs	Costs (5)	Costs (6)	Costs (7)

Risk and Return Profile

Less Risk
Typically less
Return

Higher Risk
Typically higher
Return

1 2 3 4 5 6 **7**

This indicator is based on historical data and can not be taken as a reliable hint on the risk profile of the fund.
The risk category displayed is no guarantee and can change in the course of time.
The lowest category is not equal to a risk-free investment.
The fund belongs to category 7 because of the nature of its investments, which include the risks mentioned below. These can influence the value of the investment or lead to a loss by themselves or in combination.

- The investment risk concentrates on specific markets, sub-markets or currencies. Thus the funds reacts more intensively on local economical, market-related, political or regulatory influences.

- The value of stocks or similar securities is influenced by daily development of stock markets and other factors like political or economical events, company account data or major company events.
Further specific risks:
- Counterpart risk: Other finance companies engage in services like security deposit or act as counterparty in financial contracts, e.g. derivatives. There is the risk, that these companies do not pay back fund's money or return fund's assets.
- Liquidity risk: Reduced liquidity implies that there are not enough buyers or sellers, so that the fund is constrained in his ability to sell or buy assets.

Figure A.11: Risk and Return Profile - All Funds (1)

Previous Performance

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time displayed in the graph. It is expressed as the percentage change of net asset value at year end. The fund was incepted at December 31st, 2000. The value of the fund is EUR.

Current expenses were incorporated into the calculation, however front-end loads/back-end loads were ignored.
† Index benchmark: DAX®

Historical performance until December, 31st, 2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fund	-44.61%	36.39%	6.03%	26.04%	22.02%	20.80%	-40.86%	22.59%	15.14%	-15.93%
Index benchmark: DAX®	-43.94%	37.08%	7.34%	27.07%	21.98%	22.29%	-40.37%	23.85%	16.06%	-14.69%
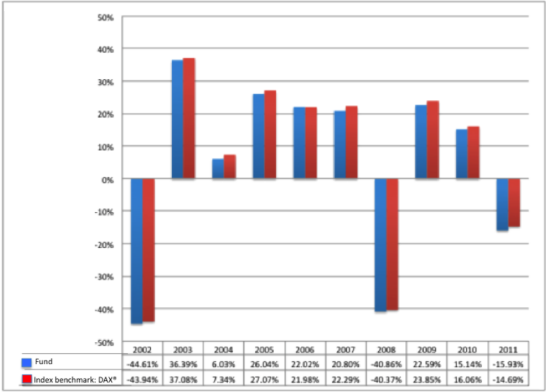
Figure A.12: Previous Performance Fund Tethys/Ixion [C] (2)

Previous Performance

Historical performance until December, 31st , 2011

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time displayed in the graph. It is expressed as the percentage change of net asset value at year end. The fund was incepted at December 31st , 2000. The value of the fund is EUR.

Current expenses were incorporated into the calculation, however front-end loads/ back-end loads were ignored.
† Index benchmark: DAX®

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fund	-44.61%	36.39%	6.03%	26.04%	22.02%	20.80%	-40.86%	22.59%	15.14%	-15.93%
Index benchmark: DAX®	-43.94%	37.08%	7.34%	27.07%	21.98%	22.29%	-40.37%	23.85%	16.06%	-14.69%

Figure A.13: Previous Performance Fund Okeanos/Eris [A] (3)

Previous Performance

Historical performance until December, 31st , 2011

Past performance is no guarantee for future developments.

The graph shows the annual performance of the fund in EUR for the full calendar year across the time displayed in the graph. It is expressed as the percentage change of net asset value at year end. The fund was incepted at December 31st , 2000. The value of the fund is EUR.

Current expenses were incorporated into the calculation, however front-end loads/ back-end loads were ignored.
† Index benchmark: DAX®

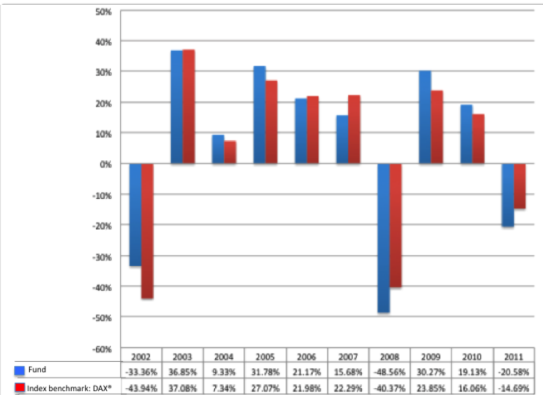|	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fund	-33.36%	36.85%	9.33%	31.78%	21.17%	15.68%	-48.56%	30.27%	19.13%	-20.58%
Index benchmark: DAX®	-43.94%	37.08%	7.34%	27.07%	21.98%	22.29%	-40.37%	23.85%	16.06%	-14.69%

Figure A.14: Previous Performance Fund Phoibe/Varuna [B] - Treat. 1 & 2 (4)
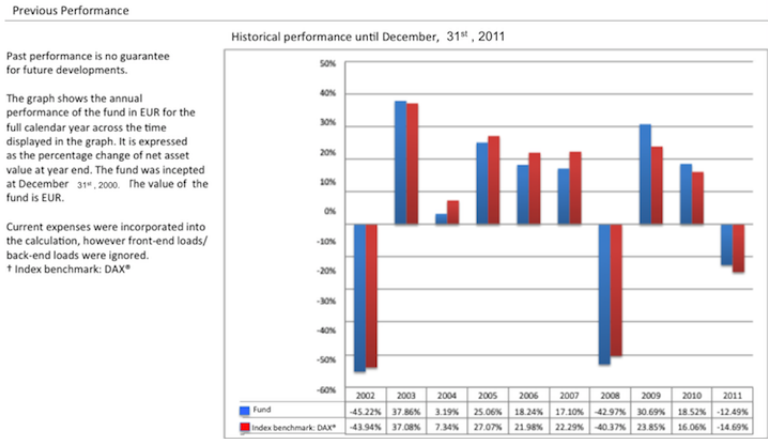
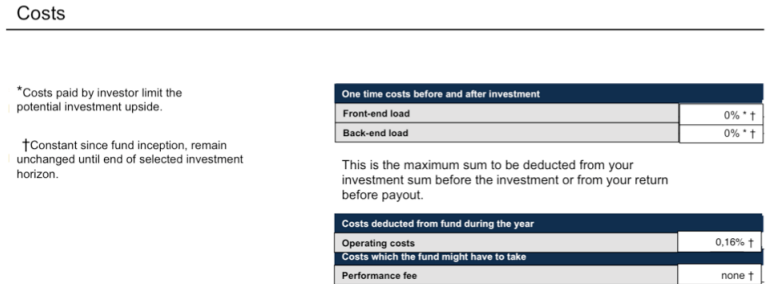Figure A.15: Previous Performance Fund Phoibe/Varuna [B] - Treat. 3 & 4 (4)

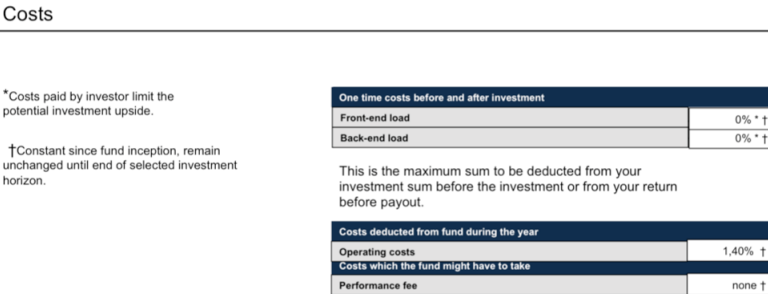Figure A.16: Costs Fund Tethys/Ixion [C] (5)

Figure A.17: Costs Fund Okeanos/Eris [A] Treat. 1 & 2 (6)

Costs

*Costs paid by investor limit the
potential investment upside.

†Constant since fund inception, remain
unchanged until end of selected investment
horizon.

One time costs before and after investment	
Front-end load	0% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your
investment sum before the investment or from your return
before payout.

Costs deducted from fund during the year	
Operating costs	1,76% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.18: Costs Fund Okeanos/Eris [A] Treat. 3 & 4 (6)

Costs

*Costs paid by investor limit the
potential investment upside.

†Constant since fund inception, remain
unchanged until end of selected investment
horizon.

One time costs before and after investment	
Front-end load	5% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your
investment sum before the investment or from your return
before payout.

Costs deducted from fund during the year	
Operating costs	1,40% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.19: Costs Fund Phoibe/Varuna [B] Treat. 1 & 2 (7)

Costs

*Costs paid by investor limit the
potential investment upside.

†Constant since fund inception, remain
unchanged until end of selected investment
horizon.

One time costs before and after investment	
Front-end load	6% * †
Back-end load	0% * †

This is the maximum sum to be deducted from your
investment sum before the investment or from your return
before payout.

Costs deducted from fund during the year	
Operating costs	1,76% †
Costs which the fund might have to take	
Performance fee	none †

Figure A.20: Costs Fund Phoibe/Varuna [B] Treat. 3 & 4 (7)

Financial advisor

You have the opportunity to receive a recommendation from an independent financial advisor for free. If you want to do so, just click on the link below.

> **Fund Varuna [B] is a mutual fund following an active management strategy**, i.e., the fund's manager decides for himself (actively) about the fund's portfolio. He bases his decisions about which securities to buy, hold or sell on analyst reports, forecasts and evaluations. Fund managers of actively managed funds do not believe in efficient markets, e.g., that it is possible to identify mispriced securities, thus exceeding the performance of the market. In contrast, passively managed funds try to replicate a market's performance (e.g, fund Ixion [C]).
>
> The actively managed fund Varuna [B] has performed better than the passively managed fund Ixion [C] in six of the past ten years. However, past returns are no direct indication of future performance.
>
> **I recommend fund Varuna [B]**.

Figure A.21: Advice Treatment 1

Fund Varuna [B] is a mutual fund following an active management strategy, i.e., the fund's manager decides for himself (actively) about the fund's portfolio. He bases his decisions about which securities to buy, hold or sell on analyst reports, forecasts and evaluations. Fund managers of actively managed funds do not believe in efficient markets, e.g., that it is possible to identify mispriced securities, thus exceeding the performance of the market. In contrast, passively managed funds try to replicate a market's performance (e.g, fund Ixion [C]).

The actively managed fund Varuna [B] has performed better than the passively managed fund Ixion [C] in six of the past ten years. However, past returns are no direct indication of future performance.

I recommend fund Ixion [C].

Figure A.22: Advice Treatment 2

Fund Ixion [C] is a mutual fund following a passive management strategy, i.e., the fund's manager replicates the market's performance as precisely as possible. Passively managed funds are based on the theory of efficient markets, e.g., that it is not possible to identify mispriced securities, thus exceeding the performance of the market. Hence, analyst reports, forecasts and assessments which securities to buy, hold or sell are useless. In contrast, actively managed funds try to beat a market's performance with a selection of securities (e.g., fund Varuna [B]).

The passively managed fund Ixion [C] has performed better than the actively managed fund Varuna [B] in six of the past ten years. However, past returns are no direct indication of future performance.

I recommend fund Ixion [C].

Figure A.23: Advice Treatment 3

Fund Ixion [C] is a mutual fund following a passive management strategy, i.e., the fund's manager replicates the market's performance as precisely as possible. Passively managed funds are based on the theory of efficient markets, e.g., that it is not possible to identify mispriced securities, thus exceeding the performance of the market. Hence, analyst reports, forecasts and assessments which securities to buy, hold or sell are useless. In contrast, actively managed funds try to beat a market's performance with a selection of securities (e.g., fund Varuna [B]).

The passively managed fund Ixion [C] has performed better than the actively managed fund Varuna [B] in six of the past ten years. However, past returns are no direct indication of future performance.

I recommend fund Varuna [B].

Figure A.24: Advice Treatment 4

Potential Payment

If you are selected for payment, your decision here is decisive for your payment with a probability of 2/3.

Please select an investment horizon (choice of 2, 5, 10 years)

—————————**Choice of one fund** —————————

A.4 Experiment 3 - Instructions / Situation

Instructions

During the experiment, you will make an investment decision for a horizon of five years. After the experiment, about 10% of all participants will be randomly drawn for payment. The amount depends on the portfolio end value at the end of the investment horizon. The expected value of this amount - if you are selected for payment - is about EUR 25. Your actual payment can be higher or lower depending on your decision. Apart from your investment decision, we will evaluate your financial knowledge, your risk attitude and reasons for your behavior. These answers do not affect your payment. All information is recorded anonymously.

Situation

Note: Advisor 1 (2,3) was named X (Y,Z).

Please imagine the following situation. You inherited the amount of EUR 100,000, of which EUR 30,000 are currently invested in a portfolio of funds. This consists of the following three funds. There are no other funds available.

Table A.3: Funds

| Fund Name	Fund A	Fund B	Fund C
Style	Fixed Income	Stocks/Fixed Income	Emerging Markets Asia (ex Japan)
Load	1.00%	4.00%	5.00%
Risk-Return- Indicator (1 less risk, 7 higher risk)	1	5	7
Historical Performance	Click *Shown as Hyperlink*	Click *Shown as Hyperlink*	Click *Shown as Hyperlink*
Benchmark	EURIBOR (3 months)	Nikkei 225 (12.5%)	MSCI Far East (ex Japan)
		Dow Jones (12.5%)	
		MSCI Europe (25%)	
		JPM Global Government Bonds (50%)	
Current Portfolio Share	38%	27%	36%
Fee (p.a.)	0.15 %	0.15 %	0.15 %
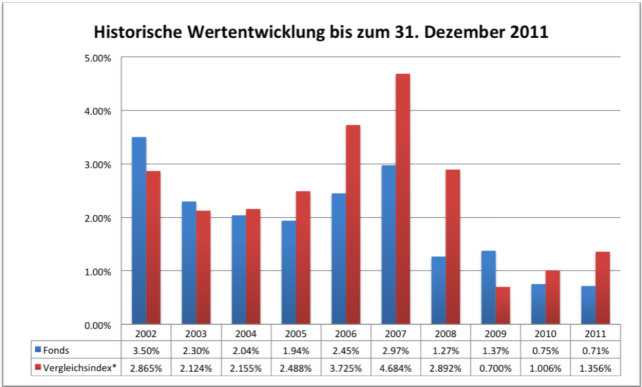
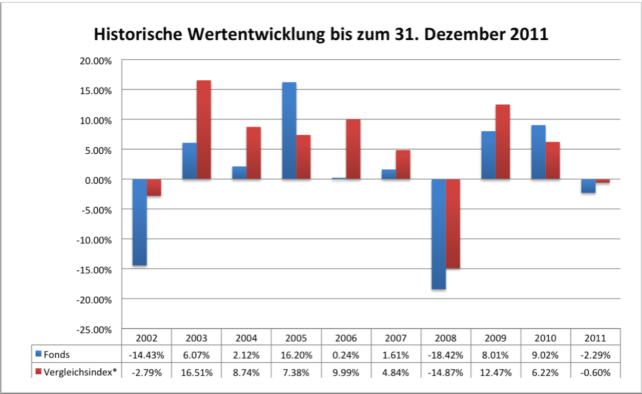Figure A.25: Historical Performance (Fund A) until Dec. 31, 2011 (Fund/Benchmark)

Figure A.26: Historical Performance (Fund B) until Dec. 31, 2011 (Fund/Benchmark)
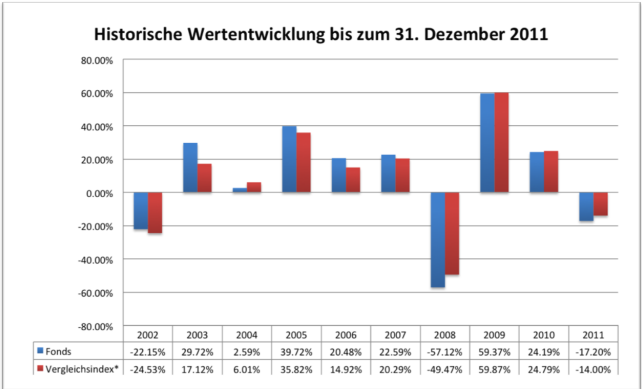
Figure A.27: Historical Performance (Fund C) until Dec. 31, 2011 (Fund/Benchmark)

XXXVI

You have decided to invest the cash amount of EUR 70,000 **for five years** into these three funds. You contact the financial advisor W. His recommendation is free of charge; however, he receives a **part of the loads paid by you** back from the product provider. He offers to conduct the investment / restructuring of the assets for you. He suggests six alternatives. Alternative 1 means that the **cash amount of EUR 70,000** is invested like the current portfolio. Alternatives 2 to 5 imply that the **whole amount of EUR 100,000** is re-invested. Alternative 6 means that the whole amount of EUR 100,000 is invested into a bond.

The following alternatives are available (shares rounded). Click on the link in the table to show the missing values.

The following table shows all values, i.e. after the missing values (return, risk, cost) have been revealed by clicking on a link. There were separate links for return, risk and cost.

Table A.4: Alternatives Phase 1

Fund	Fund A Share	Fund B Share	Fund C Share	Exp. Return p.a.*	Volatility p.a.	Total Costs EUR
Alternative 1	38%	27%	36%	4.50%	14.60%	2,247
Alternative 2	13%	49%	38%	4.50%	17.70%	3,102
Alternative 3	23%	48%	29%	3.80%	14.60%	2,772
Alternative 4	45%	21%	34%	4.50%	13.60%	2,114
Alternative 5	43%	20%	37%	4.80%	14.60%	2,201
Alternative 6	0	0	0	1.00%	0	0

*already deducted: Annual management fee and transaction costs (these are costs which are incurred at the buying/selling of securities at the exchange)

_____**Choice of one portfolio**

_____

_____

You chose alternative [number of chosen portfolio]. However, this must not be your final decision. You consider a second opinion from additional advisors.

_____**Start Default Group** _____

You visit financial advisor X and ask for a recommendation. He has the same qualifications as advisor W. His recommendation if free of charge, however, he receives - like advisor W on the previous page - a **part of the loads paid by you** back from the product provider. You will receive more detailed information about this below.

_____**End Default Group** _____

_____**Start Control Group** _____

There are two additional financial advisors (X and Y) available. Both have the same qualifications as W; they only differ in the way they are compensated.

The recommendation of X is free of charge, however, he receives - like advisor W on the previous page - a **part of the loads paid**

by you back from the product provider. You will get more detailed information about this once you decide on this advisor.

The recommendation of Y **costs EUR 1,000 once** irrespective of your decision, but there are no other costs to bear.

Please choose either advisor X or Y or continue your decision without a further recommendation by confirming your decision below. You cannot change your decision in favor of or against advisor X or Y.

_____**End Control Group** _____

Advisor X recommends different proportions (shares rounded). Click on the link in the table to show the missing values.

The following table shows all values, i.e. after the missing values (return, risk, cost) have been revealed by clicking on a link. There were separate links for return, risk and cost.

Table A.5: Alternatives Offered by Advisor X

Fund	Fund A Share	Fund B Share	Fund C Share	Exp. Return p.a.*	Volatility p.a.	Total Costs EUR
Recommendation Advisor X						
Treatment Lower Commission	48%	18%	34%	4.50%	13.30%	2,060
Treatment Higher Commission	45%	17%	38%	4.90%	14.60%	2,187
Your previous decision				*Values for previous decision*		

*already deducted: Annual management fee and transaction costs (these are costs which are incurred at the buying/selling of securities at the exchange)

Commission of product provider for advisor W if you leave your decision (alternative [number of chosen portfolio]) unchanged: *amount of commission shown in EUR*

Commission of product provider for advisor X if you
follow his recommendation:*Treatment Low*: EUR 1,052.80 / *Treatment High* EUR 1,195.20

This means that advisor X earns a **lower** (*Treatment High*:**higher**) commission than advisor W if you follow the recommendation of advisor X.

––––––––––––––**Start Default Group** ––––––––––––––

You have the opportunity to contact financial advisor Y in addition. He has the same qualifications as advisor X and advisor W. His recommendation **costs EUR 1,000** irrespective of your decision, but there are no other costs to bear.

Would you like to see the recommendation of this advisor? If so, click on the button below.

Button to pay EUR 1,000 and to access the recommendation of advisor Y

––––––––––––––**End Default Group** ––––––––––––––

Advisor Y recommends different proportions (shares rounded).

Table A.6: Alternatives Offered by Advisor Y

Fund	Fund A Share (%)	Fund B Share (%)	Fund C Share (%)	Exp. Return p.a. (%)*	Expected Risk Standard Volatiliy p.a. (%)	Total Costs Cumulated Load in EUR
Recommendation						
Advisor Y	48%	13%	39%	5.00%	14.60%	
Your previous decision	*Values for previous decision*					

*already deducted: Annual management fee and transaction costs (these are costs which are incurred at the buying/selling of securities at the exchange)

Button to show fund information of Table A.3 again (optional)

———— **Decision whether to stick with previous decision or to take recommendation of advisor X (or Y, if applicable)** ————

A.5 Control, Subjective and Comprehension Variables

The following tables show a conclusive list of variables used in the three experiments.

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Table A.7: Financial Literacy

Exp.	Var.	Question	Answer
1,2,3	$fl1$	Imagine you have EUR 100 in a savings account. The interest rate is 2% per year. If you don't make any deposits or payouts, how much money is in your savings account after 5 years?	**More than EUR 102** Exactly EUR 102 Less than EUR 102 I do not know Skip this question
1,2,3	$fl2$	Imagine that the interest rate for your savings account is 1% per year and the inflation rate is 2% per year. How much can you buy without any deposits or payouts after 1 year?	More than today Just the same as today **Less than today** I do not know Skip this question
1,2	$fl3$	Imagine your friend inherits EUR 10,000 today and his sister inherits EUR 10,000 in 2014. Who is richer?	Both are equally rich **My friend** His sister I do not know Skip this question
2	$fl3$	Imagine your friend inherits EUR 10,000 today and his sister inherits EUR 10,000 in 2014. There is no inflation and the interest rate is more than 0. Who is richer?	Both are equally rich **My friend** His sister I do not know Skip this question
1,2,3	$fl4$	If the value of an investment decreases by 50% and then increases by 50%, the investor incurs?	A profit **A loss** No change in value I do not know Skip this question
1,2,3	$fl5$	How often does an investor generally have to pay a front-end load?	More than twice Annually **Once** I do not know Skip this question

Note: Correct answers are printed **bold**. Questions $fl1$, $fl2$ and $fl3$ were taken from Van Rooij, Lusardi and Alessie (2011). $fl1$ and $fl2$ were also used by FINRA Investor Education Foundation (2013).

Table A.8: Financial Literacy (cont'd)

Exp.	Var.	Question	Answer
1,2,3	$fl6$	What is the usual role of an equity holder?	**Co-owner of the firm** Bails for corporate debt Lent money to the firm I do not know Skip this question
1,2,3	$fl7$	Compared to an open-end mutual equity fund the volatility of a single stock's return will usually be?	Less Equal **Higher** I do not know Skip this question
1,2,3	$fl8$	Which of the following measures is used to compound the management fee of a mutual fund?	Return of the preceding period **Current net asset value** Difference between current return and return of preceding period I do not know Skip this question
1,2,3	$fl9$	If the interest rate of an economy falls, what should usually happen to bond prices?	Fall **Rise** Stay unchanged I do not know Skip this question
1,2,3	$fl10$	Given are two securities (1,2) with a standard deviation of $\sigma_1 > 0$, $\sigma_2 > 0$ and a correlation coefficient $\rho = 0$. Are you able to build a portfolio out of the two securities whose risk (σ_p) is less than the risk of security 1 ($\sigma_p < \sigma_1$)?	**Yes** No Depending on the ratio of returns (μ_1/μ_2) I do not know Skip this question

Note: Correct answers are printed **bold**. Questions $fl6$, $fl7$ and $fl9$ were taken from Van Rooij, Lusardi and Alessie (2011). $fl7$ and $fl9$ were also used by FINRA Investor Education Foundation (2013).

Table A.9: Other Knowledge Questions

Exp.	Var.	Question	Answer
2	cr_1	A racket and a ball together cost EUR 1.10. The racket costs EUR 1.00 more than the ball. How much does the ball cost? [Enter cent amount]	5 cents
2	cr_2	If 5 machines need five minutes to produce five items, how long will it take if 100 machines produce 100 items? [Enter minutes]	5 minutes
2	cr_3	A patch of water lilies is lying in a lake. The patch is doubling in size every day. If it takes 48 days to cover the total lake, how long will it take until the half of the lake is covered by water lilies? [Enter days]	47 days
3	$divers$	A and B are two financial products. The expected annual return of A (B) is 8% (5%). Both have an annual risk of 4% (standard deviation). Which product should be preferred?	**A** B Both are equally good I do not know Skip this question

Table A.10: Subjective Variables

Exp.	Var.	Question	Answer
1,2,3	fl_{self}	Please rate your own financial knowledge on a scale from 0 to 10 (0 = no knowledge at all, 10 = very high knowledge)	Value between 0 and 10
1,3	$conf_{dec}$	Please rate your confidence in the decision you just made on a scale from 0 to 10 (0 = very low confidence, 10 = very high confidence)	Value between 0 and 10
2	$conf_{adv}$	Please rate the confidence in the recommendation of the advisor on a scale from 0 to 10 (0 = very low confidence, 10 = very high confidence)	Value between 0 and 10
2	inf_{adv}	Please rate the influence the advisor had on your decision on a scale from 0 to 10 (0 = very low confidence, 10 = very high confidence)	Value between 0 and 10
1	mot	Please rate the the level of motivation you had while fulfilling the task on a scale from 0 to 10 (0 = very low motivation, 10 = very high motivation)	Value between 0 and 10
3	$sffc$	Please rate whether the fund information provided was sufficient to make an informed decision on a scale from 0 to 10 (0 = not at all, 10 = yes, definitely)	Value between 0 and 10
1,2,3	$risk_g$	Please rate your general risk attitude on a scale from 0 to 10 (0 = high risk aversion, 10 = no risk aversion)	Value between 0 and 10
1,2,3	$risk_f$	Please rate your financial risk attitude on a scale from 0 to 10 (0 = high risk aversion, 10 = no risk aversion)	Value between 0 and 10
1,2	$risk_l$	You find ten different version of the lotteries A and B below. Please decide for every version whether you would prefer to play lottery A or B. If you receive a payment out of the experiment, you will be payed one result out of the chosen lotteries in addition to your payment from the investment task in the experiment. The paying lottery will be selected randomly. (Holt and Laury (2002), see following table)	Number of risk-averse choices made

Table A.11: Lottery Risk Attitude

Version	Lottery A					Lottery B				
	Click to select this lottery	Prob. for following payment	Payment	Prob. for following payment	Payment	Click to select this lottery	Prob. for following payment	Payment	Prob. for following payment	Payment
1		1/10	EUR 2.00	9/10	EUR 1.60		1/10	EUR 3.85	9/10	EUR 0.10
2		2/10	EUR 2.00	8/10	EUR 1.60		2/10	EUR 3.85	8/10	EUR 0.10
3		3/10	EUR 2.00	7/10	EUR 1.60		3/10	EUR 3.85	7/10	EUR 0.10
4		4/10	EUR 2.00	6/10	EUR 1.60		4/10	EUR 3.85	6/10	EUR 0.10
5		5/10	EUR 2.00	5/10	EUR 1.60		5/10	EUR 3.85	5/10	EUR 0.10
6		6/10	EUR 2.00	4/10	EUR 1.60		6/10	EUR 3.85	4/10	EUR 0.10
7		7/10	EUR 2.00	3/10	EUR 1.60		7/10	EUR 3.85	3/10	EUR 0.10
8		8/10	EUR 2.00	2/10	EUR 1.60		8/10	EUR 3.85	2/10	EUR 0.10
9		9/10	EUR 2.00	1/10	EUR 1.60		9/10	EUR 3.85	1/10	EUR 0.10
10		10/10	EUR 2.00	0/10	EUR 1.60		10/10	EUR 3.85	0/10	EUR 0.10

Table A.12: Comprehension Question

Exp.	Var.	Question	Answer
1,2	$fund_{dec}$	Why did you select the fund *choice displayed*?	Mostly corresponds to my risk attitude Less fees Promises the highest return Recommendation of financial advisor (if seen) Random decision I do not know Other (please specify)
1,2	adv_{no}	Why did you not request the recommendation of the financial advisor (if applicable)?	I forgot it I've had bad experiences with the recommendations of financial advisors To save time I did not need a recommendation Other (please specify)
1,2	adv_{yes}	Why did you request the recommendation of the financial advisor (if applicable)?	I've had good experiences with the recommendations of financial advisors To save time I needed a recommendation Other (please specify)
1,2	fol_{no}	Why did you not follow the recommendation of the financial advisor (if applicable)?	Recommendation didn't sound trustworthy I did not understand recommendation I made a wrong keyboard input Recommendation did not match my personal opinion Other (Please specify)
1,2	fol_{yes}	Why did you follow the recommendation of the financial advisor (if applicable)?	Recommendation sounded trustworthy To save time Recommendation matched my personal opinion Other (Please specify)
3	dec	Why did you (not) pay for another advisor? Why (did) you not change your decision after hearing the second opinion?	Text Entry

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Table A.13: Demographics

Exp.	Var.	Question	Answer
1,2,3	*gender*	Gender	Female Male
1,2,3	*age*	Age	Choice of age between 18 and 67 years
1,2	*study*	Course of Study	Business Administration / Economics Business Arithmetic / Mathematics (Commercial) Information Technology Social Science None of the above
3	*econ*	Course of Study	Economics Other
1,2,3	*degree*	Aspired Degree	B.Sc. M.Sc. Diploma Ph.D. / Doctoral Degree None of the above
1,2,3	*sem*	Semester	Choice of semester between 1 and 12, larger than 12