DISCUSSION PAPER SERIES

No. 8091

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FINANCIAL ECONOMICS

Centre for Economic Policy Research

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ISSN 0265-8003

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Discussion Paper No. 8091
November 2010

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CEPR Discussion Paper No. 8091

November 2010

ABSTRACT

Trading on Advice

Why do people trade? Because they are told to! Using a unique dataset from a large German bank, we find that retail investors who report that they rely heavily on their advisors' recommendations have a substantially higher trading volume and purchase a higher fraction of investment products for which their advisors were incentivized ("promotion products"). As we have access to administrative data on the bank's revenues from security transactions, we can show that, altogether, customers who rely strongly on advice generate more than twenty percent higher revenues. We further support our picture of "advice-driven" trading activity by using survey evidence on the initiative and frequency of contacts between advisors and investors. Confirming the predictions of our formal model, investors rely more on advice when they perceive less of a conflict of interest and when they have a lower opinion of their own and a higher opinion of their advisors' expertise. Given that advice is ubiquitous in retail financial services, our theoretical and empirical findings should be applicable more broadly.

JEL Classification: D14, D18 and G20
Keywords: financial advice, trading

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Submitted 1 November 2010

1 Introduction

Why do retail investors trade? And what investments do they choose? We document how retail investors' trading volume and investment choices can be significantly affected by an often-overlooked determinant: professional financial advice.

Professional financial advice is pervasive. In Germany, the source of our dataset, a survey of retail investors finds that more than 80 percent of investors consult a financial advisor.[1] In the U.S., mutual funds and equities (outside employer-sponsored plans) are overwhelmingly purchased after receiving financial advice.[2] In Europe, further evidence on the role of financial advice comes from a large cross-country survey, showing that in several countries; close to 90 percent of respondents expect financial institutions to provide advice.[3]

Using a unique dataset from a large German bank, our study sheds light on the potentially large implications of financial advice. In addition to individual portfolio and trade characteristics, we have access to a detailed customer survey. We also know per-customer revenues from security transactions for the analyzed period, 2005 to 2007, and, in addition, for what fraction of those transactions advisors were additionally "incentivized." Revenues from security transactions consist mainly of the fees ("loads") that are paid up-front. These are credited to the bank branch, both for "in-house" products and for those issued by other institutions.[4] On average, for customers in our

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[1] Cf. DABank (2004): "Faszination Wertpapier: Fakten und Hintergründe zum Anlegerverhalten in Deutschland," München. Two thirds respond that they obtain financial advice from their main bank. For a comparison, only one fifth (also) obtain advice from an independent financial advisor.

[2] Cf. Bergstresser et al., (2007) and *Equity Ownership in America 2005* (http://www.ici.org/pdf/rpt_05_equity_owners.pdf). In a survey conducted by the Investment Company Institute (ICI 2007), over 80 percent stated that they obtained financial advice from professional advisors or other sources.

[3] Cf. Eurobarometer 60.2, Nov-Dec 2003. For instance, 95 percent in Germany, 90 percent in Denmark, 95 percent in Austria, 91 percent in the Netherlands, and 86 percent in Finland expect to receive advice from financial institutions. (However, only 40 percent of Greek households expect to receive advice.) Furthermore, 65 percent of German respondents report that they trust advice, which compares with 76 percent in Denmark, 75 percent in Austria, 60 percent in the Netherlands, and 79 percent in Finland, but only 22 percent in Greece.

[4] In contrast to other, more specialized forms of wealth management, neither the bank nor the individual advisor is compensated based on the performance of clients´ portfolios. See Stoughton et al. (2008) for a formal analysis of

sample bank, revenues from security transactions amount to 2,560 Euros per year, based on a mean portfolio value of 105,356 Euros.

Investors in our sample do not hold financial assets elsewhere, with the possible exception of life insurance policies, and they have no other bank relationship. Evidence from the customer survey also suggests that it is overwhelmingly the advisor—and not the investor—who takes the initiative. Virtually all security transactions are conducted directly through the advisor.

We confront the data with the hypotheses derived from a model of biased advice. We model a simple decision problem, which could represent that of reshuffling a customer´s portfolio or of allocating new funds. In the model, the advisor is possibly biased, as he may gain from new security trades and possibly even more so when the investor purchases particular products. Investors differ in their perceptions of the advisor's bias. Below we provide casual evidence from different studies that not all retail customers are wary of such conflicts of interest, and our data also supports this view. In addition, customers in our model differ in their perceived knowledge of financial matters. Together with their perception of a conflict of interest, this affects both their ability and their willingness to question recommendations. Thus, our model yields predictions both on when investors are more likely to follow advice and on when this results in higher trade volume, as well as in higher purchases of products that are particularly favorable to the bank.

Controlling for a range of factors such as portfolio size, income, risk attitude, education, financial knowledge and interest, we find that investors who report that they rely heavily on advice generate, in all our specifications, a more than 20 percent higher trading volume. They also purchase significantly more "incentivized products." Overall, when customers rely on advice, bank revenues from security transactions are more than 20- percent higher. We present both theoretical and empirical arguments for why causality should run from customers' reliance on advice to trade volume, and not vice versa.

As noted above, all the investors in our sample report that they conduct all their security dealings through the portfolio to which we have access. Therefore, the finding that reliance on advice leads, after controlling for a host of other factors, to a 20-percent increase in the value of security transactions is significant. Next to portfolio size, reliance on advice is the single sizeable

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intermediated investment management with performance-based incentives. Hackethal et al. (2008) analyze brokerage accounts where some investors can additionally pay for advice.

and consistently highly significant determinant of trading volume. Our model and empirical results, thus, suggest a new answer to the question posed by Grinblatt and Keloharju (2001): "What makes investors trade?" The answer: Advisors!

In contrast to a range of studies that are more focused on active investors with online brokerage accounts, gender has no significant effect in our study of advised investors. Gender is one of the most consistent determinants of trading behavior in the extant literature and, in many contributions, has been related to (male) customers' overconfidence (cf. Barber and Odean 2001). Also, education and reported financial expertise do not significantly impact trading volume among our sample of advised investors. While we find that the advisor usually takes the initiative, this contrasts with the attention-driven trading activity by retail investors documented by Barber and Odean (2008), Dhar et al. (2005), and Grinblatt and Keloharju (2009). Our focus on professional financial advice is also different from the previously documented influence of social interaction and non-professional advice (cf. Hong et al. 2004).

Recorded trades in our data comprise all security transactions and not only stocks or equity-linked products. While a growing literature has offered different explanations for the heterogeneity in households' share holdings (e.g., Campbell 2006; Curcuru et al. 2009), households' trading behavior is much less understood. Customers in our sample make, on average, 15 trades, of which almost half are sales, suggesting that they not only invest new funds, but also adjust their portfolios over time. Theoretical work on household finance has suggested various trading rationales, such as responding to household-specific changes - e.g., in wealth or age—or to changes in the market environment—e.g., expected returns or volatility (cf. Campbell and Viceira 2002 or, more recently, Gomes and Michaelides 2005). [5] Empirical work in this area, which is based mainly on administrative data such as retirement account data, points to household inertia and what Samuelson and Zeckhauser (1988) call "status quo bias,"—i.e., that asset allocation shares are rarely changed over time. Instead, as noted above, both theory and empirical work in behavioral finance suggest that households even "overtrade" to their detriment.[6] The observed behavior of the

[5] Cf. also the seminal work by Milgrom and Stockey (1982), who derive conditions under which households should never adjust portfolios under rational expectations.

[6] For a more detailed comparison of these two literature strands, see Bilias et al. (2010).

advised retail investors in our sample straddles these two extremes, and we document an important new determinant of security trading: possibly self-interested professional advice.

Investors in our sample rely more on advice when they are more confident in their advisor's expertise. As in our formal model, what matters for investors' propensity to rely on advice, however, is not only their *ability* to question advisors' recommendations, but also their *willingness* to do so. Investors who have a stronger perception that advisors act in *their* interest rely more on advice, which results in higher bank revenues and more "incentivized products" in their portfolios. Though this does not necessarily imply that these investors would be better off without advice, even though higher bank revenues ultimately show up as costs for investors, our analysis also does not dispel concerns about the compromised value of information and advice in the retail financial industry.[7] Recent evidence for the U.S. (Bergstresser et al. 2007; Chen et al. 2010; Edelen et al. 2008) suggests that mutual funds sold through broker/agent networks underperform and that funds with higher fees ("loads") improve distribution through higher commissions, which negatively affects fund returns. In the credit market, there are numerous allegations that high commissions have led brokers to advise homebuyers to borrow beyond their means or to take out less-advantageous mortgages.[8] Financial advisors also have an interest in increasing the turnover of their clients' portfolios ("churning") when they earn additional fees or commissions with every new purchase. Our data allow us to analyze the impact on both turnover and product selection.

At the time our survey was undertaken, neither the incentives of the bank's employees nor the revenues that the bank made from selling particular investment products had to be disclosed to investors. Recently, customers' ignorance or naïveté about conflicts of interest in the retail financial industry has been widely discussed (e.g., FTC 2008). A similar form of naïveté has been documented in empirical work on analysts' following (cf. Malmendier and Shanthikumar 2007; Hong et al. 2008), while experiments show that subjects tend to excessively follow advice even

[7] Cf. also the survey among EU members of the CFA Institute (2009), in which 64 percent of respondents agreed that the prevailing fee structure serves the purpose of steering sales rather than serving customers' needs. Inderst and Ottaviani (2010) discuss the problems related to markets with (financial) advice more generally.

[8] Cf. *Subprime and Predatory Mortgage Lending: New Regulatory Guidance, Current Market Conditions, and Effects on Regulated Financial Institutions*: Hearing before the Subcommittee on Financial Institutions and Consumer Credit of the House Committee on Financial Services, 110th Congress, 2007.

when conflicts of interest are disclosed (cf. Cain et al. 2005).[9] What is unique in our study is that investors explicitly state their willingness to follow advisors' recommendations, which we express as a function of both their own and the advisors' perceived experience and of their expectations of receiving fair advice. There is a growing literature on how people's trust in others affects their economic decisions. Butler et al. (2009) show that people who have "too much trust" in others are more likely to have lower incomes. Guiso et al. (2008) argue that investing in the stock market requires a good deal of trust in others, and they show that trust, indeed, has a strong effect on stock-market participation. Georgarakos and Inderst (2010) analyze the differential effect that trust in consumer protection and trust in financial advice have on stock-market participation of households with higher and lower financial capability. We focus, instead, on households' trading activity.

The rest of this paper is organized as follows. Section 2 provides background information on the data and some descriptive statistics. Section 3 sets up a simple model of advised security purchases. In Section 4, we ask which investors are more likely to rely on advice. Section 5 analyzes the impact that reliance on advice has on security trading. Section 6 analyzes the impact on bank revenues and product selection. Section 7 concludes. Additional material is contained in Appendices A-C: overview of descriptive statistics (Appendix A); additional regression tables (Appendix B); and formal derivations for our model (Appendix C). Appendix A also contains the main translated questions from the survey.

2 Data

We draw on the following data: customer portfolio and trading records; a structured customer questionnaire; administrative data on customer characteristics; and data on bank revenues and

[9] Such a view of household naiveté also seems to underlie current proposals in the U.S. to strengthen consumer protection in financial markets: "Impartial advice represents one of the most important financial services consumers can receive. Mortgage brokers often advertise their trustworthiness as advisors on difficult mortgage decisions. When these intermediaries accept side payments from product providers, they can compromise their ability to be impartial. Consumers, however, may retain faith that the intermediary is working for them and placing their interests above his or her own, even if the conflict of interest is disclosed. Accordingly, in some cases consumers may reasonably but mistakenly rely on advice from conflicted intermediaries." *Financial Regulatory Reform. A New Foundation: Rebuilding Financial Supervision and Regulation*, U.S. Department of Treasury, June 2009 (page 68).

internal incentives. This section provides a more-detailed account of the data and some descriptive statistics.

In July 2007, trained interviewers completed telephone interviews with a randomly drawn sample of customers of a large German bank. Interviewed customers were selected by the bank's headquarters across branches so as to make the sample representative of the bank's advised retail customers.

Interviews took, on average, 16 minutes. Questions covered customers' perception of the bank's advisory service, as well as their perception of their own financial knowledge and risk attitude. The effective response rate was 49.3 percent.[10]

To obtain a comprehensive picture of customers' investments in financial assets and their response to advice, we take only the customers who report not having other financial assets, apart from insurance policies, and not having another bank relationship. According to surveys (cf. DABank 2004), two thirds of German households receive financial advice from banks, while only one fifth report to (additionally) receive advice from other professional sources. Hence, by excluding customers with other bank relationships, we significantly reduce the likelihood that the remaining customers in our sample receive other professional financial advice. The remaining sample contains 368 customers.

The bank also provided us with comprehensive demographic and account information. Account information includes the value of customer portfolios as of July 31, 2007, as well as summary information of all buy and sell transactions over the previous two years from August 1, 2005 to July 31, 2007. In particular, we know for each customer the total number of purchases and sales and their total volume. All interviewed customers had a continuing relationship with the bank over this period. Administrative data from the bank cover customers' income, as well as the length of the relationship with their respective advisors. It is noteworthy that customers and advisors come from many different branches, as the bank's headquarters chose the original sample for the telephone interviews centrally.

[10] Out of 5,353 calls, in 3,262 cases the interviewers received no answers, while 1,061 customers refused to be interviewed. Customers had received the questionnaire earlier by mail.

We have also per-customer revenues from security transactions for the covered two-year period. Note that these revenues are credited to the respective branch of the bank. These consist mainly of fees ("loads") that customers pay when purchasing an investment product, regardless of whether the product is issued by the bank or by another financial institution. Management fees for the bank´s own investment funds are not included, as they are credited to asset management and not to the respective bank branch. In what follows, we frequently refer to this simply as the bank´s (per-customer) revenues, keeping in mind, however, that these accrue to the respective branch and are, thus, decisive for internal incentives.

All customers in our sample have, at any given point in time, a single contact person in the bank who acts as their advisor. Customers conduct almost all of their trades directly through their advisor. In fact, the bank's administrative data confirm that 95 percent of all purchases made by these customers were channeled through the branch and, thus, through their advisor, instead of through the bank's call center (telephone banking).

Customers were asked who regularly takes the initiative before transactions. Only 12 percent said that they typically take the initiative, while 45 percent said that their advisor either mostly or always initiates. We were also able to survey some advisors, albeit with a considerably smaller sample. They responded that only in three percent of the cases do customers take the initiative, while they did so 80 percent of the time. In fact, we also learned that advisors receive targets to contact all their customers several times a year at regular intervals.

Per-customer branch revenues represent the main performance indicator for advisors. The use of explicit performance pay is heavily restricted in Germany, mainly due to relatively inflexible (union) wage agreements. Still, we were told that branch managers can exert considerable pressure and, through such means as promotion, provide implicit incentives based on realized revenues. Finally, advisors are informed weekly about which financial products have been put "on promotion." We were told that advisors might also receive explicit sales targets for these products. For the two-year period under consideration, we have obtained the total value of each customer's purchase of securities that were "incentivized" in this way.

Descriptive Statistics

There is a wide variation in both revenues and portfolio sizes in our sample. As one of our main variables of interest is that of per-customer revenues, we decided to take out the highest and

lowest (in terms of revenues) one percent of customers in order to control for potential outlier problems. As we report below, all results remain quantitatively and qualitatively unchanged once we include these customers.

Our information on customers comes from the bank's own administrative data. Customers in our final sample are, on average, 61 years old (only ten percent are below 39, whereas ten percent are above 77) and have an average monthly net household income of 2,240 Euro (with 50 percent having an income between 1,875 Euro and 2,825 Euro). Fifty-one percent are male, and 34 percent have a university degree. Their average portfolio size is 105,356 Euro (with 50 percent of values between 27,114 Euro and 130,363 Euro). Customers make, on average, 15 trades over the considered two-year period, of which eight are purchases (50 percent making between three and ten purchases, and only ten percent making more than 15 purchases). The bank's revenues from these trades average 5,125 Euro per customer (with 50 percent falling between 1,192 Euro and 7,064 Euro). Recall that we cover a period of two years. Appendix A provides a graphical representation of the distribution of age, portfolio value, revenues, and trade volume. This already suggests that the main driver of bank revenues is trade volume, which is closely linked to portfolio size. We will control for this in what follows.

3 Advised Security Purchases

A simple model of advice guides our econometric analysis. In our model, investors differ, first, in their perception of their own ability, vs. the perceived ability of their advisor, to assess the suitability of a particular financial product. This affects their ability to either validate or challenge an advisor's recommendation. Second, investors differ in their perception of the conflict of interest with the advisor. Those who perceive the conflict of interest to be larger are more wary when they receive advice. Taken together, an investor's willingness to follow recommendations is, then, determined by his ability and willingness to question advice. In our model, this drives both investors' security trading and their choice of investment products.

3.1 The Model

For simplicity, our model contains one encounter between the investor and his advisor. We also consider, first, only the choice to possibly undertake one new transaction. Further, we can, to simplify expressions, abstract from specific (risk-return) characteristics of a financial product.

Thus, we stipulate that a given customer would realize from a new transaction the expected utility u, which is distributed according to the CDF G(u) with expected value E[u]. Importantly, the advisor privately observes the realization of u and thus the investor's "type", though—as we specify below—the investor also obtains some, albeit more noisy, information. The specification that the advisor observes u without noise is only made for convenience. We stipulate that U<0: Without *any* additional information, no new transaction should be made.

Specifically, we may imagine that the realization of u is investor-specific, depending on his particular preferences and needs, as derived from his tax status, wealth and income, or his liquidity needs and risk preferences.. Suitable advice can thus lead to better investment decisions.

The advisor's payoff is a convex combination of, first, the (monetary) "benefits" b>0 that he privately generates if a new transaction is made and of, second, the investor's expected utility. The advisor's concern for the investor's utility may arise from different sources, such as concern for reputation, professional ethics, or simple altruism and fairness considerations. Without loss of generality, therefore, we can suppose likewise that his payoff is equal to the sum of b, when it materializes, plus the investor's expected utility multiplied by some weight factor $0 < \rho \leq 1$. Define $\delta := b/\rho \geq 0$, and note that the advisor would want the investor to undertake the new transaction if and only if $u + \delta \geq 0$. Hence, the parameter δ captures the conflict of interest that arises when the advisor obtains personal benefits from a new transaction.

The notion that financial advice is a "credence good" is shared with the theoretical analysis in Bolton et al. (2007) and Inderst and Ottaviani (2009a/b). [11] As we specify next, however, investors in our model differ in their ability to verify the advisor's recommendation.

Investors differ in two dimensions: their perception of the underlying conflict of interest and their perception of the advisor's information advantage. We discuss both dimensions in turn. Recall from the introduction that it is frequently observed that at least some investors seem to be naïve about the conflict of interest with advisors and product providers. We allow for this by supposing that a given investor may perceive the conflict of interest with the advisor to be smaller than it

[11] The models of Carlin (2008) and Carlin and Gervais (2009) also identify potential shortcomings in the provision of suitable advice and transparent information in the market for retail financial products.

actually is, as captured by a perceived value $0 \leq \tilde{\delta} \leq \delta$. (When $\tilde{\delta} = 0$, the investor is fully naïve, unless $\delta = 0$ also.)

Next, investors with greater knowledge of financial matters may be in a better position to question advice. We model this by supposing that, depending on their own knowledge, investors receive a signal about u that is more or less precise.[12] To be specific, we employ the following convenient, though sufficiently rich, information structure.[13] The investor observes a signal s drawn from the same support as u. With probability $0 \leq m \leq 1$, the signal perfectly reflects the true value of u: s = u. With the residual probability, 1-m, the signal is, instead, perfectly uninformative and, thus, drawn from G(u). Note that this implies that ex-ante s is also drawn from G(u). The investor does not know whether his particular "draw" of s is "truth" or "noise." We interpret m as an (inverse) measure of the information distance between the advisor and the investor.

Finally, we specify the sequence of moves for our game of advice, which proceeds over periods t=1 to t=4:

t=1: The advisor reviews the investor's portfolio and, thereby, privately observes u.

t=2: The advisor then recommends whether or not the investor should undertake a transaction. At this stage, the game is one of "cheap talk" (cf. Crawford and Sobel 1982). As is standard, we focus on the informative equilibrium when this exists.

t=3: The investor observes s (with precision m).

t=4: The investor makes a decision.

3.2 Analysis

We first characterize the advisor's optimal strategy in $t = 2$. Note that, in an informative equilibrium, the investor will optimally always follow the advisor's recommendation *not* to make a transaction. From this, it is then immediate that the advisor recommends undertaking a transaction whenever he personally prefers a transaction—i.e., when $u + \delta \geq 0$. When interior, this gives rise to a cutoff $u^* = -\delta$. Given his beliefs $\tilde{\delta}$, an investor expects the advisor to apply the cutoff

[12] One may imagine, in addition, that at least some customers have information that, a priori, the advisor does not have, e.g., regarding their own preferences. However, we may suppose that this is then shared with the advisor.

[13] Cf., for a discussion, Johnson and Myatt (2006).

$\tilde{u}^* = -\tilde{\delta}$. To simplify matters, we suppose that the cutoff is always interior. This holds when, given the lower boundary $\underline{u}$ for u, we have for all feasible $\tilde{\delta}$ that $\tilde{\delta} < -\underline{u}$.

Recall, next, that all investors in our sample have opted for a brokerage account with advice, paying higher fees than they would, for instance, for an online account. Thus, we stipulate that an investor is willing to follow advice when he is not at all in a position to scrutinize the advisor's recommendation, as his own signal is perfectly uninformative. This is the case when $E[u|u \geq \tilde{u}^*] \geq 0$. This holds for all $\tilde{\delta}$ when it holds for $\tilde{\delta} = \delta$:

$$\int_{u_0-\delta}^{\overline{u}} u \frac{dG(u)}{1-G(u_0-\delta)} \geq 0, \qquad (1)$$

which imposes an upper boundary on δ. We suppose that this, together with $\tilde{\delta} < -\underline{u}$, is always satisfied in what follows.

When he is given the recommendation to make a new transaction, an investor compares this with his own signal. Intuitively, the investor will apply a cutoff s^* and will only follow this recommendation when $s \geq s^*$. An explicit characterization of this cutoff is contained in the proof of Proposition 1. There, we also show that the cutoff is strictly increasing in the precision of the investor's signal, as captured by m, and it is also higher when the investor perceives the conflict of interest to be larger (higher $\tilde{\delta}$). Both comparative statics results are intuitive. In both cases, the investor is more likely to scrutinize the advisor's recommendation and to ultimately decide against it.

Denote by ψ the *conditional* likelihood with which, when recommended to make a transaction, an investor will indeed do so. Denote by ψ_0 the overall likelihood with which an investor follows advice, i.e., including the advice not to make a transaction: $\psi_0 = [1 - G(u^*)]\psi + G(u^*)$. Together, the two measures capture an investor's tendency to follow advice.

Proposition 1 *There is a unique equilibrium of the advice game with the following properties. When the information distance between the advisor and the investor increases, as m decreases, or alternatively when the investor perceives the conflict of interest to be smaller, as $\tilde{\delta}$ decreases, then both ψ and ψ_0 increase: By both measures, it becomes more likely that the investor follows the advisor´s recommendation.*

The proof of Proposition 1 and the following results is contained in Appendix C. Finally, let τ be the likelihood with which a transaction takes place: $\tau = [1 - G(u^*)]\psi$. By varying m or $\tilde{\delta}$, which are our key variables to capture differences among investors, we can now relate the endogenous variables ψ and ψ_0 from Proposition 1 to the endogenous variable τ. This generates the following additional result.

Proposition 2 *When we vary investor characteristics by varying m or $\tilde{\delta}$, then when both ψ and ψ^0 increase, τ increases: There is a positive relationship between the likelihood that recommendations are followed and the likelihood that new security transactions are made.*

So far, we have framed the decision in our model as one between a new transaction and no transaction at all. Alternatively, we could imagine that u represents the utility difference from two different investments. To stay close to the model, we may suppose that one is more innovative or complex, generating higher revenues for the bank, which lead to incentives b>0 for the advisor. The following result is then immediate given our previous analysis.

Proposition 3 *In analogy to the result in Proposition 2, when varying customer characteristics m or $\tilde{\delta}$, there is a positive relationship between the likelihood that recommendations are followed and the likelihood that products generating a (higher) benefit b>0 for the advisor are purchased.*

4 Who Relies on Advice?

In this section, our key variable of interest is the bank customers' response to the following statement: "With respect to financial matters, I constantly rely on the advice of my financial advisor." Customers who fully agree with this statement score 5 on a Likert scale from 1 to 5, while those who fully disagree score 1. As we conduct, for robustness, both linear regressions and logit regressions in what follows, we capture investors' *reliance* on advice in different ways. One way is to treat it as a metric variable (with equally spaced intervals), which we name *rely*. We also group together customers who agreed or agreed strongly with the statement: *rely45,* which comprises 267 out of 351 observations. And, finally, we single out only those investors who agree fully to rely on advice: *rely5*, with 163 observations.[14]

[14] 163 fully agreed; 104 agreed,; 47 were indecisive; 31 did not agree; and 6 fully disagreed.

4.1 Hypotheses

We are interested in the characteristics of those investors who rely more strongly on advice. Guided by Proposition 1, we ask, in particular, how this is associated with the investor's perception of the advisor's and his own knowledge and expertise, as well as with the investor's perception of a conflict of interest.

From the survey, we can take the following question on bank customers' knowledge: Customers were asked whether they have a great interest in financial matters and whether they keep themselves informed. The variable *informed* takes on values between 1 ("fully disagree") and 5 ("fully agree"). Further, to capture, as in the model, customers' perceived difference between their own knowledge and the advisor's, we also look at whether they consider their advisor to be knowledgeable: *advisor_info*, again ranging from 1 ("fully disagree") to 5 ("fully agree"). Finally, to capture customers' perceptions regarding a potential conflict of interest, we consider whether they think that their advisor treats them fairly and takes their interests into account: *fair_advice*, ranging from 1 ("fully disagree") to 5 ("fully agree").

Investors who choose to rely more heavily on advice may, at the same time, decide to invest fewer resources into their own information acquisition, thereby remaining less informed. Though we later regress reliance on advice on customers' reported knowledge (*informed*), we acknowledge that there may thus be an issue of reverse causality. An investor's level of general education, which we capture by the binary variable *college*, should, instead, be exogenous with respect to his reliance on financial advice. We make use of this in what follows. Further, investors were also asked whether they like to deal with numbers and statistics: *numeracy*, ranging from 1 ("fully disagree") to 5 ("fully agree").

Investors' (time) costs and benefits of acquiring information could depend on portfolio value (*ln_portfolio*), income (*ln_income*), retirement (*retired*), or risk aversion (*risk_attitude)*, which is measured by the reported willingness to accept, over the period of one year, a maximum loss of 0 (4), 5% (3), 10% (2), or more than 10% (1).[15] Note, however, that the variable *informed* already

[15] Investment in riskier, more information-sensitive securities could both increase and, through greater information acquisition, decrease investors' need to rely on advice. Moreover, in experiments, risk aversion has been shown to have

captures investors' perception of their specific knowledge. We also include *gender* (1 for male). Though we have no clear hypothesis, in several experimental studies on trust, gender has been found to be significant and may thus affect also reliance on advice.[16]

Finally, we have information about how long a customer had already been paired with a given advisor. Our interviews with bank officials reveal that, mainly due to fluctuations of advisors between branches, changes are common. (In our sample, only 53 percent had a relationship longer than three years). However, it is extremely rare for a customer to initiate such a change. We include the variable *relation*, which takes on the value 0 for shorter than one year, 1 for between one and three years, and 2 for more than three years. Note, however, that it is not immediate how economic theory should inform our intuition about the sign that *relation* has on investors' reliance on advice.[17] We discuss this in detail in Section 5.

4.2 Analysis

Table 1 shows that investors who perceive themselves to be more interested in and better informed about financial matters rely less on advice, while those who perceive their advisor to be more knowledgeable rely more on advice. Investors also rely more on advisors when they perceive the advisors' advice to be fair. In particular, the effects of *informed* and *fair_advice* are highly significant, almost always at the one-percent level across the three regressions.

When we use binary dummies for investors' knowledge and their perception of receiving fair advice, the two regressors *informed* and *fair_advice*, instead of treating them as metric variables, we can see more precisely what drives the high significance. Almost all customers strongly agree or agree that they consider themselves to be fairly treated. In fact, these response categories, 4 and 5, comprise 32 percent and 60 percent, respectively, of all customers—and we obtain the highly significant effect by comparing categories 1-4 with category 5. (See Appendix A for the distribution of values for all ordinal variables.) With respect to customers' perception of their

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an impact on social interactions, most notably in (cooperative) trust games (cf., for a recent discussion, Sapienza et al. 2007).

[16] Cf. Croson and Gneezy (2009).

[17] In particular, in a repeated game ("supergame"), it is the expectation of a continuing relationship, rather than the length of the existing relationship, that matters to support different ("cooperative") equilibria.

interest and knowledge, which is relatively uniformly distributed over categories 1-5, the statistically and economically significant effect comes from categories 4 and 5.

Table 1: Relying on Financial Advice

The table presents an OLS-regression with the dependent variable *rely* and logit- regressions for rely45 and *rely5* as dependent variables. Along with the coefficient estimates (*rely*) or marginal effects (*rely45* and *rely5*), (Pseudo) R-squared values and number of observations are reported. In all models heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	rely		rely45		rely5	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
informed	-0.140***	(0.049)	-0.046**	(0.019)	-0.089***	(0.026)
numeracy	-0.064	(0.047)	-0.028*	(0.017)	-0.033	(0.024)
college	-0.298**	(0.121)	-0.120**	(0.049)	-0.121*	(0.070)
advisor_info	0.285*	(0.146)	0.033	(0.054)	0.322***	(0.089)
fair_advice	0.283***	(0.103)	0.112***	(0.038)	0.209***	(0.078)
retired	-0.030	(0.162)	-0.004	(0.069)	-0.078	(0.096)
age	0.012**	(0.006)	0.005**	(0.002)	0.009**	(0.003)
gender	0.042	(0.110)	0.021	(0.047)	0.057	(0.069)
ln_portfolio	-0.060	(0.061)	-0.031	(0.024)	-0.014	(0.033)
ln_income	0.086	(0.089)	0.034	(0.036)	0.013	(0.053)
relation	0.033	(0.071)	-0.015	(0.030)	0.040	(0.044)
risk_attitude	0.085	(0.069)	0.043	(0.029)	-0.007	(0.040)
Constant	1.206	(0.991)				
Observations	323		323		323	
R-squared	0.195					
Pseudo R-squared			0.138		0.196	

As we noted above, an investor's knowledge and his reliance on advice may be jointly determined by his decision on the amount of resources to optimally spend on acquiring information. As we also noted, such a problem of endogeneity does not arise with respect to education. It also seems less plausible with respect to the survey question regarding investors' attitude toward numbers and statistics (*numeracy*). [18] Thus, in the Appendix (Table A.1), we rerun the regression from Table 1 after dropping the variable *informed*. Once we drop *informed* from the

[18] A related issue is that of omitted variables that may jointly affect the propensity to rely on advice and, for instance, reported numeracy. For example, investors who are generally more confident may report higher numeracy and may also be disinclined to rely on other people's judgment. Recall, however, that in this section, our objective is more descriptive, documenting the associations of reliance on advice with other personal characteristics.

regression, the variable *numeracy* becomes highly significant at the one-percent level across all three regressions. This is intuitive once we note that its correlation with *informed* exceeds 0.5. Whether or not *informed* is dropped from the regressions makes no difference to the significance of the effects of *college*, *advisor_info*, and *fair_advice*, while it has only a marginal effect on the respective coefficients. For instance, investors with a university degree are 12-percent less likely to agree with the statement that they constantly rely on advice.

For a further analysis of the association between investors' propensity to rely on advice and personal characteristics, we rerun the regressions from Table 1, while transforming the variables *informed*, *numeracy*, *ad*visor*_info*, and *fair_advice* into binary variables. For this, we group together all observations above and including the median value. We do the same also for the additional control variables *relation* and *risk_attitude.*

Table 2: Relying on Financial Advice – Binary Specifications

The table presents an OLS-regression with the dependent variable *rely* and logit- regressions for rely45 and *rely5* as dependent variables. Along with the coefficient estimates (*rely*) or marginal effects (*rely45* and *rely5*), (Pseudo) R-squared values and number of observations are reported. In all models, heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	rely		rely45		rely5	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
high_informed	-0.301**	(0.121)	-0.116**	(0.046)	-0.133*	(0.072)
high_numeracy	-0.240*	(0.126)	-0.071	(0.048)	-0.225***	(0.075)
college	-0.301**	(0.120)	-0.133***	(0.049)	-0.102	(0.071)
high_advisor_info	0.331**	(0.142)	0.040	(0.057)	0.256***	(0.072)
high_fair_advice	0.420***	(0.112)	0.160***	(0.050)	0.307***	(0.061)
retired	-0.019	(0.153)	0.010	(0.067)	-0.066	(0.092)
age	0.011**	(0.005)	0.005**	(0.002)	0.009**	(0.003)
gender	0.008	(0.110)	-0.005	(0.045)	0.050	(0.069)
ln_portfolio	-0.074	(0.058)	-0.039*	(0.023)	-0.025	(0.032)
ln_income	0.091	(0.087)	0.042	(0.035)	0.020	(0.054)
high_relation	0.064	(0.109)	-0.010	(0.044)	0.062	(0.066)
high_risk_attitude	0.185	(0.116)	0.120**	(0.050)	-0.008	(0.070)
Constant	3.335***	(0.689)				
Observations	330		330		330	
R-squared	0.204					
Pseudo R-squared			0.149		0.208	

The respective regressions reported in Table 2 mirror those in Table 1. As in Table 1, in the Appendix (Table A.2), we rerun the respective regressions in Table 2 without the variable *informed*.

When investors are "highly informed" in the defined way, this is associated with a higher-than-ten-percent likelihood of relying or of relying strongly on advice (*rely45* or *rely5*). When an investor agrees to the same extent as or more than the median investor that he receives fair advice, then this is associated with a 16-percent-higher likelihood that he agrees to the statement that he relies on advice and with a 30-percent-higher likelihood that he agrees strongly.

4.3 Discussion

Our findings are also interesting from the perspective of the literature on financial literacy. For instance, using data from the DNB Household Survey, van Roji, Lusardi, and Alessie (2007) document that education, most notably higher education, is strongly associated with financial literacy, as measured by households' knowledge and understanding of basic financial concepts. Interestingly, they also report that there are only small differences across basic literacy quartiles in households' reported usage of professional financial advisors, while households who have more-advanced financial literacy seem to make slightly more use of financial advisors (cf. Table 5 in their Appendix). Though our findings are not immediately comparable—as we consider a sample of advised customers who trade through their brick-and-mortar bank—our findings suggest that investors with different perceived financial capability use advice differently: Less-able and less-knowledgeable households *rely* more on professional financial advice.

Note, also, that across all regressions, older people rely significantly more on advice. By performing the same regression with dummies across various age groups, we obtained in an unreported regression that it is mainly customers in the oldest age group who drive this effect. One could conjecture that older people have less trust in their cognitive abilities and are, thus, more willing to rely on advice, similar to less-informed investors. This observation would tie our paper to recent literature that studies the interaction of age and cognitive abilities with errors in financial decision-making (cf. Agarwal et al. 2009). As with investors who have less knowledge, our results would suggest that investors with lower cognitive ability would choose to rely on advice. Admittedly, however, the effect of age on reliance could also be interpreted as a cohort effect.

Older people with more "traditional" values may be more likely to follow recommendations by someone with perceived expertise.

Finally, note that we have performed a number of robustness analyses for the regressions in Table 1. As for all the following regressions, we also considered clustered standard errors, as several customers in our sample potentially share the same advisor. This does not, however, affect significances. In fact, recall that the original sample was constructed across branches so as to obtain a representative picture of the large bank's advised customer base. Also, including a full set of dummies for the ordinal control variables (*relation*, *risk_attitude*) or quadratic terms for income and revenues has no effect on the significance of our main regressors and only a spurious effect on the size.

5 Advice and Trading

How does reliance on advice affect investors' security trading? Proposition 2 gives rise to the hypothesis that, all else equal, customers who rely more on advice should trade more. Recall that what drives this hypothesis is the presumption that the bank earns higher revenues when there is more trade and that the advisor is then incentivized accordingly. We show in Section 6 that bank revenues are indeed highly correlated with trading volume. There, we also analyze how advice affects the composition of trades. In this section, in contrast, we analyze whether reliance on advice generates more trades.

We proceed as follows. We first provide our key regression results. We then provide both theoretical and empirical arguments for why reliance on advice should cause higher trading activity, and not vice versa.

5.1 Analysis

Our key variable of interest is now the value of customers' security transactions. We call *ln_trade_volume* the logarithm of the value of a customer's total security trades over the two-year period. This choice of main variable deserves some comment. All of our subsequent results apply equally—in terms of both significance and size of effects—when we consider the value of only

security purchases.[19] Further, note that we focus on the value of security transactions and not on the mere number of transactions. The value of transactions is not only the economically more meaningful variable, but also "loads" on security purchases and, thus, bank revenues are typically proportional to the value of investment. Below, we use regressions on both the number and the value of all transactions to additionally support our interpretation of results.

Our key regressor is customers' reliance on advice. We use the same additional controls as in the regressions reported in Table 1 and comment on their possible role as we go along.

Table 3: Security Trades Volume

The table presents OLS-regressions with the dependent variable *ln_trade_volume*. Along with the coefficient estimates, R-squared values and the number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_trade_volume		ln_trade_volume		ln_trade_volume	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.113***	(0.040)				
rely45			0.239**	(0.092)		
rely5					0.245***	(0.087)
informed	0.038	(0.033)	0.032	(0.033)	0.039	(0.033)
numeracy	0.009	(0.029)	0.008	(0.029)	0.008	(0.029)
college	-0.096	(0.085)	-0.101	(0.085)	-0.106	(0.085)
advisor_info	0.043	(0.069)	0.065	(0.070)	0.032	(0.070)
fair_advice	0.039	(0.064)	0.043	(0.065)	0.032	(0.061)
retired	-0.108	(0.129)	-0.110	(0.130)	-0.103	(0.128)
age	0.009*	(0.005)	0.009*	(0.005)	0.009*	(0.005)
gender	0.051	(0.085)	0.052	(0.085)	0.046	(0.084)
ln_portfolio	0.884***	(0.050)	0.883***	(0.050)	0.881***	(0.051)
ln_income	-0.020	(0.074)	-0.020	(0.074)	-0.012	(0.074)
relation	0.131**	(0.056)	0.139**	(0.056)	0.126**	(0.056)
risk_attitude	0.059	(0.046)	0.059	(0.046)	0.069	(0.046)
Constant	-0.057	(0.591)	0.103	(0.593)	0.362	(0.603)
Observations	323		323		323	
R-squared	0.708		0.707		0.708	

[19] Compared to the subsequent Table 3, where we use total trade volume, when we use, instead, only the volume of purchases, all coefficients of reliance on advice are again significant at the one-percent level, and both *rely45* and *rely5* have a marginal effect of more than 21 percent.

For all specifications in Table 3, customers' reliance on advice has a highly significant impact on the volume of security trades. Customers who agree or agree strongly with the statement that they constantly rely on advice generate a higher-than-20-percent trade volume. The average value of total security transactions—i.e., of purchases and sales—over the considered two-year period is 165,971 Euros. (The average value of purchases is 95,479 Euros.) Recall that the average final portfolio value is 105,356. Further, the median value of trades is 87,591 Euros. We spell out in the next section what these transactions imply for the bank in terms of additional revenues.

The importance of reliance on advice for security transactions is underscored by the insignificance of almost all other variables in the regressions of Table 3. In particular, gender, education, and customers' information are all insignificant, as is their risk attitude. Instead, portfolio size has a strong, almost mechanic effect on the value of security trading: A ten-percent increase in portfolio value is associated with an almost nine-percent increase in the value of transactions.

There is also, as we now argue, a simple explanation for why the length of a relationship (*relation*) positively affects the value of transactions. Recall, first, that we previously found no interaction between the length of a relationship and customers' reliance on advice. The usage of dummy variables for *relation* reveals that compared to the base group 2 (relationship between 1 and 3 years), a relationship of less than one year is associated with a strong decline (at the five-percent significance level) in trade volume, whereas a further increase in the length of the relationship has no statistically significant effect. Our interpretation is that a change of advisor—e.g., following a rotation between branches—simply creates frictions. A new advisor may need time to prepare for contacting new clients, and he may need further time to get acquainted with the particular circumstances of his new clients.

Again, results are robust to a number of alternative specifications. As with the regressions in Table 1, in Table 3 the impact of reliance on revenues also remains virtually unchanged when we introduce dummies for the ordinal variables *informed*, *advisor_info*, *fair_advice*, *relation*, and *risk_attitude*. Also the inclusion of quadratic terms for *ln_income* and *ln_portfolio* has only a marginal impact. Finally, when we drop all investors who report not to rely on financial advice (only six observations where *rely* takes on the value 1), the impact of reliance remains strongly

significant (at one percent or five percent across the three regressions) and becomes only slightly smaller (by, at most, one percentage point).

5.2 Discussion

Based on our formal model, our interpretation of the results in Table 2 is that investors who rely on advice are more easily steered into trading more often. As already noted, we show in the following section that this generates substantially higher revenues for the bank. We next argue that causality should run from reliance on advice to trading activity, and not vice versa. Also, we want to dispel concerns that when asked whether they rely on advice, respondents to the survey may have merely *counted* the frequency with which they interacted with their advisors.

It may be argued that customers who trade more often thereby interact more with their advisors and, in doing so, are more likely to develop a more "trusting" relationship, which ultimately induces them to rely more on advice. Note, first, that it is by no means immediate how to formally support such an argument. In particular, to support more "cooperative equilibria" in repeated games, it is the future continuation of the relationship and not past play that matters. Further, if interaction allows customers to learn about some "intrinsic qualities" of the advisor, then this can go "either way." We have also not found a significant relationship between the length of a relationship and investors' propensity to rely on advice (cf. Table 1).

We can further strengthen our argument by bringing in an additional question from the survey. The survey asks customers about the frequency of personal interaction with the advisor. The variable *contact_frequency* takes on values ranging from 0 ("never") to 5 ("more than four times a year"). What is first noteworthy is that contact frequency and reliance on advice are highly correlated (8.9 percent). Even though advisors are required to contact all customers at regular intervals, from an advisor's perspective it is more worthwhile to contact a customer who is more likely to follow a recommendation to reshuffle his portfolio or buy a particular investment product. Not surprisingly, when we include *contact_frequency* in the regressions in Table 2, the significance of reliance on advice falls, though it is still always at least at the five-percent level. The size of all coefficients decreases slightly, but reliance (*rely45*) still increases trade volume by 19 percent, and strong reliance (*rely5*) increases it by 21 percent (cf. Table A.3 in the Appendix).

As is intuitive, the frequency of interaction is positively correlated with the *number* of trades that an investor undertakes. A self-interested advisor is, however, not interested in the number of

trades, but in the value of trades, as this is what drives bank revenues (cf. our previous discussion in Section 2). When we now replace the value of trades in Table 3 by the number of trades (*total_trades*), we find that contact frequency still has a large and significant effect (always at the five-percent level) across all three regressions, but reliance on advice is not significant in any of the three regressions. This is reported in Table 4.

Table 4: Number of Trades

The table presents OLS-regressions with the dependent variable *total_trades*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	total_trades		total_trades		total_trades	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	-0.243	(0.961)				
rely45			-1.735	(2.186)		
rely5					1.609	(1.649)
contact_frequency	2.100**	(0.923)	2.178**	(0.912)	1.965**	(0.884)
informed	0.445	(0.527)	0.398	(0.536)	0.606	(0.539)
numeracy	0.684	(0.522)	0.652	(0.522)	0.742	(0.523)
college	-1.982	(1.639)	-2.110	(1.644)	-1.761	(1.638)
advisor_info	1.839	(1.186)	1.852	(1.177)	1.471	(1.201)
fair_advice	0.143	(1.045)	0.268	(1.068)	-0.171	(1.031)
retired	-2.699	(2.523)	-2.729	(2.498)	-2.592	(2.513)
age	0.032	(0.074)	0.039	(0.073)	0.019	(0.071)
gender	-1.673	(1.763)	-1.641	(1.760)	-1.766	(1.762)
ln_portfolio	7.101***	(1.041)	7.048***	(1.032)	7.176***	(1.056)
ln_income	-0.829	(1.318)	-0.773	(1.325)	-0.874	(1.341)
relation	2.225**	(1.075)	2.168**	(1.057)	2.188**	(1.086)
risk_attitude	2.178*	(1.263)	2.207*	(1.255)	2.189*	(1.266)
Constant	-83.731***	(14.136)	-84.214***	(14.276)	-82.133***	(14.169)
Observations	322		322		322	
R-squared	0.357		0.358		0.358	

6 Reliance on Advice and Bank Revenues

Our interpretation of the results in Section 5 relied on the assumption that the bank gains from an increase in security trade volume and would, therefore, incentivize advisors accordingly. A unique feature of our data is that we can directly analyze the impact that reliance on advice has on

bank-branch revenues. In general, revenues should depend both on trade volume and on the selection of investment products, and we will decompose revenues along this line in what follows. Table 5 reports results on the overall impact of reliance on revenues (*ln_revenues*).

Customers' reliance on advice has a positive and highly significant (at the one-percent level) effect on bank revenues. The bank generates 24-percent-higher revenues with customers who agree that they constantly rely on advice. Recall that the bank's average revenue per customer is 2,560 Euros per year, while the median value is 1,493 Euros.

Table 5: Revenues

The table presents OLS-regressions with the dependent variable *ln_revenues*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_revenues		ln_revenues		ln_revenues	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.125***	(0.040)				
rely45			0.240***	(0.090)		
rely5					0.216***	(0.082)
informed	0.032	(0.032)	0.025	(0.033)	0.030	(0.032)
numeracy	0.011	(0.029)	0.010	(0.030)	0.009	(0.030)
college	-0.049	(0.078)	-0.058	(0.077)	-0.066	(0.078)
advisor_info	0.040	(0.080)	0.065	(0.080)	0.038	(0.083)
fair_advice	0.038	(0.060)	0.046	(0.060)	0.039	(0.059)
retired	-0.115	(0.146)	-0.117	(0.147)	-0.111	(0.147)
age	0.005	(0.005)	0.005	(0.006)	0.005	(0.005)
gender	0.043	(0.079)	0.044	(0.080)	0.040	(0.080)
ln_portfolio	0.796***	(0.046)	0.794***	(0.047)	0.791***	(0.048)
ln_income	0.010	(0.067)	0.011	(0.067)	0.018	(0.067)
relation	0.160***	(0.050)	0.168***	(0.051)	0.156***	(0.050)
risk_attitude	0.120***	(0.042)	0.121***	(0.042)	0.130***	(0.043)
Constant	-2.690***	(0.600)	-2.516***	(0.614)	-2.290***	(0.648)
Observations	323		323		323	
R-squared	0.696		0.693		0.693	

The effect of reliance on advice on bank revenues is largely comparable to its effect on the value of security trades. This is not surprising, as we noted previously that revenues consist mainly of "loads" from security purchases, which, for retail customers, are typically proportional to the

sum invested. This explains also, by our previous arguments, the significance of portfolio size and the length of a relationship. Bank revenues, albeit not trade volume (cf. Table 3), depend also on customers' risk attitude. Customers who are less risk-averse generate substantially more revenues for the bank. Presumably, they invest to a larger extent in more-complex (equity-linked) products that involve higher fees.

We have performed the same robustness checks as for the regressions in Table 1, and the results again remain virtually unchanged when we introduce dummies for the ordinal control variables or include quadratic terms for income and portfolio values.

Bank revenues are not bank profits. On the one hand, as we noted above, for the bank's own investment products, branch revenues do not include management fees, as these are credited to asset management. On the other hand, costs are not included. It could be argued that investors who rely more on advice also generate higher costs, as they use up more advisor time. Then, using advisors' time to steer these investors may, despite higher revenues, be unprofitable. Note, however, that it is overwhelmingly the advisor who initiates contacts, implying that—provided that the bank's and the advisor's interests are aligned—this must ultimately be profitable for the bank. As a proxy for the bank's costs, we have also included the frequency of interaction in the regressions performed in Table 5. This is reported in Table A.4 in the Appendix. Reliance on advice stays significant in all regressions at least at the five-percent level, and the values of all coefficients are only slightly reduced.

Revenues and Product Selection

Our model predicts (Propositions 2-3) that investors who rely more on advice should have a higher trade volume and should purchase products that are more profitable for the bank. Another unique feature of our data is that we have, for each customer, aggregate information on the value of "incentivized" products: We know the total value of the respective security transactions. Recall, also, that these products, which may change weekly, are flagged separately for advisors and that advisors may even receive sales targets.

We have obtained a list of all incentivized products over the covered period. As might be suspected, incentivized products are, in general, managed products or structured products called "*Zertifikate.*" These structured products are very common among German retail investors. The underlying of these products could be stocks, but also bonds or commodities. We first confirm that

the sale of these products is attractive for the bank branch. To isolate the effect of product selection, Table 6 regresses per-customer revenues on the fraction of incentivized products that the customer buys (*fraction_inc*) and other possible determinants of revenues.

Table 6: Decomposition of Revenues

The table presents an OLS-regression with the dependent variable *ln_revenues*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_revenues	
VARIABLES	Coefficient	Stand. Err.
ln_trade_volume	0.752***	(0.045)
frac_inc	0.382***	(0.075)
ln_portfolio	0.150***	(0.052)
risk_attitude	0.085***	(0.024)
Constant	-2.513***	(0.244)
Observations	345	
R-squared	0.885	

Intuitively, trade volume and portfolio value are main determinants of bank revenues. The same holds for risk attitude, as this may affect the choice of more-complex products with higher fees (cf. our preceding remarks following Table 5). In addition, the fraction of the value of all security purchases that is made up by incentivized products has a large impact on revenues: A ten-percent increase in the fraction of incentivized products increases revenues by 3.8 percent.

We analyze how reliance on advice affects investors' purchase of these incentivized products. Reliance on advice is significant at the five-percent level in the first two regressions in Table 7.[20] In particular, when investors agree or fully agree that they constantly rely on advice, this increases the fraction of "incentivized products" by almost ten percent (compared to an average of 33 percent). We do not find a significant effect of *rely5*. A histogram for the distribution of *frac_inc* can be found in Appendix A.

[20] In order to accommodate for the fact that *frac_inc* is a proportion, we follow Papke and Wooldridge (1996) in estimating a GLM model.

Table 7: Incentivized Products

The table presents GLM-models with the dependent variable frac_inc. Along with the marginal effects, the number of observations is reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	frac_inc		frac_inc		frac_inc	
VARIABLE	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.040**	(0.018)				
rely45			0.096**	(0.042)		
rely5					0.039	(0.038)
informed	-0.008	(0.015)	-0.010	(0.015)	-0.011	(0.015)
numeracy	0.011	(0.014)	0.011	(0.014)	0.009	(0.014)
college	0.088**	(0.039)	0.088**	(0.039)	0.080**	(0.039)
advisor_info	0.059	(0.042)	0.066	(0.041)	0.065	(0.042)
fair_advice	-0.039	(0.030)	-0.039	(0.030)	-0.035	(0.031)
retired	-0.052	(0.049)	-0.052	(0.049)	-0.052	(0.050)
age	0.003	(0.002)	0.003	(0.002)	0.003*	(0.002)
gender	-0.031	(0.038)	-0.031	(0.038)	-0.031	(0.038)
ln_portfolio	-0.046**	(0.020)	-0.046**	(0.020)	-0.047**	(0.020)
ln_income	0.029	(0.030)	0.028	(0.030)	0.032	(0.030)
relation	0.006	(0.025)	0.009	(0.025)	0.006	(0.025)
risk_attitude	-0.006	(0.020)	-0.007	(0.020)	-0.003	(0.020)
Observations	323		323		323	

As a final remark on our regressions, recall that we have excluded the bottom and top one percent in terms of revenues. We report in Table A.5 of the Appendix that our key results remain virtually unchanged once we take the full sample.

7 Concluding Remarks

For many financial decisions, households seek financial advice. This has been reported in surveys across many countries (cf. the introduction). Using a sample of advised customers of a large German bank, we obtain information about the degree to which investors actually rely on advisors' recommendations. We find that their propensity to rely on advice affects both trade volume and product selection.

Investors who rely more heavily on advice have a higher volume of security transactions and are more likely to invest in products for which the bank has incentivized its advisors—and which,

as we show, generate higher revenues. Based on a rich survey questionnaire, we also provide an in-depth analysis of the characteristics of customers who rely more on advice. Our analysis confirms the hypothesis from our formal model that investors who rely more on advice also perceive themselves to be less knowledgeable or the advisor to be more knowledgeable, or they perceive that there is less of a conflict of interest.

Our analysis of the impact of reliance on trading and investment focuses on three variables: the total volume of security transactions over the considered two years; bank revenues from security transactions; and the fraction of the value of all purchased products accounted for by "incentivized" products. Still, our analysis does not provide a full analysis of how customers' reliance on advice affects the fee- and risk-adjusted performance of their portfolios. As noted in the introduction, however, the fact that more reliance on advice leads to more trading suggests, at least, that advice does not provide an antidote to the frequently observed "excessive" trading of some retail investors (cf. Odean 1999 or Barber and Odean 2001).

As we noted previously, advice may provide a substitute for the lack of retail investors' own financial knowledge or skills.[21] Results in Dhar and Zhu (2005) suggest that investors with greater financial literacy are less prone to suffer from a "disposition effect." Calvet et al. (2009) show how investment mistakes become less likely when customers are more educated. A more far-reaching research question is, thus, whether professional financial advice provides a cure for retail investors' possible behavioral biases and limited financial literacy, or, instead, whether self-interested advice exploits these biases and investors' lack of knowledge and expertise.

[21] It is very unlikely that the advisors in our sample have privileged information that would allow them to generate higher alpha. (See, instead, Anderson and Martinez 2008, where broker recommendations seem to generate positive profits, but where this effect stems from transactions before the recorded recommendation date).

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Appendix A: Data Description

1. Description of Variables

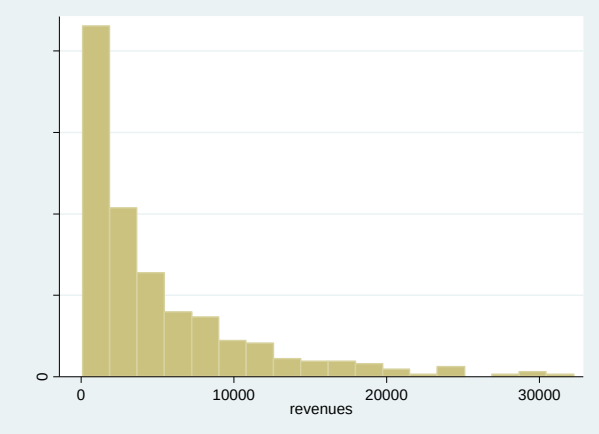
Variable Name	Question	Content	Data Type
rely	I always trust the advice of my financial advisor when investing.	Level of reliance: 1 (lowest) and 5 (highest)	Questionnaire
rely45	I always trust the advice of my financial advisor when investing.	Equal to 1 if reliance is either high or very high	Questionnaire
rely45	I always trust the advice of my financial advisor when investing.	Equal to 1 if reliance is very high	Questionnaire
informed	I am very interested in financial matters and keep myself informed about potential investment opportunities.	Variable indicating the level of a customer´s interest in financial issues: 1 (lowest) to 5 (highest)	Questionnaire
numeracy	I enjoy working with numbers and statistics	Variable indicating the level of a customer's affinity to statistics and numbers: 1 (lowest) to 5 (highest)	Questionnaire
high_numeracy	I enjoy working with numbers and statistics	Equal to 1 if customer's affinity to statistics and numbers is equal or above the median	Questionnaire
college	What is your highest academic qualification?	Equal to 1 if a customer has a university degree	Questionnaire
advisor_info	The advisor appeared to be knowledgeable.	Variable indicating whether advisor is perceived as being well informed: 1 (lowest) to 5 (highest)	Questionnaire
high_advisor_ info	The advisor appeared to be knowledgeable.	Equal to 1 if the perception of the advisor informedness is equal or above the median	Questionnaire
fair_advice	The advisor has treated me fairly and has clearly ensured my advantage.	Variable indicating whether customer perceives himself to be treated fairly: 1 (lowest) to 5 (highest)	Questionnaire

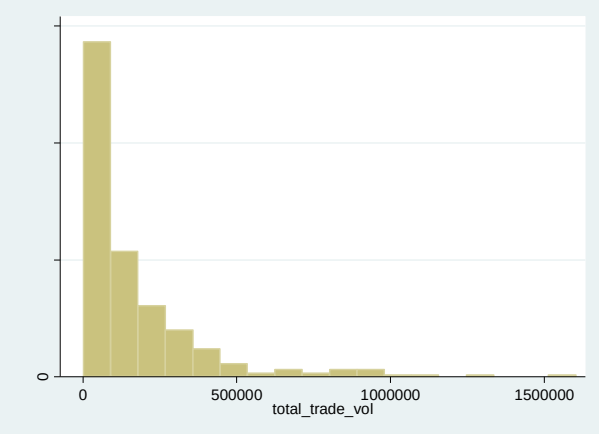
high_fair_ advice	The advisor has treated me fairly and has clearly ensured my advantage.	Equal to 1 if customer's perception of having been treated fairly is equal or above the median.	Questionnaire
retired	What is your current occupation?	Binary variable equal to 1 if a customer is retired	Questionnaire
age	How old are you?	Customer age.	Administrative data
gender	What is your gender?	Equal to 1 for male customer	Questionnaire
contact_ frequency	During the course of a year, how often do you have personal contact with your advisor to extensively (> 10 minutes) discuss investment opportunities?	Frequency of personal contact: 0 (never) to 5 (more than four times a year)	Questionnaire
ln_portfolio		The natural logarithm of the portfolio value of a customer	Administrative data
ln_income		Natural logarithm of the monthly income of a customer	Administrative data
relation	How long has your advisor already been counseling you?	Length of relationship: 1=relation shorter than one year, 2= between 1 and 3 years, 3=longer than 3 years	Questionnaire
high_relation	How long has your advisor already been counseling you?	Equal to 1 if the length or relation is equal or above the median	Questionnaire
risk_attitude	Investing in securities may result in losses. What is the maximum loss you might be willing to accept within the next 12 months?	Customer´s reported maximum tolerated loss: 0 % (1), 5 % (2), 10% (3), and > 10% (4).	Questionnaire
high_risk_ attitude	Investing in securities may result in losses. What is the maximum loss you might be willing to accept within the next 12 months?	Equal to 1 if customer's reported maximum loss tolerance is equal or above the median	Questionnaire

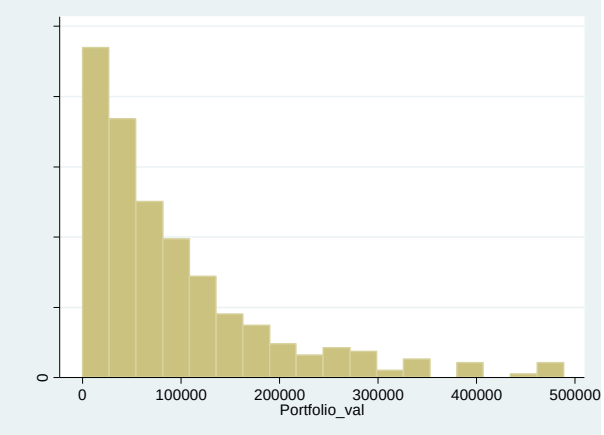
ln_revenues		Natural logarithm of all revenues related to security transactions	Administrative data
ln_trade_ volume		Natural logarithm of total security transactions	Administrative data
fraction _inc		Per-customer volume of "incentivized" purchases divided by volume of all purchases	Administrative data

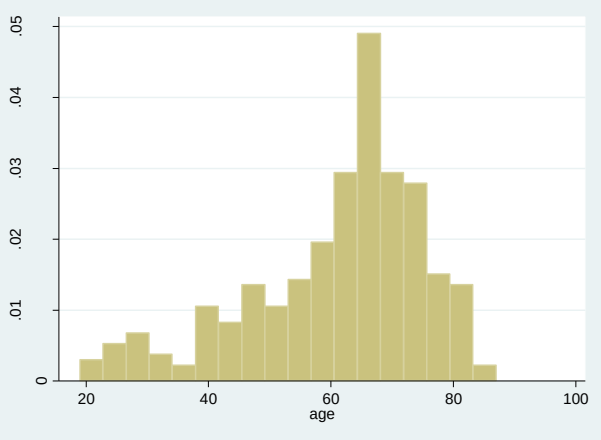
2. Descriptive Statistics

2.1 Histograms of Portfolio Volume, Revenues, Trade Volume, and Age

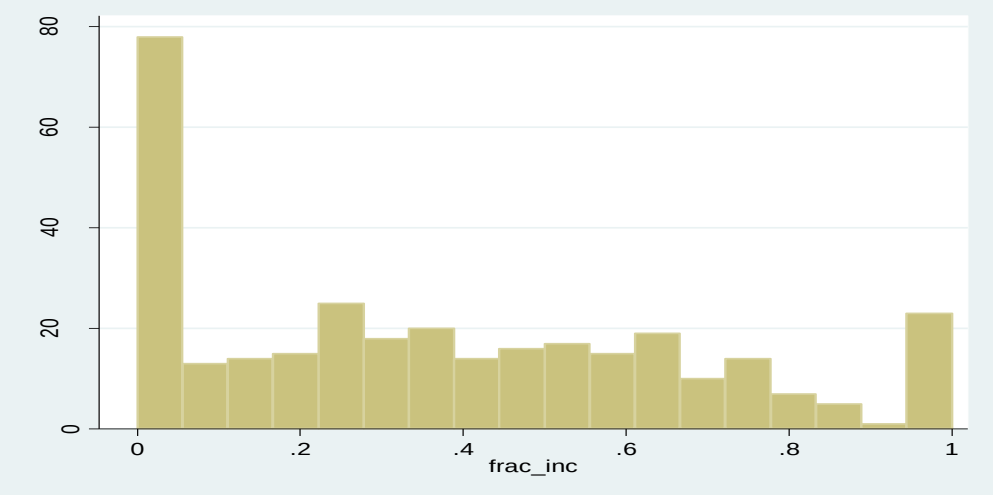








2.2 Histogram of frac_inc



2.3 Frequencies for Ordinal Variables

Variable	Statistics	Fully disagree				Fully agree	Obs.	Mean	Median
		1	2	3	4	5			
	Freq.	69	76	45	67	67	324	2.96	3.00
informed	Percent	21.3	23.46	13.89	20.68	20.68	100		
	Cum.	21.3	44.75	58.64	79.32	100			
	Freq.	5	29	42	99	149	324	4.10	4.00
rely	Percent	1.54	8.95	12.96	30.56	45.99	100		
	Cum.	1.54	10.49	23.46	54.01	100			
	Freq.	119	62	34	48	60	323	2.59	2.00
numeracy	Percent	36.84	19.2	10.53	14.86	18.58	100		
	Cum.	36.84	56.04	66.56	81.42	100			
	Freq.	1	0	3	64	256	324	4.77	5.00
advisor_info	Percent	0.31	0.31	0.93	19.75	79.01	100		
	Cum.	0.31	0.31	1.23	20.99	100			
	Freq.	1	1	15	107	200	324	4.56	5.00
fair_advice	Percent	0.31	0.31	4.63	33.02	61.73	100		
	Cum.	0.31	0.62	5.25	38.27	100			

		Loss tolerance						
	Statistics	0%	<5%	<10%	>10%			
	Freq.	142	114	55	13	324	1.81	2.00
risk_attitude	Percent	43.83	35.19	16.98	4.01	100		
	Cum.	43.83	79.01	95.99	100			

		Length of relation						
	Statistics	< 1year	1 - 3 years	> 3 years				
	Freq.	54	99	171		324	2.36	3.00
relation	Percent	16.67	30.56	52.78		100		
	Cum.	16.67	47.22	100				

Appendix B: Additional Regression Material

Table A.1: Reliance on Advice (without informed)
The table presents an OLS-regression with the dependent variable *rely* and logit- regressions for rely45 and *rely5* as dependent variables. Along with the coefficient estimates (*rely*) or marginal effects (*rely45* and *rely5*), (Pseudo) R-squared values and number of observations are reported. In all models, heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	rely		rely45		rely5	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
numeracy	-0.132***	(0.040)	-0.050***	(0.015)	-0.073***	(0.022)
college	-0.314**	(0.123)	-0.126**	(0.051)	-0.123*	(0.070)
advisor_info	0.310**	(0.139)	0.042	(0.050)	0.317***	(0.084)
fair_advice	0.260**	(0.104)	0.104***	(0.038)	0.185**	(0.076)
retired	-0.010	(0.162)	0.005	(0.069)	-0.050	(0.092)
age	0.012**	(0.006)	0.005**	(0.002)	0.008**	(0.003)
gender	0.025	(0.113)	0.013	(0.047)	0.036	(0.067)
ln_portfolio	-0.076	(0.064)	-0.035	(0.025)	-0.027	(0.033)
ln_income	0.066	(0.089)	0.030	(0.037)	0.006	(0.052)
relation	0.039	(0.072)	-0.012	(0.030)	0.039	(0.043)
risk_attitude	0.079	(0.070)	0.041	(0.029)	-0.010	(0.040)
Constant	1.263	(0.978)				
Observations	323		323		323	
R-squared	0.170					
Pseudo R-squared			0.123		0.170	

Table A.2: Reliance on Advice – Binary Specifications (without informed)

The table presents an OLS-regression with the dependent variable *rely* and logit- regressions for rely45 and *rely5* as dependent variables. Along with the coefficient estimates (*rely*) or marginal effects (*rely45* and *rely5*), (Pseudo) R-squared values and number of observations are reported. In all models, heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	rely		rely45		rely5	
VARIABLES	coef	se	coef	se	coef	se
high_numeracy	-0.356***	(0.113)	-0.110**	(0.044)	-0.275***	(0.067)
college	-0.314**	(0.122)	-0.139***	(0.052)	-0.107	(0.071)
high_advisor_info	0.349**	(0.142)	0.049	(0.059)	0.259***	(0.070)
high_fair_advice	0.417***	(0.113)	0.156***	(0.050)	0.305***	(0.061)
retired	-0.013	(0.153)	0.009	(0.067)	-0.055	(0.090)
age	0.012**	(0.006)	0.005**	(0.002)	0.009**	(0.003)
gender	0.000	(0.112)	-0.014	(0.046)	0.047	(0.068)
ln_portfolio	-0.095	(0.059)	-0.048**	(0.024)	-0.035	(0.032)
ln_income	0.079	(0.089)	0.038	(0.037)	0.019	(0.054)
high_relation	0.064	(0.109)	-0.013	(0.045)	0.061	(0.065)
high_risk_attitude	0.163	(0.116)	0.112**	(0.050)	-0.018	(0.070)
Constant	3.557***	(0.698)				
Observations	330		330		330	
R-squared	0.188					
Pseudo R-squared			0.133		0.201	

Table A.3: Trade Volume (with contact_frequency)
The table presents OLS-regressions with the dependent variable *ln_trade_volume*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_trade_volume		ln_trade_volume		ln_trade_volume	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.091**	(0.041)				
rely45			0.189**	(0.093)		
rely5					0.212**	(0.088)
contact_frequency	0.114***	(0.041)	0.117***	(0.042)	0.119***	(0.041)
informed	0.022	(0.033)	0.017	(0.033)	0.024	(0.034)
numeracy	0.010	(0.028)	0.010	(0.028)	0.010	(0.028)
college	-0.087	(0.084)	-0.092	(0.084)	-0.094	(0.084)
advisor_info	0.057	(0.069)	0.075	(0.070)	0.046	(0.070)
fair_advice	0.030	(0.064)	0.034	(0.065)	0.022	(0.062)
retired	-0.137	(0.127)	-0.140	(0.128)	-0.134	(0.126)
age	0.009*	(0.005)	0.009*	(0.005)	0.009*	(0.005)
gender	0.056	(0.084)	0.057	(0.085)	0.053	(0.083)
ln_portfolio	0.860***	(0.050)	0.859***	(0.051)	0.856***	(0.051)
ln_income	-0.019	(0.075)	-0.018	(0.075)	-0.012	(0.075)
relation	0.117**	(0.057)	0.123**	(0.057)	0.112*	(0.057)
risk_attitude	0.037	(0.045)	0.037	(0.045)	0.044	(0.045)
Constant	-0.065	(0.583)	0.063	(0.580)	0.289	(0.582)
Observations	322		322		322	
R-squared	0.711		0.710		0.712	

Table A.4: Revenues (with contact_frequency)
The table presents OLS-regressions with the dependent variable *ln_revenues*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_revenues		ln_revenues		ln_revenues	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.105***	(0.040)				
rely45			0.193**	(0.090)		
rely5					0.185**	(0.081)
contact_frequency	0.114***	(0.040)	0.120***	(0.040)	0.123***	(0.040)
informed	0.017	(0.033)	0.010	(0.034)	0.014	(0.033)
numeracy	0.013	(0.029)	0.012	(0.030)	0.011	(0.030)
college	-0.038	(0.077)	-0.047	(0.076)	-0.052	(0.078)
advisor_info	0.053	(0.080)	0.075	(0.080)	0.051	(0.082)
fair_advice	0.028	(0.060)	0.035	(0.060)	0.027	(0.059)
retired	-0.141	(0.147)	-0.145	(0.147)	-0.141	(0.146)
age	0.005	(0.005)	0.006	(0.005)	0.006	(0.005)
gender	0.046	(0.079)	0.048	(0.079)	0.045	(0.079)
ln_portfolio	0.773***	(0.048)	0.771***	(0.049)	0.767***	(0.049)
ln_income	0.008	(0.067)	0.010	(0.066)	0.017	(0.067)
relation	0.147***	(0.050)	0.153***	(0.050)	0.143***	(0.050)
risk_attitude	0.098**	(0.041)	0.098**	(0.041)	0.105**	(0.042)
Constant	-2.702***	(0.592)	-2.557***	(0.603)	-2.364***	(0.629)
Observations	322		322		322	
R-squared	0.701		0.698		0.699	

Table A.5: Key Regressions (with outliers)

The table presents OLS-regressions with the dependent variable *ln_trade_vol*, *ln_revenues* and *frac_inc*. Along with the coefficient estimates, R-squared values and number of observations are reported. Heteroscedasticity robust standard errors are in parentheses. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less.

	ln_trade_volume		ln_revenues		frac_inc	
VARIABLES	Coefficient	Stand. Err.	Coefficient	Stand. Err.	Coefficient	Stand. Err.
rely	0.118***	(0.040)	0.131***	(0.040)	0.039**	(0.018)
informed	0.039	(0.033)	0.032	(0.032)	-0.007	(0.015)
numeracy	0.005	(0.028)	0.006	(0.029)	0.011	(0.014)
college	-0.096	(0.084)	-0.050	(0.077)	0.085**	(0.038)
advisor_info	0.046	(0.070)	0.044	(0.080)	0.059	(0.042)
fair_advice	0.045	(0.064)	0.046	(0.060)	-0.040	(0.030)
retired	-0.105	(0.127)	-0.104	(0.144)	-0.052	(0.049)
age	0.009*	(0.005)	0.005	(0.005)	0.003*	(0.002)
gender	0.063	(0.084)	0.055	(0.079)	-0.031	(0.038)
ln_portfolio	0.897***	(0.048)	0.815***	(0.045)	-0.048**	(0.020)
ln_income	-0.015	(0.074)	0.017	(0.067)	0.028	(0.030)
relation	0.132**	(0.056)	0.162***	(0.050)	0.004	(0.025)
risk_attitude	0.061	(0.046)	0.120***	(0.042)	-0.005	(0.020)
Constant	-0.289	(0.573)	-2.992***	(0.587)		
Observations	328		328		328	
R-squared	0.727		0.717			

Appendix C: Proof of Propositions 1-3

In the main text we derived the advisor's optimal strategy. Turn now to stage 4 of the game where the investor reacts to advice. As argued in the main text, the investor optimally follows a negative recommendation. (Formally, $E[u|u < \tilde{u}^*] < 0$ follows strictly from $U < u_0$ together with $E[u|u \geq \tilde{u}^*] \geq 0$.) Suppose thus that the recommendation is to undertake a transaction. Given the investor´s beliefs, $u \geq \tilde{u}^*$, when he then, instead, observes a signal $s < \tilde{u}^*$, he knows for sure that this must be "noise". As $E[u|u \geq \tilde{u}^*] \geq 0$, he then optimally follows the recommendation. Take finally the case where the investor observes $s \geq \tilde{u}^*$. Then, his conditional belief that his signal is "truth" is determined as follows. Note that from

$$m = \Pr(s = "Truth" \mid u \geq \tilde{u}^*, s \geq \tilde{u}^*) \cdot \Pr(s \geq \tilde{u}^* \mid u \geq \tilde{u}^*),$$

and

$$\Pr(\, s \geq \tilde{u}^* \mid u \geq \tilde{u}^* \,) = 1 - (1 - m)G(\tilde{u}^*),$$

we have

$$\Pr(\, s = \text{Truth} \mid u \geq \tilde{u}^*, s \geq \tilde{u}^* \,) = \frac{m}{1 - (1 - m)G(\tilde{u}^*)}.$$

Using this, we thus have that the investor would indeed want to carry out the transaction when

$$\frac{m}{1-(1-m)G(\tilde{u}^*)} s^* + \left[1 - \frac{m}{1-(1-m)G(\tilde{u}^*)}\right] E[u|u \geq \tilde{u}^*] \geq 0 \qquad (3)$$

Condition (3) gives rise to a unique interior cutoff, $\tilde{u}^* < s^* < \overline{u}$, when

$$\frac{m}{1-(1-m)G(\tilde{u}^*)} [E[u|u \geq \tilde{u}^*] - \tilde{u}^*] > E[u|u \geq \tilde{u}^*] - 0, \qquad (4)$$

while otherwise we have $s^* = \tilde{u}^*$. (In the latter case, the investor thus always follows the advisor´s recommendation.) When (4) holds, then s^* satisfies

$$\frac{m}{1-(1-m)G(\tilde{u}^*)} [E[u|u \geq \tilde{u}^*] - s^*] = E[u|u \geq \tilde{u}^*], \qquad (5)$$

from which we have, in particular, that $s^* < E[u|u \geq \tilde{u}^*]$. It is now helpful to summarize the thereby obtained characterization.

Equilibrium Characterization. *There is a unique informative equilibrium of the game of advice. The advisor applies an interior cutoff rule* $u^* = -\delta$ *with* $\underline{u} < u^* < \overline{u}$ *and thus recommends a transaction only when* $u \geq u^*$. *The investor believes that the*

advisor applies the cutoff $\tilde{u}^* =$ *and always follows a negative recommendation. Instead, he refuses to follow a positive recommendation when his signal is sufficiently informative and when* $\tilde{u}^* \leq s < s^*$*. Then,* $\tilde{u}^* < s^* < \overline{u}$ *is given by (5) when (4) holds, while otherwise* $s^* = \tilde{u}^*$.

We next conduct a comparative analysis for an interior cutoff s^*, as obtained in (5). From implicit differentiation of (5) we have that

$$\frac{ds^*}{dm} = [E[u \mid u \geq \tilde{u}^*] - s^*] \frac{1-G(\tilde{u}^*)}{m[1-(1-m)G(\tilde{u}^*)]} > 0. \quad (6)$$

Turn now to a comparative analysis with respect to $\tilde{u}^*$. For this purpose, we first rewrite (5):

$$A \coloneqq ms^* + (1-m)\big(1 - G(\tilde{u}^*)\big)E[u \mid u \geq \tilde{u}^*] = 0. \quad (7)$$

Note that $\frac{ds^*}{d\tilde{u}^*} = -\left(\frac{dA}{d\tilde{u}^*}\right) / \left(\frac{dA}{ds^*}\right)$, where $\frac{dA}{ds^*} = m$ and where we obtain, after some transformations,

$$\frac{dA}{d\tilde{u}^*} = \tilde{\delta}(1-m)g(\tilde{u}^*).$$

Hence, we have that

$$\frac{ds^*}{d\tilde{u}^*} = -\tilde{\delta}\left(\frac{1-m}{m}\right)g(\tilde{u}^*) < 0. \quad (8)$$

Together with $d\tilde{u}^*/d\tilde{\delta} = -1$, we finally have that

$$\frac{ds^*}{d\tilde{\delta}} = \tilde{\delta}\left(\frac{1-m}{m}\right)g(\tilde{u}^*) > 0. \quad (9)$$

We summarize these comparative results as follows:

Comparative Analysis of the Investor´s Cutoff Rule. *When* s^* *is interior, as (4) holds, then* $\frac{ds^*}{dm} > 0$*, as given by (6), and* $\frac{ds^*}{d\tilde{\delta}} > 0$*, as given by (9).*

Intuitively, when the investor becomes more wary of the conflict of interest, then he applies a higher cutoff. Likewise, we have from (6) that the investor´s cutoff is higher when he is in a better position to scrutinize the advisor´s recommendation (higher m).

We next calculate the conditional probability with which the investor follows the recommendation to undertake a transaction: ψ. For this note first that we always have that $u^* \leq \tilde{u}^* \leq s^*$, where the first inequality holds strictly when $\tilde{\delta} < \delta$ and the second inequality holds strictly when $\tilde{\delta}$ satisfies (4). We have also that

$$\psi = \frac{\Pr(u \geq u^* \wedge s \geq s^*)}{\Pr(u \geq u^*)} + \frac{\Pr(u \geq u^* \wedge s < \tilde{u}^*)}{\Pr(u \geq u^*)}. \quad (10)$$

Recall that the second term in (10) arises from the fact that when $s < \tilde{u}^*$, the investor follows the recommendation as his perceived value then equals $E[u \mid u \geq \tilde{u}^*] > 0$.)

For the first term in (10) we can use that

$$\Pr(s \geq s^* \mid u < s^*) = (1-m)[1 - G(s^*)],$$

$$\Pr(s \geq s^* \mid u \geq s^*) = (1-m)[1 - G(s^*)] + m,$$

from which we obtain that

$$\frac{\Pr(u \geq u^* \wedge s \geq s^*)}{\Pr(u \geq u^*)} = [1 - G(s^*)] \frac{[1-G(u^*)]+mG(u^*)}{1-G(u^*)}.$$

Next, for the second term in (10) we have likewise from

$$\Pr(s < \tilde{u}^* \mid u \geq \tilde{u}^*) = (1-m)[1 - G(\tilde{u}^*)],$$

$$\Pr(s < \tilde{u}^* \mid u^* \leq u < \tilde{u}^*) = (1-m)[1 - G(\tilde{u}^*)] + m,$$

that

$$\frac{\Pr(u \geq u^* \wedge s < \tilde{u}^*)}{\Pr(u \geq u^*)} = \frac{(1-m)G(\tilde{u}^*)[1-G(u^*)]+[G(\tilde{u}^*)-G(u^*)]m}{1-G(u^*)}.$$

Taken together, we thus have that

$$\psi = 1 - [G(s^*) - G(\tilde{u}^*)] \frac{1-G(u^*)(1-m)}{1-G(u^*)}. \quad (11)$$

Note, in particular, that this expression captures also the "corner case" where $s^* = \tilde{u}^*$, such that $\psi = 1$. From differentiating (11) we have that

$$\frac{d\psi}{dm} = -[G(s^*) - G(\tilde{u}^*)] \frac{G(u^*)}{1-G(u^*)} - \frac{ds^*}{dm} g(s^*) \frac{1-G(u^*)(1-m)}{1-G(u^*)} < 0,$$

where we use that $\frac{ds^*}{dm} > 0$ holds from (6). Further, we have with

$$\frac{d\psi}{d\tilde{u}^*} = g(\tilde{u}^*) \frac{1-G(u^*)(1-m)}{1-G(u^*)}$$

and

$$\frac{d\psi}{ds^*} = -g(s^*) \frac{1-G(u^*)(1-m)}{1-G(u^*)},$$

as well as $d\tilde{u}^*/d\tilde{\delta} = -1$ and $\frac{ds^*}{d\tilde{\delta}} > 0$ from (9), that

$$\frac{d\psi}{d\tilde{\delta}} = -g(\tilde{u}^*)\frac{1-G(u^*)(1-m)}{1-G(u^*)}[1 + g(s^*)\tilde{\delta}\frac{1-m}{m}] < 0.$$

Turn now to ψ_0 : the *ex-ante* probability with which advice is followed. We have from $\psi_0 = [1 - G(u^*)]\psi + G(u^*)$ that

$$\psi_0 = 1 - [G(s^*) - G(\tilde{u}^*)][1 - G(u^*)(1-m)].$$

We thus have that

$$\frac{d\psi_0}{dm} = -[G(s^*) - G(\tilde{u}^*)]G(u^*) - \frac{ds^*}{dm}g(s^*)[1 - G(u^*)(1-m)] < 0,$$

using $\frac{ds^*}{dm} > 0$, and that

$$\frac{d\psi_0}{d\tilde{\delta}} = -g(\tilde{u}^*)[1 - G(u^*)(1-m)][1 + g(s^*)\tilde{\delta}\frac{1-m}{m}] < 0.$$

Finally, with $\tau = [1 - G(u^*)]\psi$ we have that

$$\tau = [1 - G(u^*)] - [G(s^*) - G(\tilde{u}^*)][1 - G(u^*)(1-m)],$$

such that $\frac{d\tau}{dm} = \frac{d\psi_0}{dm}$ and $\frac{d\tau}{d\tilde{\delta}} = \frac{d\psi_0}{d\tilde{\delta}}$. This concludes the proof of Propositions 1-3.