Can Unbiased Financial Advice Steer Retail Investors Towards Efficient Portfolios?

Answers from a Large Field Study[*]

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Abstract

Working with one of the biggest brokerages in Europe, we record what happens when unbiased investment advice is offered for free to about a random 8,000 of their several hundred thousand active retail customers. We analyze the data to answer which customers accept the offer and, if they accept the offer, do they improve their portfolio efficiency. These are our findings. First, only 5%, (who are likely to be male, older, richer, more financially sophisticated, and have a longer relationship with the brokerage) accept the offer. Second, of those who accept the offer, the advice is hardly followed. Third, though the portfolio efficiency does not improve for the average advisee, it does improve for the average advisee who follows the advice. Fourth, it seems that the investors who most need (do not need) the financial advice are the ones who are most likely to not get it (get it). Overall, our results imply that the mere availability of unbiased financial advice is a necessary but not a sufficient condition for benefiting retail customers.

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1. Introduction

Hwa is thet mei thet hors wettrien the him self nule drinken (who can give water to the horse that will not drink of its own accord?)

Oldest English proverb, first recorded in 1175, compiled by Heywood (1546)

There is a large and growing literature in household finance, which we briefly discuss below, that documents that retail investors make serious investment mistakes. There is another burgeoning literature, which we also discuss below, that shows that professional advice given to retail investors is often conflicted, and retail investors who obtain such advice actually worsen their investment performance. An implication from these two literatures is that retail investors would benefit if they could only get unbiased and theoretically sound professional advice.

This paper tests the above implication. Can unbiased financial advice steer retail investors towards efficient portfolios? To answer this question, we work with one of the biggest brokerages in Europe. The brokerage runs the following study. It offers financial advice for the first time to about a random 8,000 of their several hundred thousand active retail customers. The advice is free, lasts for about 6 months and aims at improving portfolio efficiency in the long run. The advice is ex-ante unbiased – it is generated from a commercial optimizer that improves portfolio efficiency – and, as we will later document, the advice is ex-post sound because it significantly improves diversification. As we have demographic data on all retail customers, for those who accept the advice and for those who do not accept the advice, and we also possess for both these groups their daily trading records for a number of years before the advice is offered and up to ten months after the advice is offered, we can answer some key questions. How many and which types of customers accept the offer? If customers accept the offer, is

the advice followed? Does portfolio efficiency improve for the average advisee who accepts the offer? Does portfolio efficiency improve for the average advisee who follows the advice? Are investors who most need (do not need) the financial advice the ones who are most likely to get it (not get it)?

There is a rich literature that documents that households make serious investment mistakes by deviating from the prescriptions of normative finance. The majority of households do not even participate in the stock market (e.g., Guiso, Haliassos and Jappelli (2002)) despite the large equity premium that exists (e.g., Mehra and Prescott (1985, 2003) and Dimson, Marsh and Staunton (2007)). The few households that do participate in equity markets hold under-diversified portfolios (e.g., Blume and Friend (1975), Kelly (1995), Goetzmann and Kumar (2008)). Under-diversification with regard to geographical diversification is particularly acute – investors are found to exhibit both a home bias and a preference for local stocks (e.g., French and Poterba (1991), Lewis (1999), Cooper and Kaplanis (1994), Huberman (2001), Zhu (2002), Ahearne, Griever and Warnock (2004) and Calvet, Campbell and Sodini (2007)).

Other investment mistakes in the trading behavior of private investors have also been documented. We observe inertia, resulting in insufficient portfolio adjustments of individual investors to general market movements (e.g., Calvet, Campbell and Sodini (2009), Agnew, Balduzzi and Sundén (2003) and Madrian and Shea (2001)). Investors trade too much because they are overconfident (e.g., Barber and Odean (2000), Barber et al. (2009), Deaves, Lüders and Luo (2003), and Odean (1999)). Investors tend to sell winners too early and hold on to losers too long, an investment mistake called the disposition effect (e.g., Shefrin and Statman (1985), Odean (1998), and Frazzini (2006)). Investors are fixated on cognitive reference points (e.g., Bhattacharya, Holden and Jacobsen (2010)).

Are these investment mistakes serious? Barber and Odean (2000), by looking at the consequences of overconfidence, find that overconfidence leads to substantial return decreases after the deduction of transaction cost. For the aggregate portfolio of individual Taiwanese investors, Barber et al.

(2009) document an annualized loss of 3.8%. Finally, Calvet, Campbell and Sodini (2007) measure the cost of non-participation and under-diversification and report a substantial loss for Swedish households.[1]

Next to financial education, default options or regulation (Campbell (2006)), another potential remedy for private households' investment mistakes is financial advice. The business of providing financial advice is a big business in many countries. In the U.S., the Financial Planning and Advice Industry is estimated to have a size of 37 billion dollars.[2] The Investment Company Institute (2007) notes that over 80% of respondents state that they obtain financial advice from professional advisors or other sources in the United States. In Germany, Europe's largest economy, a survey among retail investors indicates that more than 80% of investors consult a financial advisor.[3]

Financial advice, however, is offered by third parties, and this advice may be conflicted because these third parties have their own interests. The theoretical literature formalizing this point remarks that the apparent information asymmetry between investor and advisor may provide camouflage to advisors to act in their own interests to the detriment of the clients (e.g., Bolton, Freixas and Shapiro (2007), Carlin (2009), Inderst and Ottaviani (2008, 2009a, 2009b), Carlin and Gervais (2009), or Stoughton, Wu and Zechner (2010)).

Recent empirical evidence supports the agency conflict claims formalized in the above theoretical models. Mutual funds in the U.S. sold through brokered channels underperform. Those funds that provide higher fees are sold more heavily, which in turn negatively affects returns (e.g., Bergstresser, Chalmers and Tufano (2009), Chen, Harrison and Kubik (2006) and Edelen, Evans and Kadlec (2008)). Hackethal, Haliassos and Jappelli (2009) find that individual investors whose account is run by, or in consultation with, a financial advisor achieve lower returns. Additionally, in an audit study, Mullainathan, Nöth and Schoar (2009) conclude that financial advisors seem to be aggravating the

[1] Malkiel (1995) and Carhart (1997) show that even mutual funds underperform the market net of expenses. Fama and French (2010) find no evidence that the average mutual fund produces alphas that cover its costs.

[2] http://www.ibisworld.com/industry/default.aspx?indid=1316

[3] Cf. DABbank (2004): Two-thirds said that they obtain financial advice from their main bank, whereas about a fifth obtained advice from an independent financial advisor.

existing biases of their investors. A survey among the European Union members of the CFA Institute (2009) revealed that 64% of respondents believe that the prevailing fee structure is intended to steer sales instead of serving the customer. Also, recommendations made by research analysts who are compromised through an incentive scheme are shown to have only very limited potential for value enhancement (e.g., Womack (1996), Metrick (1999) and Barber et al. (2001)).

The above two literatures point to an obvious supply-side cure to improve the portfolio efficiency of retail investors: offer unbiased and theoretically sound financial advice that brings advisees closer to efficient portfolios and household investment mistakes will be ameliorated. If you build it, they will come.

If you build it, will they really come? Will investors really benefit if honest and unbiased financial advice is offered? This paper attempts to answer these questions. In so doing, we explore the demand side of financial advice. We are the first, to the best of our knowledge, to link the recommendations of advisors with actual customer behavior after the advice is given. This allows us to answer questions that have not been answered – who accepts advice, do they follow the advice after accepting it, and does their subsequent portfolio efficiency depend on the degree to which they follow the advice. Since we also have demographics and trading data on the customers who do not receive the advice, we use this group as our control group in answering many of these questions.

We obtain the following answers. First, only about 5%, (who are likely to be male, older, richer, more financially sophisticated, and more likely to have a longer relationship with the brokerage) accept the offer. Second, of those who accept the offer, the advice is hardly followed. Third, though portfolio efficiency does not improve for the average advisee, it does improve for the average advisee who follows the advice. It improves more for less financially sophisticated investors. Fourth, it seems that the investors who most need (do not need) the financial advice are the ones who are most likely to not get it (get it). Overall, our results imply that the mere availability of unbiased and theoretically sound financial advice is a necessary but not a sufficient condition for benefiting retail customers. So you can lead a horse to water, but you can't make it drink.

Campbell (2006), and especially Campbell et al. (2010), recognize that consumers need financial protection not just because of supply-side problems but also because of demand-side problems. Using the latest research from behavioral economics, Campbell et al. (2010) make a very powerful argument that many consumers do not have the ability to understand complex financial products in an age where they have to make most of their own financial decisions. Benartzi and Thaler (2004) recognize demand-side problems in the context of savings decisions. They offer possible solutions by taking into account behavioral factors when designing saving plans. They develop a choice architecture system called "Save More Tomorrow"™ (SMarT) which is designed to help people commit in advance to defined contribution increases in pension plans. In an experiment on payday loan borrowers, Bertrand and Morse (2009), examine the cognitive limitations of these borrowers, and focus on solutions. They find that information disclosure that aims at "de-biasing" is effective.

Existing regulation, however, deals mostly with the supply-side problem. In the U.S., in the financial reform bill (called "Restoring American Financial Stability Act of 2010") that was signed into law on July 17, 2010, a new agency called the Consumer Finance Protection Agency was created to deal with mostly supply-side problems. It is the same in Europe. The "Markets in Financial Instruments Directive (MiFID)" (Directive 2004/39/EC of the European Parliament), effective on November 1, 2007, intends to improve the protection of retail investors by increasing the transparency of financial products. Implementing this directive is obligatory for EU member states. Germany, for instance, passed a new Securities Trading Act (§ 31d WpHG) that forces financial service firms to disclose any fees (kick-backs, bonuses, etc.) related to a product sale. The UK goes even further: the FSA has launched the Retail Distribution Review (RDR) that, among others, envisions minimizing conflicts of interest by prohibiting commissions in financial product sales or defining minimum qualification standards for financial advisors after 2012.

Our paper points out the importance of the demand-side problem, and the limitations of regulation in dealing with demand-side problems. How do you *force* a person to follow unbiased and sound financial advice? This problem is faced in medicine as well. Research on patients' adherence to medical

advice has been conducted for decades. A meta-analysis of 50 years of research in this field finds that "the average non-adherence rate is 24.8%". The reasons for not following a doctor's advice are: patients think they know more than the doctor, depression, lack of social support, or simply because they misunderstand or forget what they have been told. Non-adherence is rational in exceptional cases; in general it is just a waste of resources. Additionally, adherence increases with more circumscribed regimens, as well as education and income, but not as a function of demographic characteristics (such as gender or age) or the severity of illnesses (DiMatteo (2004)).

Why do our subjects not opt for or opt for and then not follow the unbiased financial advice? Typical obstacles for investors include bounded rationality (e.g., Kahneman (2003)) and procrastination that leads to inertia (e.g., Samuelson and Zeckhauser (1988), Laibson (1997) or O'Donoghue and Rabin (1999)). Other studies such as Barber and Odean (2000) find that investors tend to be overconfident, and overconfident people tend not to follow advice. Additionally, people who have lower trust (e.g., Guiso, Sapienza and Zingales (2008)) are less likely to follow financial advice. Other influences on the propensity to opt for and follow financial advice may be social interaction (e.g., Hong, Kubik and Stein (2003)) and financial literacy (e.g., Christelis, Jappelli and Padula (2009)).

The goal of our field study is modest. It helps us answer whether people opt to receive unbiased financial advice and, if they receive it, do they follow it. Analyzing in detail why people do not follow advice cannot be answered by this field study. However, it should be pointed out that we cannot find a link between demographics and followership, which is perfectly in line with results from medical research where demographic effects on adherence to prescribed treatments are also found to be minor (e.g., DiMatteo (2004)). We can also rule out some other hypotheses why most subjects are not following the advice in our study. First, could it be that the subjects are getting advice from other brokerages who they trust, or they discard all offers of advice because they are getting multiple offers from other brokerages, or this bank's offer goes to their SPAM folder? As we do not conduct a laboratory experiment but a field study, these questions cannot be answered definitively. Even if they have outside advice, this advice must either be bad or not followed because we find portfolios to be largely inefficient before the offer and

significant potential for improvement remained. Additionally, in comparison to official statistics provided by Deutsche Bundesbank (2010) and Deutsches Aktieninstitut (2009), the investors in our sample are richer than an average retail investor in the population. The larger account value signals that these brokerage portfolios do not represent "play money" account values. This indicates that we are looking at investors' main accounts and that their financial wealth is predominantly with this brokerage. This was the first time this bank offered advice. The email containing the offer was an official email sent into the inbox of the banking account (not private email). This inbox is never crowded because these emails have a predetermined maturity. Emails were also followed by personal phone calls. Second, could it be that investors are scarred by past free advice that turned out to be a scam? That could be, but such advice did not come from this main brokerage of theirs because this was the first time the bank was offering advice. As this is a real world example, every market entrant offering unbiased financial advice would face the same hurdles. Third, could it be that the subjects are really well-diversified holding a large well-diversified portfolio consisting of cash and government securities outside the brokerage? That is unlikely because, as mentioned before, the financial wealth of our subjects are predominantly held in this bank. Even if they are well-diversified outside, it is hard to explain why they are not well-diversified in the risky part of the portfolio held with our brokerage. Fourth, could it be that the advice was ignored because it was short-lived? As our data shows that subjects have an average holding period horizon of less than one year, the advice does not seem short-lived compared to this. Fifth, do they ignore advice because they were not sophisticated? That could be, our results show that actually the more sophisticated subjects, as measured by their past investment performance, choose to receive the advice. Sixth, do they ignore advice because they do not trust it? That could be, trust – measured by the length of relationship with the brokerage – increases the likelihood of opting for advice. Seventh, is inertia causing them to ignore the advice? Subjects do not seem to be inert because they trade actively. Eighth, are they too busy to accept the advice? Again, our subjects do seem to have enough time in their hands to trade actively.

The plan of the paper is as follows. Section 2 describes our field study. We give a broad overview of the field study, the details of the offer made to the retail customers of the brokerage, and the

particulars of the advice. We explain how the recommendations are generated. We argue that the advice is unbiased and theoretically sound. Section 3 details the raw data, and the methodology used to estimate investment performance and portfolio efficiency of investors, and the degree to which investors follow the advice. Section 4 gives some revealing descriptive statistics. Section 5 examines which retail customers opt to receive the advice. Section 6 examines who follows the advice. Section 7 explores the portfolio efficiency of the customers after receiving the advice. Section 8 analyzes which customers would benefit most from the advice. Section 9 concludes.

2. The field study

2.1 Overview

The brokerage we work with was originally founded as the direct bank subsidiary of a large European bank. Its focus was on offering brokerage services via the telephone and the internet. Over time it evolved to a full service bank providing clients with brokerage and banking services as well as advice on mortgages. However, the bank never offered investment advice to their clients; so all their client trades were self-directed. That changed in 2009. In order to retain existing and to attract new customers, the brokerage set out to introduce a financial advisory business. As a new entrant to the investment advisory market, the brokerage designed a financial advice model that was distinctively different from the ones traditional retail banks in Europe offer. First, the financial advice offered would not be conflicted, i.e., securities recommendations would be independent of product issuers. The financial advice would not be discretionary advice from an individual advisor but recommendations produced by a mean-variance optimizer that improves portfolio efficiency. The optimizer would use mainly ETFs and mutual funds to increase diversification within and across asset classes, both domestic and foreign. Second, in order to ensure and signal the objectivity of its financial advice, the bank would avoid any incentive problems by not charging any commissions on trades based on the recommendations given. Third, during a test phase, from which our data originates, the advice itself would also be free of charge.

In order to test this new advice model, a large field study is conducted. The purpose of this field study is twofold. First, the bank wanted to test the technical functionality of background IT systems supporting the new model. Second, the bank, with the help of the authors of this study, intended to evaluate the newly introduced advisory model in terms of customer acceptance, and the quality of the advice as measured by improvement in portfolio efficiency.

2.2 Details of the Offer

About 8,000 customers are selected randomly from a total of the brokerage's several hundred thousand *active* customers. Active customers are defined as customers with at least EUR 25,000 assets under management, at least three trades over the past twelve months, and between 18 and 80 years of age. Exactly 8,195 customers are selected. In early May 2009 an email was sent into the inbox of the banking account (not private email) of the selected customers. In this email, the new advisory service was advertised to be objective – it was mentioned that, one, the recommendations would be system generated and independent of product issuers; two, no commissions, overt or covert, would be charged for trades based on the recommendations; and, three, the advice would be free for the test phase. Customers were told that at the end of the test phase, the free advisory service would be terminated automatically. It was also made clear to the customers that there would be no obligation to make any transactions based on the recommendations given. Thus, there would be no risk of any unintended future commitment for the customer. If customers did not react to the offer, a follow-up phone call was initiated, and an advisor explained the offer again, and answered questions.

2.3 Details of the advice

We assign all customers to our treatment group who opt to receive the free advice from the brokerage. All other customers who declined the offer form our control group.

Every person in the treatment group was contacted by an advisor to schedule an initial call. This call was used to gather additional demographic information (e.g., job, household size), wealth proxies

(e.g., income, total financial wealth including cash, other assets) and to find out about personal risk preferences. Risk preferences were mainly solicited via the following method. The advisees were asked to select one out of six categories ranging from "safe" to "chance" as their investment philosophy. There were no replies for two of these categories and, therefore, we have four levels of risk-aversion. Based on demographic data and the above customer inputs, the brokerage calculated a risk capacity score that determined the maximum possible level of risk a client should be exposed to in the recommended portfolio.

This risk capacity score is the main input for the formation of customer specific recommendations that enhances portfolio efficiency. The customer receives a detailed documentation – see the Appendix for a disguised example of a detailed recommendation – that includes the following information:

- Description of the idea of diversification by investing in different asset classes and markets
- Explanation of important concepts (e.g. volatility, mean-variance efficiency, Sharpe ratio)
- Consideration of tax advantages by keeping old investments in the portfolio
- Analysis of the existing portfolio (historical and expected risk/return profile)
- Analysis of the recommended portfolio (list of securities, risk/return profile compared to the existing portfolio)
- Inclusion of peoples' wishes as a side condition into recommendations
- List of necessary trades to realize the recommended portfolio
- Characteristics of the recommended securities (e.g., description, ex-ante return and risk)

In addition to this detailed written documentation that was sent via email, an advisor explained the recommendation to the customer over the phone.

2.4 The Mean-Variance Optimizer

The bank's recommendations are generated by a mean-variance optimizer based on the original framework of Markowitz (1952) that focuses on diversification. The literature tells us that retail investors make mistakes by holding under-diversified portfolios. This under-diversification is typically not linked

to investment skills (e.g., Goetzmann and Kumar (2008)). If a portfolio optimizer improves diversification, it will consequently add value for a typical retail investor. It is probably less important which exact optimization method is applied as long as it increases diversification. DeMiguel, Garlappi and Uppal (2009) show that even more sophisticated techniques are not better than a naive 1/N portfolio strategy.

Expected returns and variances are required as inputs. To build efficient and well-diversified portfolios, it is important that the expected return estimates are not biased by any past extreme return realizations. Two precautionary measures are taken. First, the optimizer uses a shrinkage factor as proposed in Jorion (1986) or Michaud (1998). The shrinkage factor is implemented using a security's deviation from the long-run average return of securities with a comparable level of risk. Second, and more important, the optimizer is set up in a way that it proactively adds only a set of 80 securities, predominantly ETFs and/or mutual funds. For such well diversified portfolios, Holden (2009) notes that the potential effect of past idiosyncratic realizations is minimized. Volatilities are estimated using historical figures, since these are found to be rather time invariant. A money-market ETF is used as a risk-free asset to represent customers' cash holdings. Finally, the last input into the mean-variance tool optimizer is the risk capacity score of the customer.

Even though only 80 securities are considered in the basic investment opportunity set of the optimizer, the potential opportunity set of the optimizer is much larger because it is capable of considering the entire set of securities that are held by the investors in our sample. Additionally, the optimization is subject to some constraints and side conditions e.g., maximum weight on an asset class due to a client's wishes or risk capacity, maximum number of securities, minimum weight on a single security, absence of a risk-free asset, and a short sale constraint. It is also possible to define other constraints such as the number of securities from the existing portfolio to be kept. As will be shown in section 4.2, on average, about 15% of the value of the original portfolio is retained. This is done for two reasons: one, to retain securities on which customers have a tax advantage and, two, to increase the level of acceptance of the recommendations by the investors. This implies that the recommended portfolios are

different across investors because investors differ in their risk-capacity, their prior portfolio allocations, their side conditions and the point in time at which they receive their recommendations.[4]

Despite these constraints, Tables 1a – 1c show that the optimizer is indeed able to improve the diversification of the portfolios along three important dimensions. Firstly, as you can see in Table 1a, the average recommended portfolio is more diversified along different asset classes than the average existing portfolio before the advice. The share of equity is reduced from 64% to 50%, while the share of money market, fixed income and real estate securities is increased from 23% to 36%, as is the average share of commodities from 1% to 11%. Secondly, as Table 1b shows, international diversification is strongly enhanced by the recommendations. Whereas prior to the advice, investors hold about 50% of their assets in German securities, the recommendations suggest 30% in German securities. Thirdly, as Table 1c shows, investments in single stocks are reduced from 45% to 23%. Clients are advised to invest 71% in well-diversified ETFs and mutual funds.

[INSERT TABLES 1a – 1c ABOUT HERE]

Table 2 provides evidence that the optimizer also aligns the clients' risk capacities and the risk of recommended portfolios. From risk class 1 (highly risk averse) to 4 (least risk averse), the share of equity and commodities monotonically increases whereas the share of fixed income, money market and real estate investments declines.

[INSERT TABLE 2 ABOUT HERE]

All in all, given the constraints, it seems as if the optimizer manages to recommend well-diversified portfolios for everyone.

[4] In order to address the issue of commonality among the recommendations, all our results are also estimated using a cluster robust regression analysis with risk class being the cluster variable. All non-advised clients were grouped into one class. Results remain qualitatively unaltered.

2.5 Time-Line

As mentioned before, the offer was sent to a random sample of 8,195 customers drawn from a population of several hundred thousand customers in early May 2009. This is our "event date", which we index as t = 0 on the event time line.

We have demographic data of our 8,195 sample customers from September 2005. It is an unbalanced panel. Only 5,952 customers were with the brokerage as early as September 2005. The other 2,243 joined afterwards but before May 2009. The period between September 2005 and May 2009 is called the "pre-advice" period. So the pre-advice period is t = -44 months to t = 0.

The 8,195 sample customers could join the treatment group between May and October 2009. The first free recommendation was given on May 13, 2009, and the last customer opted in on the last week of September 2009. This is why we define the "post-advice period" as the period after September 2009. The "post-advice" period lasts 6 months and ends at the end of March 2010.

[INSERT FIGURE 1 ABOUT HERE]

3. Data and methods

3.1 Data collected

The first part of the dataset consists of demographics for the entire random sample group of 8,195 customers. Table 3 shows the data that we collected.

[INSERT TABLE 3 ABOUT HERE]

This data includes gender, age and micro geographic status, as well as time-invariant account information such as the account opening date. The micro geographic status measures the average wealth level of people living in a given micro area (on a street level). It has nine categories, with nine being the wealthiest. This variable is provided by a specialized data service provider who uses several factors such as house type and size, dominant car brands, rent per square meter or unemployment rate to construct this variable. The account opening date allows us to compute the length of relationship between a customer and the brokerage.

The second part of the dataset has account data for each customer. Account data includes position statements, transactions and transfers of holdings from other portfolios. Position statements are on a security-by-security level and are taken from the beginning of every month. For each position we have the International Security Identification Number (ISIN), the number of securities held per ISIN and their EUR-value. Transactions and transfers are recorded on a daily basis and for each of them we know the ISIN, trade volume and the transaction price. Further, for the customers who opted to receive advice, we have data on when a customer received advice and what exactly the customer was recommended to buy and sell. This permits us to calculate four different daily return series for each customer in the treatment group (customers who opted to get advice): actual investment returns in the pre-advice period, actual investment returns in the post-advice period, "buy & hold" investment returns in the post-advice period *if portfolios had not been changed from the day before the advice was given*, and investment returns of the "recommended" portfolio in the post-advice period *if advice had been completely followed*. The data also allows us to calculate two different daily return series for each customer from the control group (customers who opted not to get advice): actual investment returns in the pre-advice period and actual investment returns in the post-advice period.

The third part of the dataset contains market data from Thomson Financial Datastream. Sample customers hold and trade a total of 46,361 securities over the observation period. Thomson Financial Datastream covers 97% of these securities measured by total portfolio holdings. We use daily total returns, price changes and corporate actions for all these securities. A number of our tests use the Carhart (1997) model to estimate risk-adjusted returns. Therefore, we also produce weekly return series for the following four factors: the country market factor (MKT), small minus big (SMB), high minus low (HML) and the momentum factor (MOM).

3.2 Return calculations

The brokerage data in conjunction with the market data from Thomson Financial Datastream allow us to accurately compute daily holdings on a security-by-security level and daily portfolio returns.

First, we infer daily holdings from monthly position statements, security transactions and account transfers. We have end-of-day holdings for the last day in a month. We multiply the end-of-day value of each holding by the corresponding price return (excluding dividends but taking into account any capital actions) for that security to arrive at the next end-of-day holdings. These holdings are then properly adjusted for any sales, purchases and account transfers that occurred on that very day. We repeat this procedure for every security and investor for each trading day in a given month. The holdings on the last day of each month are then reconciled with the true holdings obtained from the brokerage.[5]

Second, we compute daily portfolio returns as weighted average returns over all securities held, purchased or sold by the investor on that day. We use total return data (including dividends) for securities without transactions on that day. For securities that are either purchased or sold we take into account exact transaction prices to compute returns. We weight each security's return to calculate investors' daily portfolio returns. All holdings and sales are weighted using EUR-values based on previous day's closing prices. All purchases are weighted using the transaction value in EUR.

When we compute hypothetical returns for portfolios recommended by the broker, we follow the same procedure and assume that purchase and sale transactions occur at the price that prevails at the end of the day on which the recommendation was given.

For our regressions we cumulate all daily portfolio returns into weekly returns to avoid potential problems that often come with daily returns such as non-synchronous trading and short-term correlation attributable to noise. Portfolio excess returns are weekly portfolio returns minus the risk-free rate, which we assume to be equal to the 3-month EURIBOR. We regress this excess return on the four factors used by Carhart (1997),

$$R_{j,w}-R_{fw}=\alpha_{jw}+\beta_{jw}\cdot(R_{mw}-R_{fw})+s_{jw}\cdot SMB_w+h_{jw}\cdot HML_w+m_{jw}\cdot MOM_w+\varepsilon_{j,w} \quad (1)$$

where R_{jw} is the return of investor j's portfolio in week w, R_{fw} is the 3-month EURIBOR rate in week w, $\cdot R_{mw}$ is the return in week w of a broad domestic stock market index (MKT), SMB_w and HML_w are the returns for the size and value-growth portfolios according to Fama and French (1993) in week w, and

[5] The deviations between inferred and actual holdings are negligible.

MOM_w is the one-year momentum return from Carhart (1997) in week w. The intercept (alpha) in regression (1) is our measure for risk-adjusted portfolio returns. For robustness we also calculate Jensen's one factor alphas for both the domestic stock market as well as the MSCI World in EUR.

We estimate alphas only in the pre-advice stage where we have 44 months of data. We *do not* estimate alphas in the post-advice period since we only have 6 months of data. We, however, estimate measures of portfolio efficiency in both these periods, and these we now describe.

3.3 Measures of portfolio efficiency

We focus on measuring diversification. To do so, we use two measures: The Herfindahl-Hirschmann Index (HHI) and the idiosyncratic variance share.

The HHI is a commonly accepted and simple measure of diversification (e.g., Dorn, Huberman and Sengmueller (2008) or Ivkovic, Sialm and Weisbenner (2008)). It is calculated by summing up the squared portfolio weight of each security. Therefore, it follows that the lower the HHI, the better the diversification. If the security is a fund we assume that this fund consists of 100 equally weighted positions (as done by Dorn, Huberman and Sengmueller (2008)).

We use idiosyncratic risk inherent in investor portfolios as a measure of diversifiable risk. For that purpose we take the variance of the residuals from regression (1) and, as in Calvet, Campbell and Sodini (2007), divide it by the total variance of the dependent variable from the same regression. The larger this share, the more idiosyncratic risk and, therefore, diversifiable risk is borne by the investor.

3.4 Measure of Overlap

To measure the extent to which investors who opted into the advisory model actually follow the recommendations from the system, we construct a variable that captures the daily overlap between the actual and the recommended portfolio:

$$Overlap_{j,d} = \frac{\sum_{i=1}^{N} Euro \mid j,i,d_{actual} \cap j,i,d_{recommended}}{\sum_{i=1}^{N} Euro \mid j,i,d_{actual} + \sum_{i=1}^{N} Euro \mid j,i,d_{recommended} - \sum_{i=1}^{N} Euro \mid j,i,d_{actual} \cap j,i,d_{recommended}} \quad (2)$$

where j denotes the investor, i indicates security type and d indexes the trading day. "Euro" stands for the EUR-value that investor j holds in security i on trading day d. The numerator is the sum in EUR of all overlapping securities, i.e., of those securities that occur both in the actual and the recommended portfolio. The denominator is the value of the actual portfolio plus the value of the recommended portfolio less the overlap. So it is actually a ratio of the intersection of the two sets to the union of the two sets, where the two sets are the actual portfolio and the recommended portfolio. The ratio can only take on values between zero and one. The ratio is one if a customer fully follows the advice, and it is equal to zero if the actual and recommended portfolio do not share a single security.

See Table 4 for an illustration of how this overlap metric works for a real recommendation.

[INSERT TABLE 4 ABOUT HERE].

The overlap variable in (2) is a measure of following advice at a point in time. We also calculate the change in the overlap variable from the day the advice is given to each day in the period from t = 5 to t = 11. This change of overlap ratio is an exact measure of the client's efforts in following the advice: if the overlap measure is increasing (decreasing), it implies that the advisee is going towards (away from) the advice.

The overlap measure outlined above is our primary measure for the degree of following advice. As a robustness check, we use a tracking error as a second measure for the degree of following advice. If the goal is to make the actual portfolio of an investor equal to the recommended portfolio, the tracking error between the two portfolios is a very natural and intuitive way to measure the deviation of the investor's actions from his or her advised actions. Not only is the tracking error a natural and intuitive

measure, the tracking error is a very well-established and conventional method used in financial economics. It would also capture when advisees buy products similar to the exact recommendation and thereby come closer to the recommended portfolio. Then why don't we use it as our primary measure? The reason is that the degree of following advice is an independent variable in our crucial regressions where one dependent variable is idiosyncratic risk. This makes both the dependent as well as the independent variables of these crucial regressions functions of portfolio returns, which induces spurious correlations and, therefore, produces coefficients that are hard to interpret.[6] It is for this reason that we use our overlap measure as a primary measure. Nevertheless, all the tests of this paper have been run with the tracking error measure. The results are qualitatively similar.

4. Descriptive statistics

4.1 Statistics on clients, portfolios and accounts

Table 5 provides summary statistics of client demographics and account characteristics as well as portfolio characteristics for the pre- and post-advice period for different groups of investors. It divides the sample group into customers who opt to accept the free advice and customers who opt not to accept the free advice. P-Values of t-tests that are obtained when we test for the equality of variables across these two groups are provided in the last column.

[INSERT TABLE 5 ABOUT HERE]

Table 5 tells us that 91% of the customers who accepted the offer are male which compares to 81% in the control group. The mean age is also slightly higher (52.9 year vs. 49.0 years), as is the wealth level measured by the micro geographic status (mean 6.6 vs. 6.3). This means that the customers who accept the offer are likely to be male, older, and richer. Account characteristics are also significantly different for the two sub-groups of our sample. The customers who accept the offer have a longer relationship with the bank (3,318 days vs. 2,699 days), a higher account value at t = 0 (EUR 70,800 vs.

[6] This is not a problem when the dependent variable is the Herfindahl-Hirschmann Index (HHI).

EUR 45,300) and more trades per month (2.4 vs. 1.9).[7] These results are confirmed later by a multivariate test.

For those customers who have an account from September 2005 to May 2009 – the pre-advice period – we calculate average daily returns[8]of their investment portfolios, standard deviations of these returns and 4-factor alphas. The returns are not significantly higher for the customers who accept the offer than for the customers who do not accept the offer. The standard deviations of returns are significantly lower for the customers who accept the offer than for the customers who do not accept the offer. The alphas are significantly higher for the customers who accept the offer than for customers who do not accept the offer. This means that the customers who accept the offer are likely to be more financially sophisticated.

We also notice that diversification, as measured by HHI and idiosyncratic risk share, is significantly lower for the customers who accept the offer than for the customers who do not accept the offer. This further confirms that the customers who accept the offer are likely to be more financially sophisticated.

All the above results are confirmed later by multivariate tests. Also, we refrain from estimating alphas for the post-advice period because it only consists of 6 months.

It is important to mention here that the largely negative alpha estimates in the pre-advice period tell us that all our customers, those who opt for advice and those who do not opt for advice, significantly underperform the benchmark index. Similarly, high idiosyncratic risk shares and HHIs show significant potential for improvement of diversification. Regardless of whether investors are self-directed or follow

[7] How representative is our treatment and control group of the retail investor population? In comparison to official statistics provided by Deutsche Bundesbank (2010) and Deutsches Aktieninstitut (2009), the investors in our sample have about the same age (50 years), but are more likely to be male and richer. The larger account value signals that these brokerage portfolios do not represent "play money" (Goetzmann and Kumar (2008)). In line with Calvet, Campbell and Sodini (2007), our investors also hold portfolios with high idiosyncratic volatility shares. It is possible that direct bank customers self-select into our accounts, but surveys show that even among direct bank customers there is a tendency to express a demand for advice (e.g., DABbank (2004) or Kirchberg and Georgi (2010)).

[8] All figures are based on gross returns, i.e., before transaction costs, but after bid-ask spread. For raw returns, the difference between gross and net returns for the period t = -44 to t = 0 months is 1.5% per annum.

some outside advice, they could benefit from unbiased and theoretically sound advice, especially the ones who were doing relatively worse.

The results for the post-advice period are interesting. The returns are slightly higher for the customers who accept the offer than for the customers who do not accept the offer. Comparing this to the equivalent returns in the pre-advice period, where the returns were not significantly higher for the customers who accept the offer than for the customers who do not accept the offer either, this suggests that advice may not increase returns. The standard deviations of returns, HHI and idiosyncratic risk shares are significantly lower for the customers who accept the offer than for the customers who do not accept the offer. Comparing this to the equivalent standard deviations of returns in the pre-advice period, where the respective measures were also significantly lower for the customers who accept the offer than for the customers who do not accept the offer, this suggests that advice may not increase diversification. A multivariate test later confirms that advice does not decrease HHI and idiosyncratic risk of investors' portfolios. These results on return, risk and diversification, taken together, suggest that the average advisee does not benefit from the advice.

Why doesn't the average advisee benefit from the advice? It could be that the advice is not sound and/or the average advisee did not follow the advice. To check these hypotheses, we do two simple univariate tests: we compare the recommended portfolios with the actual investors' portfolios and the buy & hold portfolios.

Table 5 shows these results. We notice that the recommended portfolios perform much better than the portfolios of the advisees in the post-advice period: a return of 24.5% vs. 21.2%, a standard deviation of 9.6% vs. 15.0%, a HHI of 2.9% vs. 10.4%, and an idiosyncratic risk share of 21.2% vs. 29.6% for the average recommended portfolio vs. the advisees' portfolios, respectively. We also notice that the recommended portfolios perform much better than the buy-and-hold portfolios of the advisees in the post-advice period: a return of 24.5% vs. 18.4%, a standard deviation of 9.6% vs. 14.5%, a HHI of 2.9% vs. 9.7%, and an idiosyncratic risk share of 21.2% vs. 30.0% for the average recommended portfolio vs. the advisees' buy-and-hold portfolios, respectively. This suggests that the financial advice was sound.

This also suggests that the average advisee does not follow the offer. If he or she had followed the offer, he or she would have improved his or her investment performance. Formal tests conducted later confirm both these hunches.

4.2 Measure of overlap

We now give descriptive statistics of the measure of overlap to give a sense of how many investors follow the advice once they opt to get the advice.

[INSERT FIGURE 2a, 2b, 2c ABOUT HERE]

Figures 2a - 2c give the distribution of the overlap measure and the distribution of the changes in the overlap measure at different points and periods in time.

Figure 2a gives the distribution of the overlap measure at t = 0, which is the day the first recommendation is received by an investor who chooses to receive advice. This figure tells us that the recommended portfolio is very different from the existing portfolio of the average advisee. For about one in five investors, there is no overlap at all, and for about half of them, overlap is less than or equal to 10%. As a matter of fact, no one's existing portfolio coincides with his or her recommended portfolio.

Figure 2b gives the distribution of the average overlap measure between t = 5 months through t = 11 months, which is the "post-advice" period, for an investor who chooses to receive advice. Compared to Figure 2a, this figure tells us that some mass of the distribution shifted to the right. This means that some investors follow the advice in the "post-advice" period and increase the overlap. But as the distributions shown in Figures 2a and 2b are not very different from each other, it tells us that very few investors follow the advice.

Figure 2c gives the distribution of *the improvement* of the overlap measure from the date the investor who chooses to receive advice got advice to t = 11. As the big mass is at 0, it tells us that most investors do not follow the advice at all. As a matter of fact, as some mass is in the negative zone, some investors actually go against the advice. However, the few investors who go for the advice are more than the few investors who go against the advice. Figure 2c looks similar when we measure the improvement

of the overlap from the date of the recommendation to 10 days later, to 20 days later or use the average improvement over the entire post-advice period.

Table 6 gives the descriptive statistics of distributions of the overlap measure taken at different points in time.

[INSERT TABLE 6 ABOUT HERE]

We see in this table that the mean overlap is 15% on the day of the recommendation for the average advisee. This means that, on average, 85% of the portfolio need to be turned over to fully implement the advice. This is not an onerous task because a mean advisee had turned over 85% of his or her portfolio every 6.5 months before the offer started.

For the average advisee, the mean overlap increases to 20% ten days after the advice, and to 23.3% twenty days after the advice. However, the mean overlap is lower (17.6%) at the end of the post-advice period suggesting that investors do not stick to the advice. This also explains why the mean overlap for the entire post-advice period is only 21.8%. An important statistic in this table is the number of investors who follow the advice, at least partially. Of the number of investors who opt to receive advice, 382, 191 (=382-191) do not follow the advice, if counted at the end of the post-advice period. The 191 who do follow, as can be seen in Figure 2c, follow it very partially, if at all.

Our conclusions from Figure 2 and Table 6 are straightforward. Recommended portfolios are very different from existing actual portfolios for the average advisee. However, the average advisee does not much heed the financial advice. We do not believe that this is due to transactions costs because, as stated above, investors turn over their portfolios very frequently anyway.

5. Who chooses to get advice?

By October 2009, a total of 385 customers, out of the 8,195 customers that were offered free and unbiased financial advice, decided to accept the offer. This constitutes a little less than 5% of the customers contacted. 38 joined in May 2009, 146 in June 2009, 73 in July 2009 and the remaining 128 later.

We now formally examine who chooses to get advice. Table 7 reports the results of a probit test, where the dependent variable is set to 1 if a client opted to get financial advice and 0 otherwise. We make the following conclusions.

[INSERT TABLE 7 ABOUT HERE]

Though our sample is predominantly male, old and rich, the clients who opt to get free financial advice are more likely to be male, older, and richer (measured by their micro geo status, as well as by the value of their account holdings). They are more active traders, as measured by the number of trades per month. They are also more financially sophisticated, as measured by their actual past investment performance (their alphas are higher, and their idiosyncratic risk share and HHI are lower). Finally, they also have more trust in the brokerage, where trust is measured by the length of relationship the client has with the brokerage.

Age and wealth are linked to financial sophistication in the literature (see Calvet, Campbell and Sodini (2007 and 2009)), though being a male is not linked to financial sophistication (see Barber and Odean (2001)). Trust is a very important variable in our context because a client will not accept to get critical financial advice from a brokerage unless he or she trusts the brokerage.[9]

The overall conclusion from this section is that a paltry 5% of more than 8,000 contacted clients choose to get free and unbiased financial advice. The persons who say yes are also the more financially sophisticated, especially as measured by their past investment performance and portfolio efficiency. It does seem that the clients who most need (do not need) the financial advice are the ones who are most likely to not get it (get it). We will explore this hypothesis more fully in a later section.

6. Who chooses to follow the advice if they get it?

We now formally examine who chooses to follow the advice once they get it. Table 8 reports the results of an OLS regression, where the dependent variable is the change in the overlap ratio – as seen in

[9] The literature on trust is too vast to mention here. It probably begins with John Stuart Mill (1848) who said, "There are countries in Europe…where the most serious impediment to conducting business concerns on a large scale, is the rarity of persons who are supposed fit to be trusted with the receipt and expenditure of large sums of money."

Figure 2c – between the time a client first received the advice and the post-advice period. We make the following conclusions.

[INSERT TABLE 8 ABOUT HERE]

Clients who trade a lot tend not to follow the advice. This is probably because these clients overweight their own investment skills. None of the other variables matter. We suspect the reason there is no result in nearly all variables is because of the nature of the distribution of our dependent variable that we saw in Figure 2c – most clients do not follow the advice after getting the advice. If, instead of using the change in the overlap ratio as our measure of following advice, we use the tracking error between the actual portfolio and the recommended portfolio as our measure of following advice, we get the same results. Naturally one might ask if the distance between the actual and the recommended portfolio has an influence on the improvement in overlap ratio. Including an additional variable for distance is unnecessary since the idiosyncratic volatility variable prior to getting advice is a good proxy for the distance between the two portfolios as the recommended portfolio has been shown to be a well-diversified portfolio.

7. Does the advice benefit the advisee

We now come to the most important part of our paper. Does financial advice benefit the advisee? Many previous papers had documented that financial advice did not benefit the advisee, but the reason they had given for that finding was that the advice was conflicted. In our case we ensured that the financial advice was devoid of conflict. So does honest financial advice improve the portfolio efficiency of the advisee's portfolio?

Honest and unbiased financial advice may not improve the portfolio efficiency if the financial advice is dumb. So the first thing we need to do is to check whether the financial advice was theoretically sound, i.e., increased portfolio efficiency.

7.1 Was the financial advice sound?

From the description of the dataset and the time line, it follows that the natural research design to investigate the quality of financial advice on portfolio efficiency is to use a difference-in-difference methodology. This requires calculating the improvement of portfolio efficiency from the pre-advice period to the post-advice period for the treatment group (clients who opt to receive advice) *if they had followed the advice*, and comparing this difference with the improvement of portfolio efficiency from the pre-advice period to the post-advice period for the control group (clients who opt not to receive advice).

We use two measures of diversification: HHI and the share of idiosyncratic risk (the part of the risk that is uncompensated). The HHI for the pre-advice period is computed on the actual portfolios of both the treatment group and the control group at t = 0. The share of idiosyncratic risk in the pre-advice period is computed by running regression (1) on the actual portfolios of both the treatment group and the control group in the period September 2005 to May 2009. The HHI for the post-advice period for the treatment group is computed on the *hypothetical* portfolios of the treatment group at t = 11. A hypothetical portfolio is the portfolio that the treatment group would have achieved had they followed the advice completely. The share of idiosyncratic risk in the post-advice period for the treatment group is computed by running regression (1) on the *hypothetical* portfolios of the treatment group in the period October 2009 and April 2010. Note that we can compute this because we know the date and the details of each of the recommendations. The HHI for the post-advice period for the control group is computed on the actual portfolios at t = 11. The share of idiosyncratic risk in the post-advice period for the control group is computed by running regression (1) on the actual portfolios of the control group in the period October 2009 and April 2010.

If the decrease, which is the improvement, in the HHI or the share of idiosyncratic risk from the pre-advice period to the post-advice period for the treatment group is *greater* than the decrease in the HHI or the share of idiosyncratic risk from the pre-advice period to the post-advice period for the control group, it would suggest that the advice is theoretically sound.

We run two OLS regressions. The dependent variable in our first OLS regression is the *decrease* in HHI from the pre-advice period to the post-advice period. The dependent variable in our second OLS regression is the *decrease* in the share of idiosyncratic risk from the pre-advice period to the post-advice period. The main independent variable of interest is "dummy advice" which is set to 1 for the treatment group and 0 for the control group. Table 9 reports the results for these regressions.

[INSERT TABLE 9 ABOUT HERE]

The coefficient on the "dummy advice" variable is positive and statistically significant in both these regressions. This implies that if the clients who opt to receive advice actually followed the advice, they would have improved their portfolio efficiency, both in terms of decreasing the HHI of their portfolios and decreasing the share of idiosyncratic risk of their portfolios. So the advice is sound.

7.2 Does advice benefit the average advisee?

We use the same research design as above with one important exception. Instead of computing the HHI and the share of idiosyncratic risk in the post-advice period for the treatment group by using their *hypothetical* portfolios, we use their *actual* portfolios.

If the decrease, which is the improvement, in the HHI or the share of idiosyncratic risk from the pre-advice period to the post-advice period for the treatment group is *greater* than the decrease in the HHI or the share of idiosyncratic risk from the pre-advice period to the post-advice period for the control group, it would suggest that the advice benefitted the average advisee.

We run two OLS regressions. The dependent variable in our first OLS regression is the *decrease* in HHI from the pre-advice period to the post-advice period. The dependent variable in our second OLS regression is the *decrease* in the share of idiosyncratic risk from the pre-advice period to the post-advice period. The main independent variable of interest is "dummy advice" which is set to 1 for the treatment group and 0 for the control group. Table 10 reports the results for these regressions.

[INSERT TABLE 10 ABOUT HERE]

The coefficient on the "dummy advice" variable is statistically insignificant in both these regressions. This implies that the average advisee does not benefit. The other side results are similar to Table 9.

Why does the average advisee not benefit? Given that the advice was theoretically sound, it follows that the average advisee does not benefit because he or she does not follow the advice. We gave evidence that advice was not being followed by the average advisee earlier in section 4.2.

We now go on to investigate whether advice benefits the advisee if he or she *partially* follows the advice. To do this, we run the same regressions we ran for Table 10 with an additional independent variable – the variable measuring the average improvement in the overlap ratio between the time a client first received the advice and the end of the post-advice period (see Figure 2c). An increase (decrease) in this overlap ratio implies that the advisee is partially going for (against) the advice.

[INSERT TABLE 11 ABOUT HERE]

Table 11 shows the results. The coefficient on the "change in the overlap ratio" measure is statistically significant if we use HHI as diversification measure and statistically insignificant if we use the idiosyncratic risk share as our diversification measure. If, instead of using the change in the overlap ratio as our measure of following advice, we use the tracking error between the actual portfolio and the recommended portfolio as our measure of following advice, we get results for idiosyncratic risk, too. We do not report these latter results because of potential spurious correlations (see section 3.4).

Overall, our results show that even partial following of advice would have improved the efficiency of the advisees' portfolio.

8. Who would benefit the most from the advice?

We now explore an important public policy question. Are the persons who are most likely to benefit from financial advice the ones least likely to accept the advice, and the persons least likely to benefit from financial advice most likely to accept and follow the advice? It seems that the answer to the

first question is leaning towards a "yes" in section 5, where we give evidence that the most (least) financially sophisticated are the most (least) likely to accept advice.

We run the following test. We revisit the probit regression we run to get Table 7, the test which investigates who opts to receive financial advice. We then use the coefficient estimates from this regression to predict from our full sample of 8,195 clients the 5% with the highest probability to follow advice. We define those 5% as "predicted to accept advice" and the remaining 95% as "not predicted to accept advice". We then go back to our 385 customers who actually opt to get the advice. Of these 385 customers who opt to get advice, a probit model can be estimated for 328 customers. Of these 328 customers, 61 are predicted by our probit model to opt for advice, but 267 are predicted by our probit model not to opt for advice.

We now run the same regression we run for Table 9, the regression which checks whether portfolio efficiency improves for clients who accept the offer of advice and follow the advice, for both these subgroups. Table 12 reports the results for these regressions.

[INSERT TABLE 12 ABOUT HERE]

The coefficient on the "dummy advice" variable is 0.038 (positive and statistically significant) in the HHI regression for the clients who are predicted to opt for the advice and did opt for the advice and would have followed it. The coefficient on the "dummy advice" variable is 0.096 (positive and statistically significant) in the HHI regression for the clients who are not predicted to opt for the advice but did opt for the advice and would have followed it. The difference between these two coefficients is statistically significant.

The coefficient on the "dummy advice" variable is 0.043 (positive but not statistically significant) in the idiosyncratic risk regression for the clients who are predicted to opt for the advice and did opt for the advice and would have followed it. The coefficient on the "dummy advice" variable is 0.067 (positive and statistically significant) in the idiosyncratic risk regression for the clients who are not predicted to opt for the advice but did opt for the advice and would have followed it. The difference between these two coefficients is not statistically significant.

The important result here is that the decrease in HHI would have been more for clients who are not predicted to opt for the advice – these are the ones who are less financially sophisticated as we saw in section 5 – than for clients who are predicted to opt for the advice – these are the ones who are more financially sophisticated as we saw in section 5.

The above result as well as the results in section 5 (who opts to get financial advice) all point us to the same conclusion: those who most need (do not need) the financial advice are most likely to not get it (get it).

9. Conclusion

Can unbiased financial advice steer retail investors towards efficient portfolios? To answer this question, we work with one of the biggest brokerages in Europe and offer advice that is unbiased and theoretically sound. We obtain the following answers. First, only about 5%, (who are likely to be male, older, richer, more financially sophisticated, and more likely to have a longer relationship with the brokerage) accept the offer. Second, of those who accept the offer, the advice is hardly followed. Third, though portfolio efficiency does not improve for the average advisee, it does improve for the average advisee who follows the advice. Fourth, it seems that the investors who most need (do not need) the financial advice are the ones who are most likely to not get it (get it). Overall, our results imply that the mere availability of unbiased and theoretically sound financial advice is a necessary but not a sufficient condition for benefiting retail customers. So you can lead a horse to water, but you can't make it drink.

Our paper, which is the first paper to the best of our knowledge, to examine in detail the demand side of financial advice, raises some important public policy issues at a time when protecting financial consumers has risen to the top of the regulatory agenda in many countries. The results of this paper lead us to be skeptical of only supply-side solutions imposed by regulators. Even honest and sound financial services are useless unless the customer actually follows them.

If financial economists are to develop remedies to correct wide-spread investment mistakes of households, this paper sets the stage for further work in household financial engineering (cf. Campbell

(2006)). The availability of unbiased and sound financial advice at low cost seems not to be the only remedy in the light of our results. Therefore, future research might focus on taking into account behavioral factors when trying to help people make decisions on their asset allocations. A promising start has been made by Benartzi and Thaler (2004 and 2007) who, after taking into account behavioral factors when designing plans to increase savings rates, develop sophisticated savings plans.

Financial education becomes more important in the light of our results. Teaching people the basic principles of finance should directly affect their trading behavior by lowering their overconfidence in their ability to pick stocks or time the markets. In addition, education is likely to help people recognize honest and theoretically sound advice.

Experimenting with alternative designs of advice is another useful avenue to explore. For example, in our paper the advice would require people to turn over 85% of their portfolios on average since existing portfolios are largely inefficient. Investors in our sample may have found it too complicated or too cumbersome to implement the full list of recommendations, though they did turn over 85% of their portfolios every 6.5 months during the pre-advice period. Nevertheless, suppliers might want to seek ways to simplify implementing their advice, for example by splitting the advice into smaller pieces and spread them over time. Although the information given to our advisees is extensive and clear, it may not be much different from other less theoretically anchored sources of investment advice. Future settings could therefore aim at instilling more trust in the advice.[10]

To conclude, in financial economics, much more needs to be done to understand why and how financial advice is actually followed. What makes a horse drink?

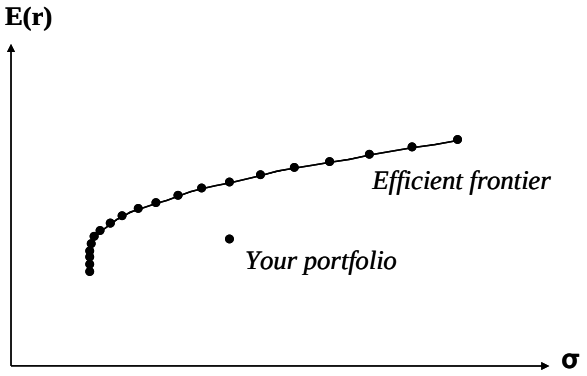
[10] Bonnacio and Dalal (2006) do a literature review to document the determinants of all effective advice, not just financial advice. One aspect is the distance of the advice from the original opinion (Yaniv (2004)); another aspect is whether the advice was paid for (Gino (2008)); another aspect is whether advice is didactic or just offers information about choices (Bonnacio and Dalal (2010)); and many other aspects. Statman (2010), who explores what investors really want, focuses on financial advice.

Appendix

Disguised example of advice that was sent to advisees

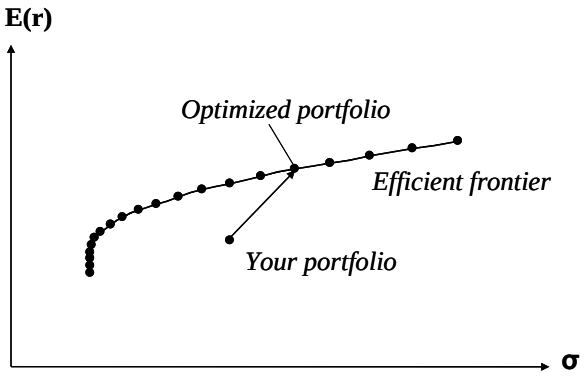
I) Description of the idea of diversification, explanation of important concepts, intuitive explanation of the portfolio optimization methodology, and discussion of tax implications.

II) Analysis of the existing portfolio



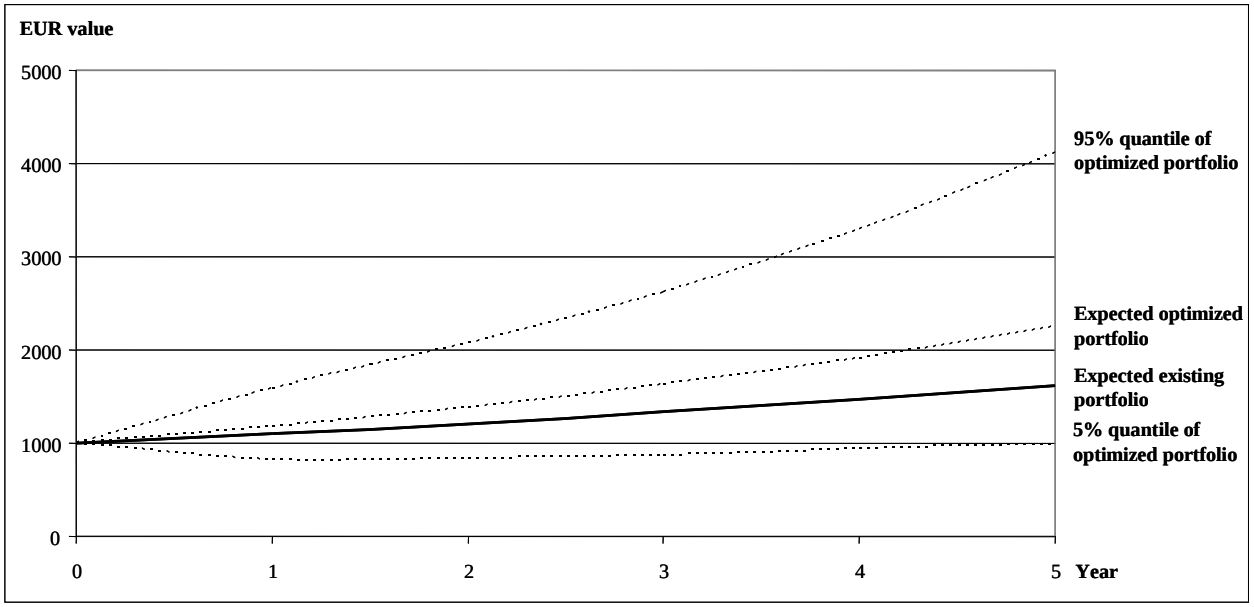
Existing portfolio	
Return (past 1 year):	x %
Standard deviation (past 1 year):	x %
Expected return:	x %
Expected standard deviation:	x %
Expected Sharpe ratio:	x %

III) Analysis of recommended (optimized) portfolio[11]



Recommended (optimized) portfolio	
Expected return:	x %
Expected standard deviation:	x %
Expected Sharpe ratio:	x %

[11] Recall that the goal of the optimizer is to enhance portfolio efficiency by improving diversification. This may improve portfolios along two dimensions. Either the risk for a given level of return decreases or the expected return for a given level of risk increases. The brokerage communicated in this report changes along both dimensions.



	Model calculation of possible portfolio development in 5 years			
	Current value	Expected value	Lower bound (5%)	Upper bound (95%)
Existing portfolio	EUR 1000	EUR 1700	EUR 1100	EUR 2500
Recommended (optimized) portfolio	EUR 1000	EUR 2200	EUR 1000	EUR 4100

Model calculation assumes constant risk/return estimates

IV) The client's investment requests

V) List of necessary transactions

VI) Analyst report for each security on recommendation list

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Table 1a
Advisees' vs. recommended portfolios – by asset class

The table shows the average portfolio share by asset class of the advisees' actual portfolio (*Investor)* compared to the portfolio recommended to the advisees (*Recommended)* at the time of the recommendation.

	Portfolio share	
Asset class	Investor	Recommended
Equity	64%	50%
Money market	12%	14%
Fixed income	9%	14%
Real estate	2%	8%
Commodities	1%	11%
Others	13%	3%
Total	100%	100%

Table 1b
Advisees' vs. recommended portfolios – equity share by region

The table provides a regional break down of the equity share shown in table 1a for the average advisees' actual portfolio (*Investor)* as well as for the average portfolio recommended to the advisees (*Recommended)* at the time of the recommendation.

	Equity share	
Region	Investor	Recommended
Germany	49%	30%
Europe	15%	25%
North America	12%	10%
Asia Pacific	9%	18%
World	9%	9%
CEE	2%	6%
Others	4%	2%
Total	100%	100%

Table 1c
Advisees' vs. recommended portfolios – by instrument

The table shows the average portfolio share by instrument of the advisees' actual portfolio (*Investor)* compared to the portfolio recommended to the advisees (*Recommended)* at the time of the recommendation.

	Portfolio share	
Instrument	Investor	Recommended
Single stocks	45%	23%
Funds	27%	49%
ETFs	13%	22%
Single bonds	7%	1%
Others	8%	5%
Total	100%	100%

Table 2
Average asset class shares of recommended portfolios by advisees' risk aversion

The table shows the average asset class share within advisees' portfolios for each level of risk aversion.

	Risk aversion			
Asset class	1 = Highest	2	3	4 = Lowest
Equity	38%	43%	53%	63%
Fixed income	27%	20%	14%	7%
Money market	14%	15%	13%	10%
Commodities	5%	9%	10%	13%
Real Estate	14%	10%	7%	5%
Other	2%	4%	3%	3%
Total	100%	100%	100%	100%
N	20	95	172	55

Table 3
Data collected

The table summarizes the data collected during the course of the study. Client demographics have been provided by the brokerage. The record date is July 2010. Account characteristics are calculated on the basis of the information on account holdings and transactions provided by the bank. Market data is taken from Thomson Financial Datastream. The third column reports the availability of time series data and their frequency.

Type of data	**Type of data**	**Dates available**
Client demographics	Gender	Time-invariant
	Date of birth (measure of age)	Time-invariant
	Micro geographic status (measure of wealth)	Time-invariant
Account characteristics	Actual holdings	Daily
	Actual transactions	Daily
	Recommended holdings	On day of recommendation
	Recommended transactions	On day of recommendation
	Number of trades	Daily
	Account opening date	Time invariant
	Account value	Daily
Market data	Carhart (1997) four factors on broad domestic index	
	- Market factor	Weekly
	- Small minus big (SMB)	Weekly
	- High minus low (HML)	Weekly
	- Momentum factor	Weekly
	Individual security returns	Daily

Table 4
Illustration of the overlap measure

The table provides an example of the overlap measure. The table reads as follows: securities E.ON and H&M overlap between the original and the recommended portfolio. The value of the overlap in this case is 4,224 EUR (681 EUR in E.ON and 3,543 EUR in H&M). We calculate the overlap ratio for each day as the overlap between the two portfolios divided by the EUR-value of assets in the actual portfolio plus assets in the recommended portfolio less the overlap (here: 4,224 / (23,426+23,688-4,224) = 10%).

Original portfolio (t = 0)		**Recommended portfolio (t = 0)**			**Interpretation**	**Buy**	**Sell**	**Keep**
	EUR		EUR			EUR	EUR	EUR
Deutsche Bank	8,646			→	Sell		8,646	
HSBC Indian Equity Fund	3,622			→	Sell		3,622	
Raiffeisen CEE Equity Fund	2,792			→	Sell		2,792	
HSBC BRIC Equity Fund	1,862			→	Sell		1,862	
Commerzbank	439			→	Sell		439	
E.ON	2,523	E.ON AG	681	→	Decrease		1,842	681
H&M	3,543	H&M	3,543	→	Keep			3,543
		Comstage ETF EONIA	4,072	→	Buy	4,072		
		Schroder ISF Europa Corporate Bond Fund	3,883	→	Buy	3,883		
		Allianz Pimco Europazins Bond Fund	3,799	→	Buy	3,799		
		Allianz Pimco Corporate Bond Europa Fund	2,434	→	Buy	2,434		
		UBS Lux Bond Fund	1,751	→	Buy	1,751		
		Grundbesitz Europa Real Estate Fund	1,470	→	Buy	1,470		
		Pictet EM Fund	1,247	→	Buy	1,247		
		Allianz RCM Small Cap Fund	808	→	Buy	808		
	23,426		**23,688**			**19,463**	**19,202**	**4,224**

Table 5
Summary statistics

The table reports summary statistics. The columns "Accept advice" and "Not accept advice" present means, medians and number of observations for the respective clients in the group. The last column reports p-values of a t-test on a difference of means between the previous two columns.

		Accept advice			Not accept advice			t-test
Data variable	Measurement units	Mean	Median	N	Mean	Median	N	p-value
Client demographics								
Gender	Dummy = 1 if male	91%	100%	385	81%	100%	7810	0.00
Age	Years	52.9	52	385	49.0	47	7810	0.00
Wealth	Categories (9 in Micro Geo Status = wealthiest)	6.6	7	340	6.3	6	6847	0.00
Portfolio characteristics								
Raw returns								
From t = -44 to t = 0 (investors' portfolio)	Percent, annualized	-5.3%	-4.7%	316	-7.0%	-5.4%	5232	0.13
From t = 5 to t = 11 (investors' portfolio)	Percent, annualized	21.2%	20.4%	382	17.0%	20.2%	7157	0.21
From t = 5 to t = 11 (buy & hold portfolio)	Percent, annualized	18.4%	18.5%	384				0.68 [1]
From t = 5 to t = 11 (recommended portfolio)	Percent, annualized	24.5%	23.2%	384				0.02 [1]
Standard deviation								
From t = -44 to t = 0 (investors' portfolio)	Percent, annualized	25.8%	23.8%	316	30.4%	26.5%	5232	0.00
From t = 5 to t = 11 (investors' portfolio)	Percent, annualized	15.0%	14.0%	382	21.2%	17.9%	7157	0.00
From t = 5 to t = 11 (buy & hold portfolio)	Percent, annualized	14.5%	14.0%	384				0.00 [1]
From t = 5 to t = 11 (recommended portfolio)	Percent, annualized	9.6%	9.0%	384				0.00 [1]
4-factor alpha								
From t = -44 to t = 0 (investors' portfolio)	Percent, annualized	-6.0%	-5.6%	316	-8.5%	-6.3%	5231	0.03
Herfindahl-Hirschmann Index								
At t = 0 (investors' portfolio)	Percent	12.0%	7.6%	369	20.3%	10.8%	7100	0.00
At t = 11 (investors' portfolio)	Percent	10.4%	4.8%	377	19.8%	9.8%	7014	0.00
At t = 11 (buy & hold portfolio)	Percent	9.7%	4.7%	384				0.00 [1]
At t = 11 (recommended portfolio)	Percent	2.9%	1.6%	384				0.00 [1]
Idiosyncratic risk share								
From t = -44 to t = 0 (investors' portfolio)	Percent	36.3%	30.6%	316	39.5%	33.9%	5231	0.01
From t = 5 to t = 11 (investors' portfolio)	Percent	29.6%	21.9%	381	32.5%	23.7%	7080	0.03
From t = 5 to t = 11 (buy & hold portfolio)	Percent	30.0%	19.6%	384				0.06 [1]
From t = 5 to t = 11 (recommended portfolio)	Percent	21.2%	18.1%	384				0.00 [1]
Account characteristics								
Length of relationship with the bank	Days since account opening	3318	3523	385	2699	3215	7810	0.00
Account value at t = 0	EUR thousands	70.8	46.3	369	45.3	31.6	7116	0.00
Average monthly trades till t = 0	Trades per months	2.4	1.4	385	1.9	1.0	7810	0.01

[1] Investors' portfolio used for non-advised clients

Table 6
Summary statistics of the overlap ratio

The table reports summary statistics of the overlap ratio. The table reports mean overlap, median overlap, number of followers and observations for three distinct time periods (upon receiving the first recommendation, after 10 days, after 20 days and at the end of the post-advice period) and the average over the entire post-advice period. Note that these time intervals are specific for each investor in the sample. Only the average of the post-advice period is the same for all investors opting for the advice model. Additionally, number of followers is defined as investors who increase overlap.

	t = Advice start	t = 10 days	t = 20 days	t = 11 months (end of measurement period)	Average over measurement period (t = 5 to t = 11 months)
Mean overlap	15.0%	20.0%	23.3%	17.6%	21.8%
Median overlap	10.2%	13.9%	15.7%	11.1%	15.5%
Number of followers	0	213	223	191	227
Observations	382	382	382	382	382

Table 7
Who opts for advice? – A Probit Test

The table reports probit estimates of the participation in the advisory model offered by the brokerage. Clients are set equal to one once they join the advisory service. For the estimation of the probit model we include the following explanatory variables: a dummy which is equal to one if a client is male (*Dummy_male)*, the age of a client (*Age)*, the wealth of a client measured by the micro geographic status rating by an external agency (*Wealth)*, the account value of the customer at t = 0 measured in EUR (*Account value (at t = 0))*, the time period the client is with the bank (*Length of relationship)*, the number of trades per month (*Trades per month)*, the weekly alpha of a particular customer before opting for financial advice (*Alpha (t = -44 to t = 0))*, the idiosyncratic risk share (*Idiosyncratic risk share (t = -44 to t = 0))* and the Herfindahl-Hirschmann Index (*HHI (t = 0)).* Alpha and idiosyncratic risk share stem from applying a Carhart (1997) four factor model calibrated for a European country. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used.

	Dummy advice				
Dependent variable	(1)	(2)	(3)	(4)	(5)
Dummy male	0.356***	0.266***	0.288***	0.296***	0.293***
	(0.000)	(0.002)	(0.005)	(0.003)	(0.001)
Age	0.008***	0.007***	0.010***	0.010***	0.007***
	(0.000)	(0.005)	(0.000)	(0.000)	(0.004)
Wealth	0.033**	0.037**	0.033*	0.034**	0.041***
	(0.024)	(0.012)	(0.051)	(0.047)	(0.007)
Account value (at t = 0)	0.003***	0.003***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Length of relationship		0.000***	0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Trades per month		0.038***	0.041***	0.041***	0.035***
		(0.000)	(0.000)	(0.000)	(0.000)
Alpha (t=-44 to t=0)			24.119***		
			(0.005)		
Idiosyncratic risk share (t=-44 to t=0)				-0.378**	
				(0.016)	
HHI (t=0)					-0.954***
					(0.000)
Constant	-2.755***	-3.191***	-3.698***	-3.572***	-3.077***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	6,585	6,585	4,899	4,899	6,567
Pseudo R-squared	0.0384	0.0643	0.0698	0.0700	0.0792

Table 8
Who chooses to follow advice?

The table reports OLS estimates of the coefficients related to the improvement of the overlap measure from the date the investor who chooses to receive advice got advice to t = 11 (*Improvement of overlap ratio*). For the estimation of the model we include the following explanatory variables: a dummy which is equal to one if a client is male (*Dummy_male)*, the age of a client (*Age)*, the wealth of a client measured by the micro geographic status rating by an external agency (*Wealth)*, the account value of the customer at t = 0 measured in EUR (*Account value (at t = 0))*, the time period the client is with the bank (*Length of relationship)*, the number of trades per month (*Trades per month)*, the weekly alpha of a particular customer before opting for financial advice (*Alpha (t = -44 to t = 0))*, the idiosyncratic risk share (*Idiosyncratic risk share (t = -44 to t = 0))* and the Herfindahl-Hirschmann Index (*HHI (t = 0)).* Alpha and idiosyncratic risk share stem from applying a Carhart (1997) four factor model calibrated for a European country. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used.

	Improvement of overlap ratio				
Dependent variable	(1)	(2)	(3)	(4)	(5)
Dummy male	-0.009	-0.008	-0.000	0.005	-0.006
	(0.842)	(0.849)	(0.997)	(0.921)	(0.896)
Age	-0.000	-0.001	-0.001	-0.001	-0.001
	(0.661)	(0.516)	(0.328)	(0.281)	(0.507)
Wealth	0.001	0.001	0.001	0.002	0.001
	(0.919)	(0.855)	(0.889)	(0.809)	(0.818)
Account value (at t = 0)	0.000	0.000	-0.000	-0.000	0.000
	(0.710)	(0.709)	(0.373)	(0.254)	(0.779)
Length of relationship		0.000	0.000	0.000	0.000
		(0.166)	(0.333)	(0.340)	(0.160)
Trades per month		-0.007**	-0.007**	-0.006*	-0.008**
		(0.018)	(0.031)	(0.053)	(0.015)
Alpha (t=-44 to t=0)			-3.992		
			(0.391)		
Idiosyncratic risk share (t=-44 to t=0)				-0.059	
				(0.318)	
HHI (t=0)					-0.042
					(0.609)
Constant	0.051	0.035	0.046	0.070	0.037
	(0.389)	(0.592)	(0.654)	(0.508)	(0.575)
Observations	327	327	276	276	327
R-squared	0.001	0.021	0.025	0.027	0.022

Table 9
Does financial advice improve diversification?

The table reports OLS estimates of the coefficients related to a decrease of HHI (model (1) to (4)) and a decrease of idiosyncratic risk (model (5) to (8)). The latter variable is computed based on a Carhart (1997) four factor model calibrated for a European country. HHI and portfolio returns are calculated assuming investors had fully followed the recommendations (*hypothetical* portfolios). The focus of the table is on the variable *Dummy_advice* which is equal to one if a client opts for financial advice. Additionally, the model controls for the following other explanatory variables: a dummy which is equal to one if a client is male (*Dummy_male)*, the age of a client (*Age)*, the wealth of a client measured by the micro geographic status rating by an external agency (*Wealth),* the account value of the customer at t = 0 measured in EUR (*Account value (at t = 0))*, the time period the client is with the bank (*Length of relationship)*, the number of trades per month (*Trades per month)* and the weekly alpha of a particular customer before opting for financial advice (*Alpha (t = -44 to t = 0)).* Alpha stems from applying a Carhart (1997) four factor model calibrated for a European country. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used.

	Decrease of HHI				Decrease of idiosyncratic risk			
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy advice	0.088***	0.086***	0.087***	0.087***	0.080***	0.067***	0.067***	0.068***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dummy male		0.001	0.001	0.003		0.011	0.012	0.012
		(0.905)	(0.890)	(0.544)		(0.137)	(0.107)	(0.129)
Age		0.000	0.000	-0.000		-0.001***	-0.001***	-0.001***
		(0.694)	(0.689)	(0.500)		(0.006)	(0.009)	(0.008)
Wealth		0.002	0.002	0.001		0.003*	0.003*	0.003*
		(0.149)	(0.154)	(0.525)		(0.060)	(0.054)	(0.059)
Account value (at t = 0)		-0.000***	-0.000***	-0.000***		0.000	0.000	0.000
		(0.000)	(0.000)	(0.006)		(0.517)	(0.591)	(0.398)
Length of relationship			0.000	0.000			-0.000	-0.000
			(0.847)	(0.681)			(0.125)	(0.126)
Trades per month			-0.001	-0.000			0.003**	0.003*
			(0.308)	(0.983)			(0.042)	(0.051)
Alpha (t=-44 to t=0)				-0.454				-2.203*
				(0.764)				(0.071)
Constant	0.002	-0.006	-0.005	0.002	0.072***	0.078***	0.087***	0.084***
	(0.225)	(0.576)	(0.639)	(0.881)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	7,255	6,385	6,385	4,796	5,454	4,816	4,816	4,816
R-squared	0.016	0.017	0.017	0.019	0.009	0.009	0.011	0.012

Table 10
Does the average advisee benefit?

The table reports OLS estimates of the coefficients related to a decrease of HHI (model (1) to (4)) and a decrease of idiosyncratic risk (model (5) to (8)). The latter variable is computed based on a Carhart (1997) four factor model calibrated for a European country. HHI and portfolio returns are calculated based on the *actual* portfolios of investors. The focus of the table is on the variable *Dummy_advice* which is equal to one if a client opts for financial advice. Additionally, the model controls for the following other explanatory variables: a dummy which is equal to one if a client is male (*Dummy_male)*, the age of a client (*Age)*, the wealth of a client measured by the micro geographic status rating by an external agency (*Wealth)*, the account value of the customer at t = 0 measured in EUR (*Account value (at t = 0))*, the time period the client is with the bank (*Length of relationship)*, the number of trades per month (*Trades per month)* and the weekly alpha of a particular customer before opting for financial advice (*Alpha (t = -44 to t = 0)).* Alpha stems from applying a Carhart (1997) four factor model calibrated for a European country. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used.

	Decrease of HHI				Decrease of idiosyncratic risk			
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy advice	0.013	0.011	0.012	0.006	-0.003	-0.007	-0.006	-0.005
	(0.144)	(0.232)	(0.219)	(0.581)	(0.807)	(0.604)	(0.636)	(0.692)
Dummy male		-0.000	0.000	0.003		0.009	0.010	0.010
		(0.984)	(0.984)	(0.596)		(0.224)	(0.172)	(0.202)
Age		-0.000	-0.000	-0.000		-0.001***	-0.001**	-0.001**
		(0.960)	(0.977)	(0.320)		(0.009)	(0.014)	(0.012)
Wealth		0.001	0.001	0.001		0.003*	0.003*	0.003*
		(0.203)	(0.208)	(0.669)		(0.092)	(0.084)	(0.090)
Account value (at t = 0)		-0.000**	-0.000**	-0.000**		0.000	0.000	0.000
		(0.010)	(0.013)	(0.048)		(0.250)	(0.299)	(0.179)
Length of relationship			-0.000	0.000			-0.000*	-0.000*
			(0.998)	(0.607)			(0.081)	(0.083)
Trades per month			-0.001	0.000			0.003**	0.003**
			(0.418)	(0.762)			(0.037)	(0.044)
Alpha (t=-44 to t=0)				-0.255				-2.193*
				(0.867)				(0.073)
Constant	0.002	-0.002	-0.001	0.005	0.072***	0.078***	0.090***	0.087***
	(0.225)	(0.835)	(0.913)	(0.735)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	7,251	6,381	6,381	4,792	5,453	4,815	4,815	4,815
R-squared	0.000	0.001	0.001	0.001	0.000	0.002	0.005	0.006

Table 11
Does the average advisee benefit if partly followed?

The table reports OLS estimates of the coefficients related to a decrease of HHI (model (1) to (4)) and a decrease of idiosyncratic risk (model (5) to (8)). The latter variable is computed based on a Carhart (1997) four factor model calibrated for a European country. HHI and portfolio returns are calculated based on the *actual* portfolios of investors. The focus of the table is on the variable *Improvement of overlap ratio* that shows the improvement of overlap ratio from the time of the first recommendation to t = 11 and takes the value 0 for non-advised clients. *Dummy_advice* is equal to one if a client opts for financial advice. Additionally, the model controls for the following other explanatory variables: a dummy which is equal to one if a client is male (*Dummy_male),* the age of a client (*Age),* the wealth of a client measured by the micro geographic status rating by an external agency (*Wealth),* the account value of the customer at t = 0 measured in EUR (*Account value (at t = 0)),* the time period the client is with the bank (*Length of relationship),* the number of trades per month (*Trades per month)* and the weekly alpha of a particular customer before opting for financial advice (*Alpha (t = -44 to t = 0)).* Alpha stems from applying a Carhart (1997) four factor model calibrated for a European country. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used.

	Decrease of HHI				Decrease of idiosyncratic risk			
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Improvement of overlap ratio	0.149***	0.153***	0.152***	0.195***	0.119*	0.084	0.092	0.091
	(0.003)	(0.007)	(0.008)	(0.004)	(0.081)	(0.238)	(0.197)	(0.204)
Dummy advice	0.009	0.007	0.007	-0.001	-0.007	-0.010	-0.009	-0.008
	(0.323)	(0.483)	(0.459)	(0.922)	(0.580)	(0.473)	(0.486)	(0.537)
Dummy male		0.000	0.000	0.003		0.009	0.010	0.010
		(0.997)	(0.963)	(0.573)		(0.224)	(0.171)	(0.201)
Age		-0.000	-0.000	-0.000		-0.001***	-0.001**	-0.001**
		(0.971)	(0.991)	(0.341)		(0.010)	(0.015)	(0.013)
Wealth		0.001	0.001	0.001		0.003*	0.003*	0.003*
		(0.207)	(0.211)	(0.682)		(0.093)	(0.084)	(0.091)
Account value (at t = 0)		-0.000***	-0.000**	-0.000*		0.000	0.000	0.000
		(0.010)	(0.013)	(0.059)		(0.240)	(0.287)	(0.171)
Length of relationship			-0.000	0.000			-0.000*	-0.000*
			(0.960)	(0.640)			(0.078)	(0.079)
Trades per month			-0.001	0.000			0.003**	0.003**
			(0.471)	(0.677)			(0.034)	(0.041)
Alpha (t=-45 to t=0)				-0.232				-2.185*
				(0.879)				(0.074)
Constant	0.002	-0.002	-0.001	0.004	0.072***	0.078***	0.090***	0.087***
	(0.225)	(0.827)	(0.906)	(0.757)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	7,251	6,381	6,381	4,792	5,453	4,815	4,815	4,815
R-squared	0.002	0.003	0.003	0.004	0.001	0.003	0.005	0.007

Table 12
Who would benefit most from advice?

The table reports OLS estimates of the coefficients related to a decrease of HHI and a decrease of idiosyncratic risk. The explanatory variable is *Dummy_advice,* which is equal to one if a client receives financial advice. For both dependent variables we run separate regressions depending on whether a client is predicted to accept financial advice or not. P-values are in parentheses. Pseudo R-squared values and number of observations are reported. Three stars (***) denote significance at 1% or less; two stars (**) significance at 5% or less; one star (*) significance at 10% or less. Heteroscedasticity robust standard errors are used. The third column reports the p-value of a test of equality of the coefficients for *dummy_advice* using seemingly unrelated estimation.

	Decrease of HHI			Decrease of idiosyncratic risk		
Dependent variable	Predicted to accept advice	Not predicted to accept advice	P-value	Predicted to accept advice	Not predicted to accept advice	P-value
Dummy advice	0.038***	0.096***	0.00	0.043	0.067***	0.44
	(0.000)	(0.000)		(0.114)	(0.000)	
Constant	-0.005	0.003		0.107***	0.072***	
	(0.156)	(0.206)		(0.000)	(0.000)	
Observations	325	6,060		318	4,494	
R-squared	0.057	0.016		0.008	0.005	

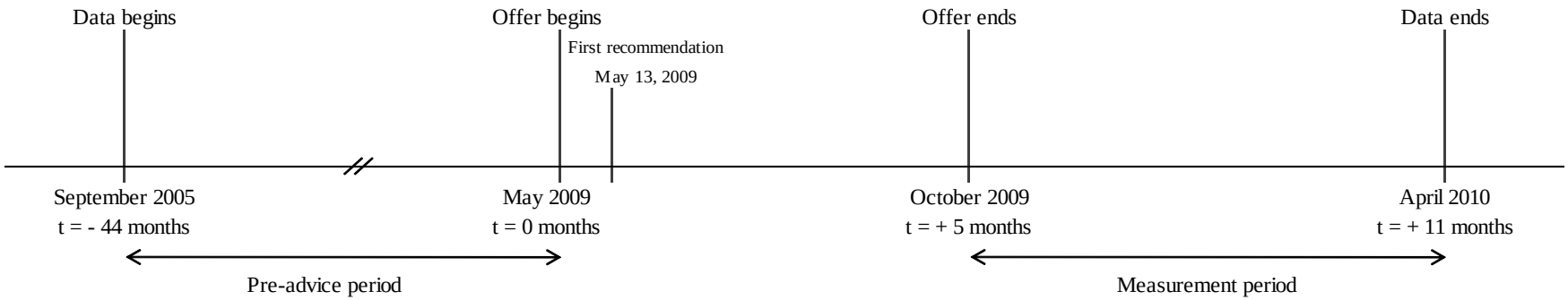

Figure 1. Time Line. The sequence of events in the field study (dates are of the beginning of the respective month)

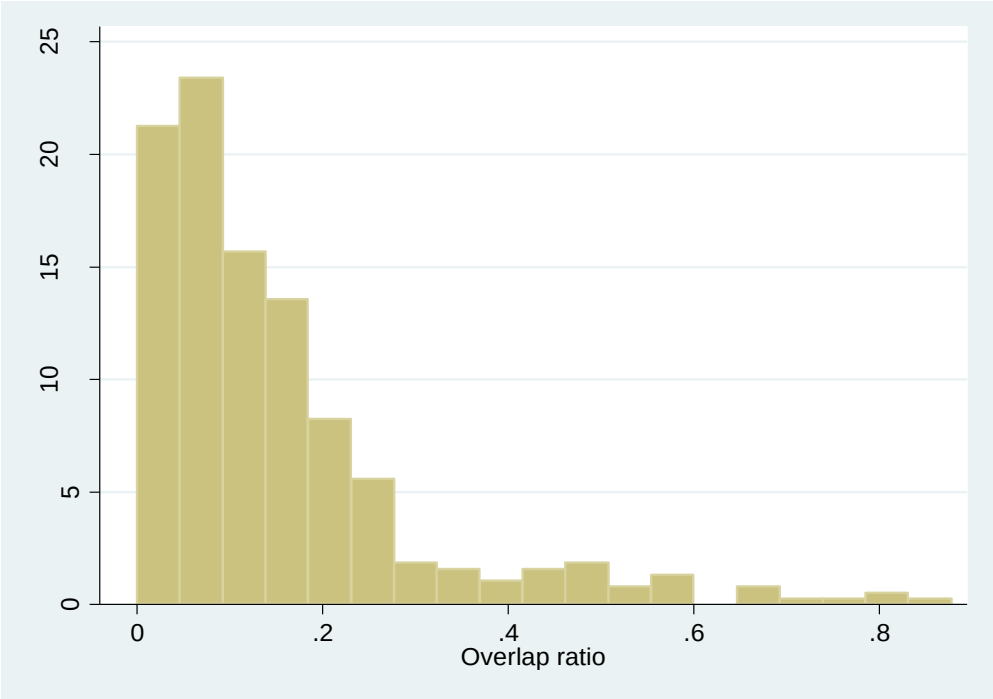

Figure 2a. Initial Overlap. The cross-sectional distribution of the overlap ratio when the first recommendation was given.

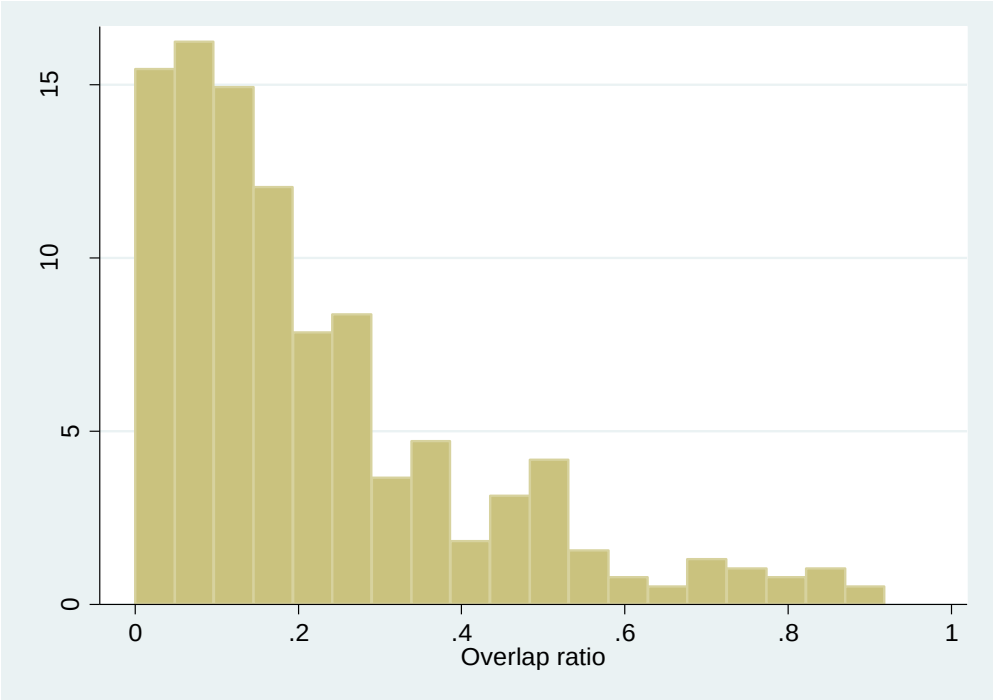

Figure 2b. Later Overlap. The cross-sectional distribution of the average overlap ratio between time t = 5 and t = 11 months.

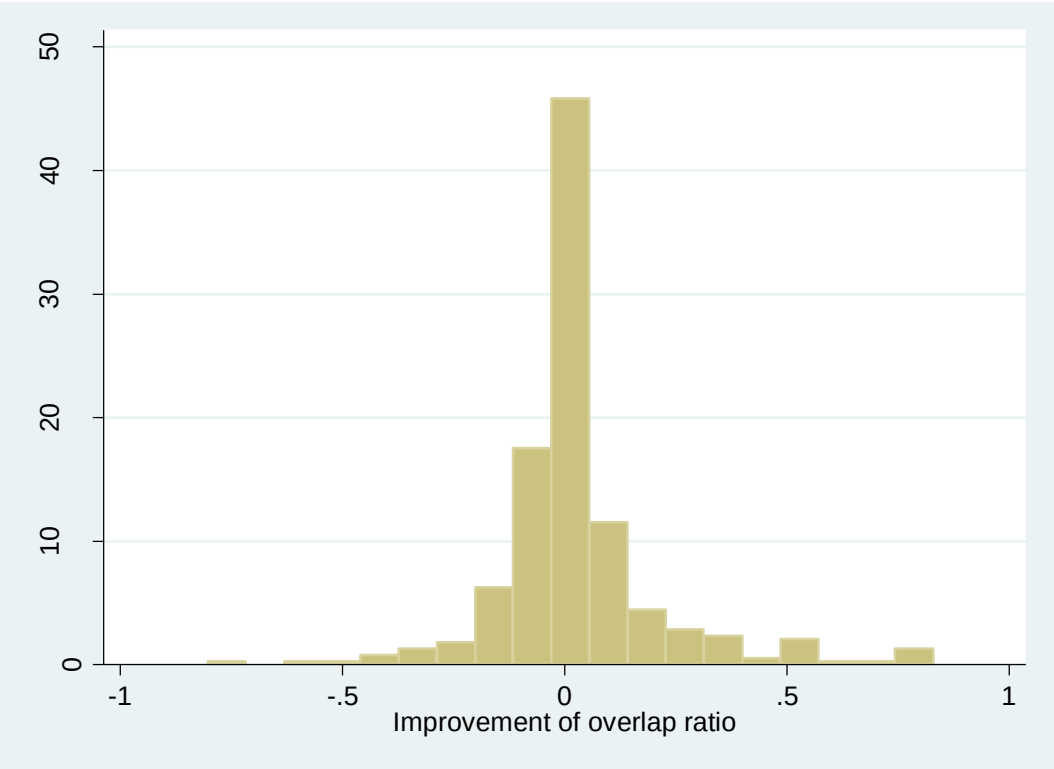

Figure 2c. Improvement in Overlap Ratio. Improvement of overlap ratio from the time of the first recommendation to t = 11.