It takes two to Tango: Households' response to financial advice and the role of financial sophistication

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Abstract—Using a unique dataset of over 6,000 clients of a German advisory firm who have received financial advice on basic retirement provision and the insurance of major life risks, we investigate households' response to advice while controlling for major agency conflicts. Overall, our results indicate that fixing supply-side issues of financial advice does not necessarily translate into more efficient consumer behavior: two thirds of the households under review ignore the advice completely and if they choose to heed it, they tend to follow it only to a relatively little extent. Moreover, our findings suggest that the generally inefficient use of financial advice is disproportionately driven by the financially knowledgeable households, implying that the adverse effect of financial sophistication on the use of financial advice as documented in previous studies does not stem from the moral hazard issue inherent in conflicted financial advice.

Keywords: Financial advice, financial sophistication, household finance, retirement provision

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1. Introduction

As individuals have constantly assumed greater responsibility for their own financial well-being in recent years, they have faced a market for financial services and products characterized by a growing complexity at the same time. In view of these developments—which make the misallocation of funds both more likely and more momentous—professional financial advice as a qualified source of guidance has become increasingly important for individuals to avoid making poor financial decisions.

However, a fundamental issue associated with financial advisory services arises from the moral hazard problem inherent in the advisor-advisee relationship. By now, a host of theoretical and empirical studies has shown that financial advice might be biased when advisors act as sellers of financial products, and biased advice, in turn, does not necessarily improve households' financial situation but instead might even have an adverse effect on allocation efficiency.[1] In recent years, addressing this supply-side problem has been the top priority of policy interventions in the field. Existing regulations for consumer financial services were put under scrutiny around the world and comprehensive financial market reforms have been initiated as a result thereof (see, for instance, Inderst and Ottaviani, 2012a). The rationale behind these interventions is that the reasons which prevent people from benefiting from financial advice are essentially rooted in the supply side and increasing access to unbiased and economically sound advice should solve the problem of poor financial decision-making and misallocated funds.

Clearly, however, unbiased financial advice is useless unless it is followed and as yet, there is hardly any information about whether good investment advice really works. In a seminal study, Bhattacharya et al. (2012) investigate individuals' responsiveness to investment advice outside an environment with moral hazard and find that even unbiased and free advice is rarely sought to enhance portfolio efficiency. Thus, achieving the policy goal of improving peoples' financial decisions by focusing exclusively on the supply side of financial advice should not be regarded as a foregone conclusion: in fact, if people consult with neutral

[1] Bolton et al. (2007), Carlin (2009), Stoughton et al. (2011), and Inderst and Ottaviani (2012b), among others, show theoretically that agency conflicts arising from the information asymmetry between client and advisor lead to self-interested financial advice which may be detrimental to the client. Several empirical studies including Bergstresser et al. (2009), Mullainathan et al. (2011), Hackethal et al. (2012), and Karabulut (2012) confirm the model predictions regarding the negative impact of conflicts of interest on the quality of investment advice received by retail customers.

financial advisors but afterwards do not follow their advice, the recommendations obviously fail to translate into sound financial decisions—however beneficial they might be in principle.

Following Bhattacharya et al. (2012), the present study adds to our understanding of the demand side of financial advice and extends their research in two ways. First, while they focus on investment advice, we study the extent to which individuals follow financial advice with regard to basic retirement saving and the insurance of major life risks. How do people respond to unbiased financial advice aimed at closing their existential provision and insurance gaps rather than optimizing their portfolio structure?

Second, we inquire into the role of financial sophistication when it comes to following unbiased advice. Previous studies on the use of financial advice document that financial knowledge has an adverse impact on a person's propensity to *demand* and to *follow* advice, respectively: while financially sophisticated individuals are more likely to consult with financial advisors, they are also less likely to rely on their advice once they have obtained it.[2] However, prior research could not account for the effect of agency conflicts, i.e. supply-side characteristics, potentially driving this puzzling result. This study improves on this limitation by analyzing the effect of financial sophistication on the use of *unbiased* financial advice, i.e. controlling for the supply side. This specific setting allows us to investigate whether the adverse effect of financial knowledge on following professional advisors' suggestions can be ascribed to the moral hazard issue inherent in conflicted financial advice—in which case it should disappear in our data—or rather stems from motives unrelated to the supply side.

In order to answer these questions, we draw on a unique dataset of more than 6,000 clients of a German advisory firm who have received financial advice free of major agency conflicts and directly compare the recommendations they have been given with their actual post-advice activity.

To preview our results, we generally document a largely inefficient use of neutral financial advice. In fact, two thirds of the households under review in this study opt to ignore the advice completely: three months after having been advised, 55.9% of households have remained entirely inactive while another 10.8% exhibit post-advice activity which is in no way connected to the suggestions given by their advisor. Likewise, if they choose to heed the advice, households tend to follow it only to a very little extent. Thus, the disregarding of unbiased advice does not appear to be a phenomenon limited to securities investment but instead

[2] See section 2 for a discussion of the related literature.

extends to other, arguably more significant domains of individuals' financial well-being, i.e. retirement provision and the insurance of major life risks.

Moreover, we find that offering unconflicted financial advice is not able to break up the adverse effect of financial sophistication on following advisors' suggestions. Instead, even in the absence of agency conflicts, the negative impact of individuals' financial knowledge on their propensity to implement the financial advice they obtain remains statistically and economically significant. Thus, our results suggest that the inefficient use of unbiased financial advice even aggravates for the most financially knowledgeable households in our sample and indicate that the adverse effect of financial sophistication on the use of advice is a demand-side puzzle which likely cannot be addressed by the mere availability of unconflicted financial advice.

The remainder of this study is organized as follows. Section 2 relates our work to the previous literature on the use of financial advice. Sections 3 and 4 describe our data and methodology. In section 5, we present our empirical results. Section 6 concludes.

2. The adverse effect of financial sophistication on the use of financial advice

Several studies on the use of financial advice show that a person's financial knowledge has an adverse impact on her propensity to *demand* and to *follow* advice, respectively: while financially sophisticated individuals are found to be more likely to consult with financial advisors[3], they are, at the same time, less likely to rely on their advice once they have received it. Specifically, Hackethal et al. (2011), who study the trading behavior of advised retail clients using data from German brokerage accounts, find that they are less likely to implement the advice given to them when their financial sophistication is higher. In a related study, Georgarakos and Inderst (2011), who draw on a panel of households across the Eurozone, show that investors who choose to participate in the stock market only rely on professional financial advice if their own financial knowledge is sufficiently low. Likewise, Calcagno and Monticone (2014) survey the retail customers of a large Italian bank and provide empirical evidence supporting the notion that, while financially literate consumers are more likely to solicit advice, they are less likely to fully delegate the portfolio selection to the advisor. Finally,

[3] See, e.g., Lusardi and Mitchell (2007, 2011), van Rooij et al. (2011), Hackethal et al. (2012), and Collins (2012) for empirical evidence on the complementarity of financial knowledge and the demand for financial advice.

Bucher-Koenen and Koenen (2011), who study the impact of financial advice on the private pension choice reported by German households, also document a negative relationship between financial knowledge and the propensity to follow advisors' recommendations.

To rationalize the puzzling role of financial knowledge with respect to the use of financial advice, it is argued in the literature that financial sophistication carries two dimensions, i.e. involves the ability to understand advice on the one hand, and the literacy to question it as well as to process information privately (a possibility which Bucher-Koenen and Koenen, 2011, refer to as *outside option*), on the other hand. At this, the ability to understand the advice increases the likelihood of demanding it, whereas the competence to question advice, along with the skills to gather private information, reduces the likelihood of following it. This is because the financially sophisticated advisee understands the advice and only opts to follow it if she prefers the recommendations to searching on her own, while she ignores it otherwise. By contrast, the less financially knowledgeable customer does not have an outside option (plus is more likely not to understand the advice) and hence has to follow the advice by default. As a result, the literature in the field distinguishes two different groups of individuals: the less financially sophisticated who need to rely on advice and the more financially savvy who are able to make their own judgment.

However, note that one important limitation of these studies is that they do not account for the effect of agency conflicts, i.e. supply-side characteristics, which potentially drive this puzzling result. By analyzing the role of financial sophistication regarding the use of *unconflicted* financial advice, i.e. controlling for the supply side, we investigate if the adverse effect of financial knowledge on following professional advisors' suggestions can be ascribed to the moral hazard issue inherent in conflicted financial advice or rather stems from motives unrelated to the supply side.

3. Data and summary statistics

3.1. Unbiased financial advice

For our analysis, we are able to draw on a unique data set of private households at a German financial advisory firm which in 2011 chose to adopt a novel advisory approach distinctly different from the services offered by traditional providers. In fact, the customers of this advisory firm ever since receive financial advice which (i) is economically sound and (ii) does not suffer from potential conflicts of interest. We will elaborate on these two features in the following.

First, households in our database are advised according to a specific set of rules designed by the *Deutsche Gesellschaft für Finanznorm* (DEFINO) which has been put in place to achieve the goal of uncompromised and efficient financial advice for individuals in Germany. DEFINO-compliant financial advice provides private households with an integrated set of product-level recommendations covering retirement provision as well as the insurance of risks relating to income, property, and health of all household members.[4] In October 2013, the DEFINO guidelines have been accepted for official accreditation as the benchmark for standardized financial advice of private households in Germany by the German Institute for Standardization (DIN).[5] The admission procedure involves the validation of the framework's objectivity by a committee of academic advisors, government representatives from the German Federal Ministry for Consumer Protection, and practitioners who jointly define and approve the set of actions to be taken at the product level as well as the specification and prioritization of each recommended product category based on the relevant legal directives and consumer protection requirements. Finally, financial advisors who wish to provide their clients with DEFINO-compliant advice require a special certification in order to do so. As a result, DEFINO authorities state that "(…) if private households comply with all DEFINO-based recommendations, they are reasonably protected against the major insurable life risks and adequately prepared for old age" (DEFINO, 2013), and we conclude that the financial advice received by the clients in our database is economically sound.

Second, each client-specific set of recommendations is generated by a computer algorithm which processes the client's data following standardized rules specified in the DEFINO framework. This implies that the responsibility of (i) selecting the appropriate product categories as well as (ii) prioritizing the required steps towards closing a given customer's provision and insurance gap is not left to the discretion of the advisor but instead solely depends on the advisee's individual financial condition and living situation. Consequently, DEFINO-compliant financial advice ensures that "sociodemographic twins", i.e. clients with identical life situations, receive an identical set of recommendations regardless of who advises them, and we are confident that the financial advice received by the households sampled in our data is free of the conflicts of interest which might other-

[4] If requested by the customer, the set of recommendations may be extended to wealth management. However, investment advice is only given in case all identified provision and insurance gaps have been filled and the advised household still disposes of free liquidity. The present study does not include investment advice; see section 3.2 for further details.

[5] Details concerning the ongoing accreditation procedure (DIN SPEC 77222) can be found at http://www.spec.din.de/projid=170375660

wise govern the advisor-advisee relationship. Given these two unique features, the recommendations we analyze in the present study are referred to as *unbiased* financial advice in the following.

3.2. The advisory process

Households in our sample are advised according to a standardized process which breaks down into three steps described in the following.

Upon paying a one-time charge, the advised household is first demanded extensive information regarding her personal financial and living conditions in order to feed the DEFINO framework. Required data items include all financial and non-financial assets and liabilities, disposable household income, a comprehensive breakdown of all currently held financial products and insurance policies along with the associated expenditures, self-assessed living expenses and—as a residual of these items of the household balance sheet—the remaining liquidity. This information is supplemented by detailed demographic characteristics of the household members including age, gender, income and household size as well as marital and professional status.[6]

This data is then processed by a computer algorithm which identifies the household's individual provision and insurance gap and generates a set of recommendations based on this information. This catalogue, which we will refer to as *recommendation schedule* in the following, may include (i) the increase of existing contracts, (ii) the (additional) conclusion of new contracts, and, finally, (iii) the cancellation of unsuitable contracts. The recommendation schedule is detailed at the level of the product category (e.g. the advice to choose a 'Riester'-type subsidized private pension plan) and suggested steps are ranked based on their individual priority for the household. At this, the DEFINO framework distinguishes recommendations based on three different levels. All measures which have to be taken in order to meet the requirements with respect to basic retirement provision and insurance against major life risks are listed in level 1 of the recommendation schedule, while advice which aims at maintaining and enhancing the household's standard of living is subsumed in levels 2 and 3, respectively. Since the DEFINO standards at level 1 are fairly high and require substantial monthly expenditures already (see section 3.4), we limit the relevant benchmark allocation to level 1-advice and omit additional suggestions in our analysis.

[6] Unless otherwise stated, the term "household members" refers to *advised* household members in the following and excludes children living in the household.

Finally, the recommendation output and the specific prioritization of the different steps are explained to the advisees during a personal meeting with their financial advisor. On this occasion, the advised household also receives information on the expected monthly expenses associated with each recommended product category and is presented a range of suitable products offered by DEFINO-compliant providers. Following this personal meeting with their advisor, households additionally receive a written documentation which details the necessity, prioritization, and cost of each measure.

Our empirical strategy laid out in section 4 is based on a direct comparison of households' first recommendation schedule with their actual account activity after having obtained this financial advice. To this end, we define the household-specific date of the initial personal meeting with the financial advisor as t=0 and track subsequent account activity over the following 12 months.[7]

3.3. Summary statistics of advised households

Table 1 reports summary statistics of our final sample of 6,431 household account records over the two-year period from March 2011 (when the advisory firm first launched DEFINO-compliant financial advice) to March 2013.

Panel A presents sociodemographic characteristics of the households under review. On average, individuals in our sample are roughly 34 years old, earn a (combined) net monthly income of 2,468 EUR[8] and report to have 993 EUR of free funds left after all monthly expenses. Moreover, 35.2% of advisees are married and 28.2% have at least one child living in the household. Owing to a substantial share of single person households in the sample (52.6%, unreported), the average household under review has only roughly two members, including children. Additionally, the percentage of households in which at least one member is self-employed amounts to 7.9%. Finally, we have gender information for the 3,609 households with only one advisee: among this subsample, 60.0% of individuals are male.

Panel B reports details on households' accounts with the advisory firm at t=0. The DEFINO logic comprises the recommendation areas *retirement provi-*

[7] Later account activity is omitted from the analysis since the DEFINO framework requires a mandatory update of the advisee's financial and living situation on an annual basis. This implies that the set of recommendations is subject to potential changes starting 12 months after the first financial advice has been received and subsequent account activity can therefore no longer be directly matched to the initial benchmark.

[8] A marginal number of households in the original dataset feature a total net monthly income of less than 500 EUR. We drop these observations from our final sample.

Table 1
Summary statistics of sampled households

	Measurement unit	N	Mean	Std.-Dev.	Min.	25^{th}	Median	75^{th}	Max.
Panel A: Sociodemographics									
Household size	Number of household members	6,431	1.904	1.186	1	1	1	3	7
Age	Average age of household members (years)	6,431	34.254	9.514	18	27	32	42	64
Income	Net monthly household income (EUR)	6,431	2,468	1,622	500	1,438	2,074	3,181	27,377
Liquidity	Self-reported free monthly liquidity (EUR)	6,431	993	1,064	3	374	731	1,273	14,344
Gender	Dummy = 1 if male	3,609	0.600	0.490	0				1
Marital status	Dummy = 1 if married	6,431	0.352	0.478	0				1
Children	Dummy = 1 if at least one child in household	6,423	0.282	0.450	0				1
Self-employed	Dummy = 1 if at least one household member self-employed	6,431	0.079	0.270	0				1

(continued on next page)

sion, *income protection*, and *supplementary insurance*, and applies this categorization to the customers' existing contracts, as well.[9] On average, roughly two

[9] Note that due to this holistic advisory approach, we can be reasonably sure that the sam-

Table 1

Summary statistics of sampled households–*continued*

	Measurement unit	N	Mean	Std.-Dev.	Min.	25^{th}	Median	75^{th}	Max.
Panel B: Pre-advice account statistics									
New client	Dummy = 1 if household has only received DEFINO-compliant financial advice	6,431	0.693	0.461	0				1
Client since	Length of relationship with advisory firm (years)	6,431	1.869	1.366	0.003	0.562	1.882	3.041	5.299
Retirement provision	Monthly expenses for retirement provision (EUR)	4,351	196	221	5	61	130	256	3,101
Income protection	Monthly expenses for income protection (EUR)	3,780	62	66	3	19	44	84	974
Suppl. insurance	Monthly expenses for insurance products unrelated to retirement provision or income protection (EUR)	5,494	69	74	2	21	54	98	1,132
Saving/Investment	Monthly expenses for saving and investment products unrelated to retirement provision (EUR)	3,057	185	276	8	45	100	230	7,603
Mortgage	Monthly mortgage payments (EUR)	1,347	519	391	100	212	430	747	5,084
Total	Total monthly expenses (EUR)	5,978	458	527	100	148	282	619	9,287
Panel C: Post-advice account information		All	t = 30d		t = 90d		t = 180d		t = 360d
N		6,431	6,258		5,968		5,279		3,897
%		100.0	97.3		92.8		82.1		60.6

This table reports summary statistics for the sociodemographic characteristics (Panel A) and accounts of the households prior to receiving financial advice (Panel B). The panel of households under review is unbalanced; Panel C reports the number of households for which post-advice account activity can be tracked conditional on the time elapsed since the date of the initial financial advice.

thirds of the households in our sample (i.e. 4,351 out of 6,431) already spend

pled households do not seek other professional financial advice during the period under review.

some funds on retirement saving prior to receiving their first DEFINO-compliant financial advice and their mean monthly expenses for old-age provision amount to 196 EUR. Likewise, 58.8% of households hold existing contracts related to income protection with associated mean monthly expenditures of 62 EUR, while 85.4% of households have existing policies assigned to the provisioning target *supplementary insurance* and amounting to mean monthly expenses of 69 EUR. In addition, 47.5% of the sampled households regularly spend money on savings and investment products unrelated to retirement provision, which amount to mean monthly expenditures of 185 EUR. Finally, roughly one fifth of all households under review dedicate an average amount of 519 EUR per month to mortgage repayments. Note that the groups of homeowners and households with savings and investments lead to a substantial inflation of total monthly expenses which sum up to a mean amount of 458 EUR. Moreover, we know the individual account opening dates of the sampled households which allows us (i) to compute the length of the relationship of a given household with the advisory firm as well as (ii) to differentiate households who have only received DEFINO-compliant financial advice from clients who have already been advised before the advisory firm adopted the DEFINO framework in March 2011. The mean length of a given household's relationship with the advisory firm amounts to roughly two years, while the fraction of customers who have only been advised according to the DEFINO logic is 69.3% in our sample.

Finally, since the advisory firm has constantly attracted new customers during our period under review, the panel of sampled households is unbalanced. As can be seen in Panel C of Table 1, we are able to track post-advice account activity in the first month after the financial advice has been received for 97.3% of all sampled households, while only 60.6% of all households have been with the advisory firm long enough to follow their account activity over a 12-month post-advice horizon.

3.4. Summary statistics of recommendations and post-advice account activity

To provide us with a first grasp of the products recommended on the one hand and actually bought on the other hand, Table 2 reports summary statistics of the advised versus empirically observable account activity aggregated over the 5,968 households whose actions we are able to track over a three-month post-advice period.

Panel A presents a comparison of recommended versus actual post-advice account activity by product category. For the target *retirement provision*, for instance, the panel reads as follows: 89.5% or 5,340 out of 5,968 households are

Table 2

Summary statistics of recommended versus actual post-advice account activity

Panel A: By product category

	Recommended account activity				Actual acc. act. 90d after advice			
	N house-holds	% of all house-holds	Mean (EUR)	Median (EUR)	N house-holds	% of HH w/rec.	Mean (EUR)	Median (EUR)
Retirement provision								
Subsidized PP plan ("Riester")	3,769	63.2	116.3	120.1	1,073	28.5	71.2	65.0
Subsidized PP plan ("Rürup")	1,916	32.1	198.9	138.5	407	21.2	140.9	133.3
PP insurance	4,827	80.9	152.9	104.2	414	8.6	72.6	53.8
Fund savings plan	4,446	74.5	135.9	95.3	41	0.9	65.1	50.0
All	5,340	89.5	434.7	354.6	1,343	25.1	122.1	100.0
Income protection								
Occupational disability insurance	3,697	61.9	112.7	93.2	1,015	27.5	55.9	55.0
Critical illness insurance	2,075	34.8	51.3	31.7	424	20.4	23.2	16.0
All	4,421	74.1	118.4	90.1	1,025	23.2	65.0	56.9
Supplementary insurance								
Liability insurance (Personal)	1,811	30.3	4.4	5.1	553	30.5	5.4	5.1
Liability insurance (Other)	243	4.1	8.3	6.6	48	19.8	5.6	5.5
Property insurance (Household)	2,208	37.0	4.9	4.5	299	13.5	6.2	5.9
Property insurance (Homeowner)	531	8.9	15.9	13.8	42	7.9	16.0	17.6
Supplementary health insurance	4,557	76.4	2.6	1.8	643	14.1	9.9	5.2
All	4,793	80.3	9.4	7.0	757	21.7	10.7	6.5
Other account activity								
Saving					153	n.a.	75.7	43.0
Securities investment (other)					97	n.a.	36.4	25.6
Mortgage					61	n.a.	163.0	160.0
Income protection (other)					447	n.a.	13.5	10.0
Supplementary insurance (other)					694	n.a.	94.4	40.9
All					1,046	n.a.	63.9	27.0
Total	5,968	100.0	501.1	402.8	2,631	44.1	118.4	86.3

Panel B: By provisioning target

	Recommended allocation (%) (N = 5,968)	Actual allocation (%) (N = 2,631)
Retirement provision	77.4	36.2
Income protection	20.0	23.2
Supplementary insurance	2.6	16.3
Other account actitvity	n.a.	24.4
Total	100.0	100.0

This table reports aggregated statistics of the recommendations receiveed by the sampled households as well as their actual post-advice account activity. Panel A presents a comparison of recommended versus actual post-advice account activity by product category. Panel B reports averages over the recommended shares of additional funds to the different provisioning targets compared to the empirically observable allocation of funds across these areas.

advised to increase their retirement savings by an average amount of 435 EUR per month in order to meet the level 1-requirements of the DEFINO framework.[10] Looking at the associated product-level recommendations, we further observe that, for instance, 63.2% of all households are advised to select a 'Riester'-type subsidized private pension plan with average monthly expenditures of 116 EUR to close their provision gap, while 32.1% of all households should invest in a state-granted pension plan of the 'Rürup' type with average costs of 199 EUR per month, and so forth. These numbers directly compare to the actual account activity aggregated over all sampled households reported on the right-hand side of the panel. Carrying forward our example, we observe that only 25.1% of the 5,340 households which are advised to increase their retirement savings actually do so. Moreover, among this subsample of 1,343 households, the average funds allocated to additional old age provision amount to only 122 EUR per month. If we break down households' actual activity to the product level, too, we find that, for instance, 28.5% of the 1,073 households recommended to choose a 'Riester'-plan follow this advice and allocate an average 71 EUR per month to this product category. Likewise, 21.2% of the 1,916 households who are advised to increase their allocation to 'Rürup'-plans indeed implement this product-level recommendation and spend an average 141 EUR per month, and so forth.

Finally, Panel B reports averages of the suggested share of additional funds to each of the different provisioning targets as well as the empirically observable allocation percentages across these areas for the subsample of households with non-zero post-advice account activity.

In sum, the behavioral patterns emerging from Table 2 provide a first indication of a largely inefficient use of unbiased financial advice among the households under review. First, only 44.1% of all households who choose to demand unbiased financial advice—i.e. who decide to provide the advisory firm with extensive personal data and to pay a lump-sum fee for the generating of their customized recommendation schedule—subsequently allocate any additional funds at all. This ratio even deteriorates when looking at specific provisioning targets (e.g. merely 25.1% in case of retirement savings). Second, with average monthly expenses of only 118 EUR, those households who do display post-advice account activity on average spend significantly less than necessary to close essential pro-

[10] Note that for those households who are unable to implement all suggested level 1-recommendations due to liquidity constraints, we limit the individual benchmark allocation to their free liquidity. The aggregate benchmark numbers presented in columns 1 to 4 of Table 2 are adjusted accordingly.

vision and insurance gaps. Third and finally, a considerable fraction of 24.4% of all additional contributions made following the initial financial advice is allocated to products which do not appear on the recommendation schedule. Thus, aggregated over all households, we document a substantial deviation of clients' observable account activity from optimal allocation of funds as prescribed by the advice they have demanded.

4. Methodology

4.1. Measuring households' degree of following

In order to yield a client-specific measure of the extent to which households implement the recommendations of their advisors, we employ a ratio introduced by Bhattacharya et al. (2012) which captures a given household's degree of following financial advice denoted by DOF and formalized as follows:

$$\mathrm{DOF}_{i,t} = \frac{\sum_{N}^{j=1} \mathrm{EUR}_{i,j,t}^{act} \bigcap \mathrm{EUR}_{i,j}^{BM}}{\sum_{N}^{j=1} \mathrm{EUR}_{i,j,t}^{act} + \sum_{N}^{j=1} \mathrm{EUR}_{i,j}^{BM} - \sum_{N}^{j=1} \mathrm{EUR}_{i,j,t}^{act} \bigcap \mathrm{EUR}_{i,j}^{BM}} \tag{1}$$

where i denotes the household, j indicates the product category, t indexes the time elapsed since having received the first unbiased financial advice, $\mathrm{EUR}_{i,j}^{BM}$ is the liquidity-adjusted value in euros of product category j in the recommendation schedule of household i, and $\mathrm{EUR}_{i,j,t}^{act}$ equals the amount of money which household i actually allocates to product category j at time t. Thus, the numerator equals the sum of all overlapping product categories (i.e. of those product categories which are found in both the recommendation schedule and the record of actual post-advice account activity), while the denominator equals the value of the household's total post-advice activity plus the liquidity-adjusted sum of all product-level measures listed in the recommendation schedule, less the overlap.

The DOF measure takes values in [0;1] and can be interpreted as a percentage rate. It equals one if a household fully follows the advice, while it assumes a value of zero if their recommended and empirically observable post-advice activity do not have a single product category in common. Note that a zero DOF may be the result of either complete inaction or a complete deviation from the advice (although in the latter case, additional funds have been allocated post-advice). Also, as opposed to a simple percentage of implemented recommendations, the DOF measure penalizes the misallocation of funds.[11] To spell this out, consider

[11] In section 5.2.2.3, we analyse how this sanctioning mechanism affects our main results.

the following example, where a given household extends its monthly expenses by 900 EUR in the three months after having obtained a set of recommendations which together sum up to 1,000 EUR per month. If, say, 400 EUR are allocated as advised, a simple approach would be to relate these 400 EUR to the sum of recommendations, yielding a ratio of 0.4. The degree of following, however, also takes into account the 500 EUR allocated to products *not* on the recommendation schedule and therefore takes on a value of only 0.267 in this example.[12]

4.2. Measuring households' financial sophistication

Next, we need to identify the specific level of financial knowledge for each of the sampled households in order to relate this measure to their individual degree of following. However, assessing households' financial sophistication is not an easy task since it cannot be readily observed. To render individuals' financial knowledge tangible, two different approaches have evolved in the literature.

On the one hand, a number of studies in the field have surveyed households to capture their cognitive abilities and financial literacy (see, e.g., Lusardi and Mitchell, 2007, 2011, van Rooij et al., 2011). Questions are designed to measure individuals' ability to perform simple calculations as well as to assess their understanding of the time value of money—i.e. how compound interest works and what effect inflation has on asset accumulation—and the basic concepts of risk and return.

On the other hand, a growing body of literature documents a strong causality between a number of generally observable characteristics of households (e.g. wealth, age, and professional status of household members) and their level of financial sophistication (see, e.g., Campbell, 2006, Calvet et al., 2007, Goetzman and Kumar, 2008, Georgarakos and Pasini, 2011). Rather than surveying households, these studies investigate their empirically observable financial decision-making patterns and define financial sophistication as the ability of a given household to avoid poor financial decisions.

Absent a survey-based measure of financial knowledge, we exploit the findings of the latter studies and infer our explanatory variables using observable household characteristics which have been shown to predict their level of financial sophistication. Specifically, we rely on an index of financial sophistication introduced by

[12] To prevent households, whose post-advice account activity exceeds total expenses of recommended products at level 1 from being automatically discriminated for computational reasons, these observations have already been dropped from our final sample of 6,431 households described in section 3.3. This pre-selection involved the omission of 10.3% of the initial number of households.

Calvet et al. (2009), who employ a comprehensive panel of 4.8 million Swedish households to show that households' ability to avoid poor financial decisions increases strongly with wealth and income as well as their contribution to private pension plans as a fraction of income. Moreover, they find that age, household size, and (to a lesser extent) education positively impact financial sophistication, whereas it turns out lower for self-employed and immigrants.[13]

Due to our rich dataset, we have the majority of financial sophistication proxies in Calvet et al. (2009) at hand. Specifically, we include household income and we are also able to construct the private pension contribution ratio, i.e. two of the three relevant financial characteristics. Straightforwardly, the latter variable, which we denote by PPCRATIO, is computed as a given household's private pension expenses at t=0 (i.e. prior to receiving financial advice) as a percentage of its net income. To specify households' demographic profile, we include age, household size, and an indicator variable for self-employment.

Beyond the variables in Calvet et al. (2009), we use our data on the professional status of the sampled individuals and, following Calcagno and Monticone (2014), identify households in which at least one member works in the

Table 3
Correlation of financial sophistication proxies

	INCOME	PPCRATIO	AGE	HHSIZE	SELFEMP	FINJOB
INCOME	1					
PPCRATIO	0.1943	1				
AGE	0.3907	0.2486	1			
HHSIZE	0.4219	0.1100	0.4174	1		
SELFEMP	0.2553	0.1094	0.1782	0.1293	1	
FINJOB	-0.0254	0.0057	-0.0695	-0.1404	0.0530	1

This table reports pairwise correlation coefficients of the explanatory variables employed in the regression analysis. See section 4.2. for variable definitions.

monetary and financial intermediation, or insurance sector. Intuitively, working in the finance sector (denoted by the indicator variable FINJOB, which takes a value of 1 for 5.3% of the 5,742 households for which we have job data) is associated with a higher-than-average level of financial sophistication. Table 3 reports correlations between our different proxies for financial sophistication.

[13] Note that the behavioral mistakes analyzed in Calvet et al. (2009) refer to household decisions when making securities investments. However, since the literature lacks a measure of financial sophistication geared to the specific decision-making process of choosing retirement provision and insuring life risks, we resort to this concept in the following.

5. Results

5.1. Univariate evidence

5.1.1. Post-advice account activity and the degree of following

We begin our discussion of the results with descriptive statistics on the distribution of households' degree of following for different points in time during the post-advice period. Table 4 reports the corresponding numbers.

Panel A displays DOF levels across all sampled households. Although we document substantial cross-sectional variation in the extent to which households implement the financial advice they receive, the degree of following turns out very low on aggregate: even 12 months after having been advised, the average household's degree of following comes to only 8.8% for the full sample. Yet, consistent with the summary evidence in section 3.4, this rather small percentage owes to a substantial number of entirely inactive households.

Table 4
Summary statistics of the degree of following

Panel A: All households

t	N	Mean	Std.-Dev.	Min.	25^{th}	Median	75^{th}	Max.
30 d	6,258	3.45	10.87	0.00	0.00	0.00	0.00	97.81
90 d	5,968	7.25	15.48	0.00	0.00	0.00	5.51	100.00
180 d	5,279	8.13	16.55	0.00	0.00	0.00	8.39	100.00
360 d	3,897	8.82	17.55	0.00	0.00	0.00	9.87	100.00

Panel B: Households with non-zero post-advice account activity

t	N	% of all	Mean	Min.	25^{th}	Median	75^{th}	Max.
30 d	1,674	26.7	12.87	0.00	0.00	3.94	19.53	97.81
90 d	2,631	44.1	15.93	0.00	0.11	8.21	25.86	100.00
180 d	2,646	50.1	16.10	0.00	0.00	9.20	26.09	100.00
360 d	2,186	56.1	15.57	0.00	0.00	6.30	24.94	100.00

This table reports distribution characteristics of the degree of following (DOF, in %) of the sampled households. See section 4.1 for a definition of the variable. Panel A (Panel B) presents summary statistics for the full sample (the subsample of households with non-zero post-advice account activity).

Panel B reports the degree of following among those households who actually exhibit non-zero post-advice account activity. The fraction of this subsample increases from 26.7% in the first 30 days after having received the financial advice to 56.1% after one year, while the slope is non-linear: after three months, the ratio has reached 44.1% already and climbs only slowly in the subsequent nine months. Likewise, household's average degree of following conditional on showing post-advice account activity reaches roughly 16% after three months and remains virtually unchanged from then on. This suggests that the increase in

overall DOF levels over time (Panel A) stems from an increasing number of active households rather than continued implementation of advice by early followers over the subsequent post-advice horizon.

Next, we look at how the amount of money which a given household spends post-advice actually relates to the degree of following which it achieves. We do so by computing a simple degree of post-advice account activity, which relates the sum of additional funds which a given household has allocated at time t subsequent to the financial advice to the total cost of implementing its entire recommendation schedule. Thus, the degree of post-advice account activity (denoted by DOA) marks the upper limit of a household's attainable DOF score.

Table 5

Post-advice account activity and the degree of following

Deciles of DOA_{90d}	N	DOA_{90d}			DOF_{90d}		
		Mean	Min.	Max.	Mean	Min.	Max.
1	264	1.23	0.08	2.21	0.59	0.00	2.15
2	263	3.75	2.22	5.46	1.36	0.00	5.38
3	263	7.65	5.49	9.80	3.68	0.00	9.72
4	263	12.26	9.80	14.99	7.01	0.00	14.78
5	263	17.71	14.99	20.54	10.20	0.00	20.54
6	263	24.09	20.57	27.63	15.59	0.00	27.63
7	263	32.13	27.64	36.81	22.24	0.00	36.80
8	263	41.56	36.82	47.49	27.16	0.00	47.46
9	263	55.16	47.51	65.33	33.00	0.00	65.25
10	263	79.93	65.44	99.84	38.46	0.00	97.81
All	2,631	27.55	0.08	99.84	15.93	0.00	97.81

This table reports distribution characteristics of households' degree of activity (DOA, in %) as well as their degree of following (DOF, in %). See sections 4.1 and 5.1.1 for variable definitions. Numbers are obtained three months after the sampled households have received the initial financial advice and organized by deciles of the degree of activity.

We compare the two ratios by assigning all households with non-zero post-advice account activity to deciles according to their DOA levels and compute the distribution of DOF levels for each of the ten subgroups three months after having received financial advice. Table 5 reports the corresponding results. Overall, the 2,631 active households show an average DOF of 15.9% after three months. Interestingly, however, they spend average additional funds of 27.6% of the total cost of implementing their individual level 1-recommendations to achieve this degree of following, pointing to a rather low efficiency of their post-advice expenses. This effect is particularly severe for households assigned to the higher

DOA deciles: while a mean DOA of 41.6% (decile 8) corresponds to an average DOF of 27.2%, advisees in the top decile—whose DOA is nearly twice as high (79.9%)—increase their degree of following by no more than 11.3% points as compared the former group. Moreover, we observe zero DOF values in each of the ten subgroups, indicating that the mere amount of money spent on additional products post-advice does not tell us much about a given household's degree of following the suggestions of its advisor.

Taken together, our evidence with respect to the degree to which households follow unbiased financial advice suggests that they generally do not use it in an efficient way. In fact, two thirds of the households under review ignore the advice completely: three months after having been advised, 55.9% of households have remained entirely inactive while another 10.8% exhibit post-advice activity which is in no way connected to the suggestions given by their advisor. Moreover, in case they choose to heed the advice, households tend to follow it only to a very little extent: average DOF levels amount to only 15.9% conditional on having (partially) implemented at least one of the measures suggested in the recommendation schedule. Generally, we show that households use much more money than necessary to achieve their relatively small degrees of following, implying that a substantial share of funds is allocated to products unrelated to advisors' recommendations. This evidence suggests, that individuals' disregarding of unbiased financial advice is not limited to securities investment (see Bhattacharya et al., 2012) but instead extends to other, arguably more significant domains of their financial well-being, i.e. retirement provision and the insurance of major life risks.

5.1.2. Financial sophistication and the degree of following

In what follows, we use our data to investigate how households' financial sophistication impacts their degree of following financial advice outside an environment with agency conflicts.

To get a first idea of the individual impact of our different financial sophistication proxies on households' degree of following, we assign them to quintiles (and, for the binary variables, categories along their differentiator, respectively) and compute mean DOF levels for either subgroup. Table 6 reports the corresponding results.

Univariately, DOF levels are negatively correlated with four of our six indicators of financial knowledge, i.e. household income and size as well as average age of household members and their private pension contributions as a fraction of income (PPCRATIO). With respect to the two dummy variables, we find that self-employment also appears to have a negative effect on households' DOF lev-

els. Recall, however, that self-employment relates to *lower* levels of financial sophistication in Calvet et al. (2009), so that this proxy seems to make an exception to the overall pattern in our data. Working in the finance sector, by contrast, does not appear to affect DOF levels; yet, we are careful not to overstate the explanatory power of this additional proxy, since it is very unevenly distributed across households in our sample.

Table 6
Financial sophistication and the degree of following - Univariate evidence

	N	DOF_{90d}							
		All	Smallest	Q2	Q3	Q4	Largest	Diff.	t-stat.
Financial sophistication variables									
INCOME	5,968	7.25	9.59	8.69	7.44	5.47	5.08	-4.51 ***	-7.15
PPCRATIO	5,968	7.25	8.78	8.41	7.43	7.01	4.63	-4.15 ***	-6.78
AGE	5,968	7.25	10.59	10.58	6.96	4.80	3.34	-7.25 ***	-12.22
HHSIZE	5,968	7.25	8.44	8.94	8.09	5.84	4.94	-3.50 ***	-5.99
SELFEMP	5,968	7.25	7.44				5.12	-2.32 ***	-3.16
FINJOB	5,742	7.31	7.31				7.18	-0.14	-0.15
Control variables									
GENDER	3,311	8.53	7.66				9.10	1.44 **	2.34
NEWCLIENT	5,968	7.25	4.48				8.79	4.31 ***	9.77

This table reports mean DOF levels of the sampled households three months after having received the initial financial advice for quintiles formed on the different financial sophistication proxies. See sections and 4.1 and 4.2 for variable definitions. For the indicator variables, categories are formed along their differentiator.

Moreover, the negative differences in the degree of following between the most and the least financially sophisticated households, reported in the rightmost column of Table 6, turn out economically meaningful and statistically significant by all conventional levels. Specifically, households in the bottom quintiles of income, contribution ratio, and size feature mean DOF levels nearly twice as high as the corresponding percentages in the respective top quintiles. This gap is even larger for the 20% youngest versus the 20% oldest households in the sample, for which the absolute difference in the average degree of following amounts to more than seven percentage points. Taken together, our univariate evidence points to a rather striking pattern regarding the response to unbiased financial advice: in fact, the inefficient use of advice as documented in section 5.1.1 is worst for those households which we proxy to be the financially savvy ones given their observable characteristics. Recall that, due to our data, we can rule out that this seemingly irrational behavior stems from the anticipation of moral hazard issues

inherent in the adviser-advisee relationship by the financially sophisticated households.

At the bottom of Table 6, we also report how gender and client status—indicating whether households have already been with the advisory firm prior to the roll-out of DEFINO-compliant financial advice—impact their individual degree of following. These characteristics are not part of the index of financial sophistication. However, gender has occasionally been shown to influence the propensity to demand financial advice (although empirical evidence on the direction of the effect is mixed[14]) which is why we include this information as a control variable in the regression analysis. Likewise, the dummy variable indicating the client status allows us to sort out unobservable effects which may arise from having an existing relationship with the advisory firm before receiving unbiased advice for the first time.[15] Univariately, both parameters appear to have a significant effect on DOF levels: new customers and—among the subsample of single person households—male customers feature a higher degree of following, albeit less pronounced in magnitude as compared to the financial sophistication proxies.

5.2. Regression analysis

5.2.1. Main results

In this section, we turn to a multivariate analysis in order to investigate the combined effect of the different indicators of financial sophistication on households' degree of following. To this end, we estimate a simple OLS model which takes the following form:

$$\begin{aligned} \mathrm{DOF}_{i,t} &= \beta_1 \log(\mathrm{INCOME})_i + \beta_2 \,\mathrm{PPCRATIO}_i + \beta_3 \,\mathrm{AGE}_i \\ &+ \beta_4 \,\mathrm{HHSIZE}_i + \beta_5 \,\mathrm{SELFEMP}_i + \beta_6 \,\mathrm{FINJOB}_i + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where $\mathrm{DOF}_{i,t}$ denotes the degree of following of a given household i at time t and the right-hand side captures the variables measuring their individual financial sophistication as defined in section 4.2. All regressions are estimated using robust

[14] Studying three different samples of advisees of German banks and brokers, Hackethal et al. (2012) and Karabulut (2012) document that males are less likely to consult with financial advisors, while Bhattacharya et al. (2012) reach the opposite result. International evidence is similarly ambiguous.

[15] Note, however, that we have no information on the advice history of the sampled households. Specifically, they may have received professional financial advice from other sources prior to joining our advisory firm.

standard errors and control for regional fixed effects at the two-digit zip code level.[16]

Table 7
Financial sophistication and the degree of following - Main results

	Regressions with DOF_{90d} as the dependent variable			
	All		NEWCLIENT	
			0	1
	(1)	(2)	(3)	(4)
log(INCOME)	-0.0245 ***	-0.0243 ***	-0.0143 ***	-0.0273 ***
	(0.0011)	(0.0018)	(0.002)	(0.0014)
PPCRATIO	-0.1566 ***	-0.2480 ***	-0.0761 ***	-0.1727 ***
	(0.0217)	(0.0333)	(0.0276)	(0.0353)
AGE	-0.0026 ***	-0.0026 ***	-0.0014 ***	-0.0029 ***
	(0.0002)	(0.0003)	(0.0003)	(0.0003)
HHSIZE	-0.0090 ***	-0.0030	-0.0028 **	-0.0107 ***
	(0.0016)	(0.0064)	(0.0014)	(0.002)
SELFEMP	-0.0064	-0.0204 *	-0.0185	-0.0014
	(0.0065)	(0.0115)	(0.0142)	(0.0094)
FINJOB	-0.0124	-0.0127	-0.0189	-0.0114
	(0.0098)	(0.0106)	(0.0132)	(0.0126)
GENDER		0.0095		
		(0.0061)		
Region dummies	Yes	Yes	Yes	Yes
N	5,742	3,311	1,749	3,993
R^2	0.2062	0.2182	0.1262	0.2376

This table presents our main regression results. We estimate an OLS model as specified in section 5.2.1 with the degree of following (DOF) as the dependent variable (see Eq. (2)). See sections 4.1 and 4.2 for variable definitions and section 4.2.1 for the different regression specifications. Robust standard errors are reported below the coefficients in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 7 reports the main results of this study. Consistent with the univariate evidence, the coefficients on logged household income and size as well as the percentage of private pension contributions prior to receiving financial advice (PPCRATIO) and the average age of the household members all retain their negative sign and turn out and statistically significant at the 1%-level for the full sample (regression (1)). Note that, while still negative, the effect of self-employment on the degree of following loses its significance when controlling for

[16] Our data includes information about the sampled households' place of residence at the two-digit zip code level. Note that households in our sample are spread over 97 of the 100 two-digit zip code regions of Germany.

the influence of the other proxies of financial sophistication. Finally, whether one of the household members works in the finance sector remains an insignificant characteristic with respect to explaining the magnitude of the observed DOF levels.

Regression (2) of Table 7 replicates the analysis for the reduced sample of households with a single advisee in order to control for a possible effect of gender on the extent to which people follow the financial advice they receive. Yet, supporting the survey-based results of Hung and Yoong (2010) and Bucher-Koenen and Koenen (2011), we find that, controlling for financial sophistication, gender does not have a significant effect on the propensity to follow advice. Note that, since the overwhelming majority of single advisees are childless (93.6%, unreported), the effect of household size on DOF levels now becomes insignificant.

Next, we split the sample based on the client status of the households under review. Regressions (3) and (4) re-estimate our baseline specification for the subsamples of existing and new clients, respectively. Qualitatively and in terms of statistical significance, we do not observe material differences between the two subgroups when it comes to the impact of households' financial sophistication on their degree of following. However, a comparison of the coefficients suggests that the magnitude of the impact of the financial sophistication proxies is predominantly driven by the group of new clients.

In sum, our main regression results confirm the univariate evidence presented in section 5.1.2. We provide evidence in support of the fact that unbiased financial advice is not able to break up the adverse effect of financial sophistication on households' degree of following. Instead, the negative impact of individuals' financial knowledge on their propensity to implement the financial advice they obtain remains statistically and economically significant even in the absence of agency conflicts. Counterintuitively, our findings indicate a disproportionately inefficient use of unbiased advice among the financially sophisticated households under review and suggest that the adverse effect of financial sophistication on individuals' likelihood of following advisors' suggestions is a demand-side puzzle which likely cannot be addressed by the mere availability of unbiased financial advice.

5.2.2. Robustness checks

Next, we test the validity of our main results by examining whether they are robust (i) to excluding households without post-advice account activity, (ii) to tracking the implementation of the advice at different points in time, and, finally, (iii) to the choice of alternative measurement concepts regarding the degree of following.

Table 8

Financial sophistication and the degree of following - Robustness analysis

	DOF_{90d}		DOF_{180d}	DOF_{360d}	$DOF_{90d}^{no\ penalty}$
	Baseline specification	Post-advice acc. act. ≠ 0			
	(1)	(2)	(3)	(4)	(5)
log(INCOME)	-0.0245 ***	-0.0459 ***	-0.0280 ***	-0.0294 ***	-0.0266 ***
	(0.0011)	(0.002)	(0.0013)	(0.0016)	(0.0013)
PPCRATIO	-0.1566 ***	-0.2111 ***	-0.1693 ***	-0.2217 ***	-0.1502 ***
	(0.0217)	(0.0568)	(0.0267)	(0.0315)	(0.0254)
AGE	-0.0026 ***	-0.0038 ***	-0.0030 ***	-0.0030 ***	-0.0027 **
	(0.0002)	(0.0004)	(0.0002)	(0.0003)	(0.0003)
HHSIZE	-0.0090 ***	-0.0259 ***	-0.0101 ***	-0.0104 ***	-0.0092 **
	(0.0016)	(0.0034)	(0.0021)	(0.0028)	(0.0018)
SELFEMP	-0.0064	-0.0005	-0.0089	-0.0070	-0.0099
	(0.0065)	(0.0149)	(0.0072)	(0.009)	(0.0075)
FINJOB	-0.0124	0.0157	-0.0237 **	-0.0227 *	-0.0143
	(0.0098)	(0.0223)	(0.0102)	(0.013)	(0.0109)
Region dummies	Yes	Yes	Yes	Yes	Yes
N	5,742	2,631	5,077	3,773	5,742
R^2	0.2062	0.4410	0.2244	0.2296	0.2073

This table reports the results of several robustness checks testing the validity of the main results presented in Table 7. See section 5.2.2 for details on the different robustness checks. Robust standard errors are reported below the coefficients in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

5.2.2.1. Financial sophistication and post-advice account activity

Recall that, consistent with Bhattacharya et al. (2012), we include all sampled households to arrive at our general results. In a first robustness check, we therefore omit all households who do not show any post-advice account activity, to test if our main findings are essentially the result of the large number of zero observations in the data. Regression (2) of Table 8 presents the corresponding results and rejects this notion. Compared to the baseline specification (regression (1)), the negative effect of each of the four statistically significant financial sophistication proxies on DOF levels turns out even stronger in magnitude. This implies that—if anything—including the zero observations leads to a more conservative estimation of the reverse impact of financial sophistication on households' degree of following unbiased financial advice.

5.2.2.2. Financial sophistication and the degree of following over time

Next, we inquire into the possibility that households' financial sophistication has an impact on how much time elapses between having received the financial ad-

vice and implementing the related recommendations. Hackethal et al. (2012), for instance, propose that several characteristics linked to greater financial knowledge (e.g. wealth and income) are also associated with higher opportunity costs of time and argue that this is one reason for which more financially savvy households are also more likely to demand financial advice. In the same vein, Bhattacharya et al. (2012) ask if certain households might simply be too busy to follow the financial advice they have obtained. Finally, Bucher-Koenen and Koenen (2011) find that people with greater financial expertise are significantly more likely to compare multiple offers before making a final choice. Intuitively, this is more time-consuming than simply delegating the decision to the advisor and therefore, more time may pass before advice actually translates into account activity in case of financially sophisticated households.

To account for this possibility, we re-estimate our baseline specification for two additional points in time, i.e. six months and one year after the household has received the initial advice. Regressions (3) and (4) of Table 8 document the corresponding coefficients and show that, indeed, they increase with greater lapse of time. However, the magnitude of change is miniscule for most indicators and we note that our results are largely unaffected by the time people take to react to the financial advice they receive.

5.2.2.3. Alternative measurement concept

As a final test of the robustness of our main result, we revisit our measure of the degree of following and relax the potentially restrictive sanctioning mechanism. Recall that the DOF measure we apply penalizes the allocation of funds to products unrelated to the recommendation schedule if the household has not yet closed all required provision and insurance gaps. To test if our results are skewed by this sanctioning mechanism, we re-estimate our baseline model using a simple degree of following as the dependent variable, which we define as the euro value of all *implemented* recommendations divided by the euro value of all *given* recommendations (denoted as $\text{DOF}^{no\ penalty}$).

Notably, the average $\text{DOF}^{no\ penalty}$ captured three months after the initial advice amounts to 8.4%, i.e. only 1.1% points above the baseline measure (unreported). This suggests a rather small impact of the misallocation penalty on our main findings. Indeed, when we re-run our regression analysis using $\text{DOF}_{90d}^{no\ penalty}$ as the dependent variable (regression (5) of Table 8), results remain virtually identical across all indicators of financial sophistication as compared to the baseline model. We conclude that our main result, i.e. that the group of financially knowledgeable households appears to use the unbiased advice particularly ineffi-

ciently, proves robust to an alternative concept of measuring the degree of following, as well.

6. Conclusion

A fundamental issue associated with financial advisory services stems from the moral hazard problem inherent in the advisor-advisee relationship. In this study, we are able to investigate what happens when this supply-side barrier to good advice is removed: how do individuals respond to unbiased and economically sound financial advice?

To this end, we employ a unique dataset of over 6,000 clients of a German advisory firm who have received unbiased financial advice regarding essential retirement provision and the insurance of major life risks, and directly compare the recommendations they have been given with their actual post-advice account activity.

Overall, our results indicate that fixing the supply-side issue of financial advice does not necessarily translate into more efficient consumer behavior.

First, we show that even in the absence of agency conflicts, the degree to which individuals follow the recommendations of professional financial advisors is remarkably low. In fact, two thirds of the households under review opt to ignore the advice completely and in case they choose to heed it, they tend to follow it only to a very little extent. Generally, we show that households use much more money than necessary to achieve their relatively small degrees of following, implying that a substantial share of funds is allocated to products which do not contribute to closing their top-priority provision and insurance gaps.

Second, our data allows us to disentangle the adverse effect of financial sophistication on the use of financial advice documented in previous studies. By analyzing the effect of individuals' financial sophistication on the use of unbiased advice, we are able to investigate whether the puzzling effect of financial knowledge on following advisors' suggestions can be ascribed to the moral hazard issue inherent in conflicted financial advice or instead arises from motives unrelated to the supply side. Our findings suggest that neutral financial advice is not able to break up the negative impact of financial sophistication on the use of financial advice. Instead, the adverse effect persists even in the absence of agency conflicts and turns out statistically and economically significant. This result suggests that the generally inefficient use of unbiased financial advice is disproportionately driven by the financially knowledgeable households and points to a

demand-side puzzle which likely cannot be addressed by the mere availability of unconflicted financial advice.

At this, our results highlight the need for further research with respect to the demand side of financial advice. What makes people follow financial advice in general, and what helps explaining the adverse effect of financial sophistication on their use of advice in particular? Why is unbiased advice largely unable to steer individuals towards improved financial decisions? One promising avenue for additional research in this field is to account for peoples' *willingness* to implement financial advice which has been shown to be linked to their perception of how trustworthy the advisor is (see Georgarakos and Inderst, 2011, and Hackethal et al., 2011). Likewise, liquidity preferences might have an influence on advisees' willingness to implement the advisor's suggestions. Finally, Benartzi and Thaler (2004, 2007) and Goda et al. (2012) document that behavioral traits play an important role when it comes to implementing financial advice. Given that such biases are potentially affected by the way the advice is presented to the consumer rather than its actual content, it might be useful to experiment with different ways in which information is conveyed or framed in future studies on the use of financial advice.

References

Benartzi, S., and R. Thaler. 2004. Save more tomorrow: using behavioral economics to increase employee saving. *Journal of Political Economy* 112, 164–187.

Benartzi, S., and R. Thaler. 2007. Heuristics and biases in retirement savings behavior. *Journal of Economic Perspectives* 21, 81–104.

Bergstresser, D., J.M.R. Chalmers, and P. Tufano. 2009. Assessing the costs and benefits of brokers in the mutual fund industry. *Review of Financial Studies* 22, 4129–4156.

Bhattacharya, U., A. Hackethal, S. Kaesler, B. Loos, and S. Meyer. 2012. Is unbiased financial advice to retail investors sufficient? Answers from a large field study. *Review of Financial Studies* 25, 975–1031.

Bolton, P., X. Freixas, and J. Shapiro. 2007. Conflicts of interest, information provision, and competition in the financial services industry. *Journal of Financial Economics* 85, 297–330.

Bucher-Koenen, T., and J. Koenen. 2011. Do smarter consumers get better advice? An analytical framework and evidence from German private pensions. Working paper.

Calcagno, R., and C. Monticone. 2014. Financial literacy and the demand for financial advice. Forthcoming in *Journal of Banking and Finance*.

Calvet, L.E., J.Y. Campbell, and P. Sodini. 2007. Down or out: Assessing the welfare costs of household investment mistakes. *Journal of Political Economy* 115, 707–747.

Calvet, L.E., J.Y. Campbell, and P. Sodini. 2009. Measuring the financial sophistication of households. *American Economic Review* 99, 393–398.

Campbell, J.Y. 2006. Household finance. *Journal of Finance* 61, 1553–1604.

Carlin, B.I. 2009. Strategic price complexity in retail financial markets. *Journal of Financial Economics* 91, 278–287.

Collins, J.M. 2012. Financial advice: A substitute for financial literacy? Financial Services Review 21, 307-322.

DEFINO. 2013. DEFINO—Gesellschaft für Finanznorm: Das Regelwerk. http://gesellschaft-finanznorm.de/finanznorm/das-regelwerk (retrieved on January 2, 2014).

Georgarakos, D., and R. Inderst. 2011. Financial advice and stock market participation. European Central Bank Working Paper.

Georgarakos, D., and G. Pasini. 2011. Trust, sociability, and stock market participation. *Review of Finance* 15, 693–725.

Goda, G.S., C.F. Manchester, and A. Sojourner. 2012. What will my account really be worth? An experiment on exponential growth bias and retirement saving. NBER Working Paper 17927.

Goetzman, W.N., and A. Kumar. 2008. Equity portfolio diversification. *Review of Finance* 12, 433–463.

Hackethal, A., M. Halliassos, and T. Jappelli. 2012. Financial advisors: A case of babysitters? *Journal of Banking and Finance* 36, 509-524.

Hackethal, A., R. Inderst, and S. Meyer. 2011. Trading on advice. Working paper.

Hung, A.A., and J.K. Yoong. 2010. Asking for help: Survey and experimental evidence on financial advice and behavior change. RAND Working Paper WR-714-1.

Inderst, R., and M. Ottaviani. 2012a. Financial advice. *Journal of Economic Literature* 50, 494–512.

Inderst, R., and M. Ottaviani. 2012b. How (not) to pay for advice: A framework for consumer financial protection. *Journal of Financial Economics* 105, 393–411.

Karabulut, Y. 2012. Financial advice: An improvement for worse? Working paper.

Lusardi, A., and O. Mitchell. 2011. Financial literacy and planning: implications for retirement wellbeing. NBER Working Paper 17078.

Lusardi, A., and O. Mitchell. 2007. Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics* 54, 205–244.

Mullainathan, S., M. Nöth, and Antoinette Schoar. 2012. The market for financial advice: An audit study. NBER Working Paper 17929.

Stoughton, N.M., Y. Wu, and J. Zechner. 2011. Intermediated investment management. *Journal of Finance* 66, 947–980.

van Rooij, M., A. Lusardi, and R. Alessie. 2011. Financial literacy and stock market participation. *Journal of Financial Economics* 101, 449–472.