Limited Awareness and Financial Intermediation*

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Abstract

We study the market interaction between financial intermediaries and retail investors, who not only face uncertainty about the performance of the different investments but also have limited awareness of the available investment opportunities. Intermediaries compete for investors via the menu of investment options they offer. We show that when competition is limited, intermediaries restrict their offers to extreme options, e.g. very risky and very safe products. We also consider investor heterogeneity and show that the presence of sophisticated, fully aware investors can impose a negative externality on investors with limited awareness. Self-reported data from customers in the Italian retail investment sector support the key predictions of the model: the menus offered to less knowledgable investors contain few products, most of them are nevertheless perceived to be at the extremes.

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1 Introduction

One of the many striking features of the recent financial crisis was the extreme exposure of investors to risk. Both investment and commercial banks had been selling excessively risky assets to investors, sometimes hiding some of the asset characteristics and safer options (e.g., Gerardi et al. (2008)). At the same time, despite the impressive amount of new financial instruments and the rapidly changing financial world, since the 1950s a large fraction (of approx. 33% in the US) of investment demand has remained on 'safe' assets (Garcia, 2012).

Most of financial investments are intermediated by professionals. Financial intermediaries are non-neutral brokers and, as such, direct, influence, and distort the demand of assets in the economy. For instance, investment bankers commonly underwrite transactions of newly issued securities, whereby they raise investment capital from investors on behalf of corporations and governments both for equity and debt capital. Financial intermediaries may also operate on the supply side of the asset market (unloading). Such practices give rise to conflicts of interest, sometimes leading to investments that are not necessarily in the best interest of the client.

At the same time, investors differ widely in their financial literacy. They not only face limits in their ability to assess the profitability of particular investments, but also have limited awareness of the available investment opportunities and must therefore rely on professional advice. For example, Guiso and Jappelli (2005) document the lack of awareness of financial assets among the 1995 and 1998 waves of the survey of Italian households (SHIW).[1] Although almost 95% of respondents in the dataset are aware of checking accounts and almost 90% are aware of saving accounts, only 65% of potential investors are aware of stocks and only 30% of investment accounts; mutual funds and corporate bonds are known by only 50% of the sample. Less than 30% of respondents are simultaneously aware of stocks, mutual funds and investment accounts.[2]

[1] The surveys are representative samples of the Italian resident population, covering 8,135 households in 1995 and 7,147 households in 1998.

[2] The share of wealth in the hand of unaware agents is also substantial. The share of wealth owned by households that are not aware of corporate bonds is approximately 20%, and so is the share owned by those unaware of mutual funds. In 1995, the households that were unaware of investment accounts owned 40% of

This paper studies the implications of such limitations by introducing unawareness into a market environment with imperfect competition and asymmetric awareness. Specifically, we consider a setting with a finite number of financial intermediaries and investors. Each investor (she) wants to invest her savings and delegates the task of picking the right product to a financial intermediary (he). The return and risk of the different investment options depend on the state of the economy. After the delegation choice is made, intermediaries receive additional information about the realized state of the economy and, hence, about the suitability of each of the investment option. However, the intermediaries' preferences are not aligned with those of the investors, e.g. due to financial professionals being less risk averse, having limited liability, having different liquidity needs, etc. As a result, investors face a tradeoff between granting flexibility to the intermediary in order to exploit the intermediary's private information and precluding the intermediary from taking biased decisions.

A key feature in our model is that intermediaries not only have private information about the suitability of the different investments but also about the set of investment opportunities that are actually available to investors. This second dimension of asymmetry is captured by the assumption that investors are only *partially aware of the feasible investment products* and can only invest in options of which they are aware.

To capture some salient features of financial markets, such as over-the-counter trading, we assume that competition between intermediaries is limited and follow a search-based approach: meetings are bilateral and investors are matched with either one or two intermediaries. Intermediaries can expand the awareness of the investor they meet by revealing additional investment opportunities. However, they face uncertainty about whether the investor simultaneously meets with a second intermediary. In this event, the investor learns from the disclosure of both intermediaries but contracts with only one of them. We assume that the investor chooses the intermediary that discloses more options, which implies that intermediaries compete for investors via the menu of investments they propose.

We characterize the market equilibrium in this setting and show that intermediaries tend

the total wealth (the fraction decreased to 32.5% in 1998).

to leave investors unaware of investment options with moderate features (e.g. products with intermediate risk). Since investors care about the intermediaries' information, the lack of availability of intermediate investment options makes it optimal for investors to allow more extreme products. As a consequence, intermediaries can invest in financial products that would be precluded if investors were fully aware. The extent to which investors remain unaware in equilibrium depends on the degree of competition intermediaries face. The higher is the probability that investors meet more than one intermediary, the more investment options (in a stochastic sense) are disclosed in equilibrium. For intermediate degrees of competition, markets are polarised, with some intermediaries disclosing all available investments and others leaving investors unaware of a significant number of moderate options. We also show that unawareness is exacerbated in times of economic downturns.

Next, we consider the spillover effects between investors who differ with respect to their initial awareness. We show that when gains from intermediation are sufficiently large for intermediaries to make positive profits with all types of investors, the presence of sophisticated, fully aware types leads to more disclosure of investment options in equilibrium, thereby generating a positive externality on investors with lower levels of awareness. On the other hand, when investing on behalf of sophisticated investors is not profitable, increasing the share of such investors actually reduces the extent to which intermediaries reveal additional investments in equilibrium. Sophisticated investors thus impose a negative externality on investors with limited awareness and cross-subsidization between the different types of investors obtains in equilibrium.

In the empirical section, we report the regression results based on self-reported data collected through an online survey we constructed. The data consists in approximately 1,400 investors reporting their experience in the retail investment sector during the years 2007-2017. We regress both the number of products offered and a measure of perceived 'extremeness' in the menu of products the investor received from the financial intermediary on an index of knowledge. The index is based on 17 questions eliciting investors' knowledge of the financial market and of the products available in the market. Consistent with the theory, our knowledge index is positively associated with the number of products offered and negatively associated with our measure of extremeness of the offered menu. These findings are robust to introducing several controls, including proxies for the naivity of the investor, his/her wealth, income, education, and his/her self-reported propensity to take risk or to invest in long-term maturity assets.

Finally, we discuss the policy implications of our findings. Clearly, promoting financial literacy among investors improves their welfare in our model. Interestingly though, our results show that it is not necessary to educate investors about all possible investment options. Instead, we observe that making investors aware of *a single product* may give intermediaries incentives to reveal several other products as well. We therefore have an interesting complementarity between the regulator and the market, suggesting a surprisingly simple, yet powerful, policy intervention. Moreover, in terms of optimal financial literacy policies, we find that a soft training provided to a relatively large fraction of individuals is typically more effective than training intensively a small fraction of potential investors. Partially trained investors are more attractive to intermediaries than fully sophisticated ones and therefore induce intermediaries to compete against each other more fiercely. The competitive effect leads to a shift in the equilibrium awareness distribution, ultimately generating positive spillovers on the investors that remain unaware.

Related Literature: This paper is related to different strands of literature. It builds on the work on optimal delegation, initiated by Holmström (1978) and developed further by Melumad and Shibano (1991); Martimort and Semenov (2006); Alonso and Matouschek (2008); Kováč and Mylovanov (2009); Armstrong and Vickers (2010); Amador and Bagwell (2013), among others. None of them consider limited awareness in this framework. Furthermore, our work is related to a relatively small literature on contract theory and unawareness. In contrast to our setting, existing work has focused on contracting problems where contingent transfers are feasible (e.g., Von Thadden and Zhao (2012) and (2014); Zhao (2011); Filiz-Ozbay (2012); Auster (2013)). The contracting model in this paper is a simplified version of the one in Auster and Pavoni (2020), where we introduces unawareness to the delegation problem of a monopolistic principal. Lei and Zhao (2020) adapt this framework to study delegation between a financial expert and an investor, who is unaware of possible contingencies.

This paper is also related to the literature on financial intermediation, which often sees banks as 'efficient brokers' who reduce transaction and information costs. The information based brokerage role of financial intermediaries has been studied by many authors starting from Leland and Pyle (1977); Ramakrishnan and Thakor (1984); Diamond (1984); Allen (1990). Empirical evidence on financial intermediaries' misbehaviour from the US retail investment market include Mullainathan et al. (2012) and Woodward and Hall (2012). Guiso et al. (2017) and Foà et al. (2019) use administrative data from the Italian Credit Register and Survey on Loan Interest Rates and document that Italian Banks provide distorted advice at the moment of counselling households between fixed and adjustable rate mortgages. Evidence from the UK includes Sane and Halan (2017). Since our empirical investigation is based on the theoretical model in this paper, we focus on different aspects of the bank-investor relationship from those emphasized in earlier works. In particular, we study the relationship between the richness and extremity of the menu of products offered by the financial intermediary and the knowledge of the investor about financial products.

Finally, our paper is related to the literature on financial literacy. We already mentioned the work by Guiso and Jappelli (2005). Other works study the implications of financial literacy on portfolio diversification or on market participation of the investors (e.g., Van Rooij et al. (2011) and Garcia (2008)).

The paper is organized as follows. The next section presents the model. In Section 3 we characterize the equilibrium and consider the effect of competition intensity and investor heterogeneity. Section 4 is devoted to the empirical analysis and Section 5 concludes with a few policy implications.

2 Environment

We consider a model of imperfect competition that is based on the work of Burdett and Judd (1983). There are N intermediaries, indexed by $n = 1, 2, ..., N$, and many investors. Meetings between investors and intermediaries are bilateral, but investors can meet simultaneously more than one intermediary. For simplicity, we assume that a fraction of investors is matched with one intermediary, while the remaining investors are matched with two. We refer to investors that have access to only one intermediary as captive. Whether an investor is captive or non-captive is not observable to the intermediaries. Instead, from the viewpoint of an intermediary, conditional on meeting a particular investor, the investor is non-captive with some probability, denoted by π. The parameter π can be viewed as a measure of competitiveness in the market: if $\pi = 0$, intermediaries act as monopolists; if $\pi = 1$, they engage in Bertrand competition. We assume that intermediaries have no capacity constraints and can therefore focus on one representative investor.

Intermediaries have access to a set of investment products, which differ according to their attributes such as riskiness, liquidity, maturity, etc. We assume that the different dimensions can be aggregated to a single index $y \in [y_{min}, y_{max}]$.[3] The return of each investment y depends on the state of the world. Let $\Theta = [0, 1]$ be the set of states and let $F(\theta)$ denote the cumulative distribution function on Θ, assumed to be twice differentiable on the support.[4]The realisation of the state of the world will be privately observed by the intermediaries. Investors and intermediaries have von-Neumann-Morgenstern utility functions that take the quadratic form

$$u(y, \theta) = -(y - \theta)^2 \quad \text{and} \quad v(y, \theta) = -(y - (\theta - \beta))^2.$$

The intermediary's preferred policy is $y = \theta$, while the investor's preferred policy is $y = \theta - \beta$. We assume $\beta > 0$, hence the intermediary has an upward bias of size β. We view the bliss point to be the investment opportunity which generates the best combination

[3]The restriction to a single dimension is in line with the literature on optimal delegation. Note further that if the principal's choice is multi-demsional and the objective function is additively separable and identical across the different choice dimensions, then the optimal contract under full awareness replicates the solution of the one-dimensional problem on each dimension, as Koessler and Martimort (2012) show.

[4]For $\theta = 0$ and $\theta = 1$, this condition holds for, respectively, the right and left derivative.

between risk, illiquidity, and return as a function of the state. The divergence between the investor's and intermediary's bliss point can be interpreted as financial professionals being less risk averse, having limited liability, having different liquidity needs, etc. If, for instance, intermediaries are less risk-averse than the investor, we can interpret low values of y in $[y_{min}, y_{max}]$ as relatively safe investments and high values of y as relatively risky ones. Under this interpretation the investor chooses from different portfolios on the mean-variance efficient frontier, trading off higher expected return against larger risk. The state of the economy determines the position of the mean-variance frontier and therefore the optimal combination of expected return and risk for the investor. The intermediary learns what this combination is, however, conditional on each θ, he prefers an investment with strictly higher expected return and risk than the investor.

Intermediaries are aware of all investment options in $[y_{min}, y_{max}]$, but the investor is not. She is aware of a strict subset $Y^P \subset [y_{min}, y_{max}]$. We assume that Y^P is closed but impose no restrictions otherwise. Upon meeting the investor, an intermediary has the possibility to disclose additional investment products. The investor fully understands the investment opportunities that are revealed to her and updates her awareness to the union of the set of newly revealed investment products and her initial awareness set.

The investor wants to hire one of the intermediaries to invest on her behalf. Having chosen an intermediary, the investor specifies a set of investment products from which the intermediary can choose once he observes the state of the world. In other words, the investor delegates the investment decision to the intermediary but imposes some constraints on the intermediary's choice.[5] After the intermediary observes the state of the world, he chooses the investment from the delegation set that maximizes his own payoff given his information. The intermediaries' outside option is denoted by $\overline{U}$.

[5]The problem of optimal delegation was first described by Holmström (1978) and has been studied extensively in the literature. The distinguishing feature is that contingent transfers are not available. Formally, the investor commits to a mechanism that specifies the product which will be implemented as a function of the intermediary's message. Alonso and Matouschek (2008) show that this contracting problem is equivalent to delegating a set of products from which the investor can choose freely after observing the state of the world. Their argument continues to hold in our setting.

Given her updated awareness, the investor chooses a delegation set. We assume that the investor can only delegate investment products that she can name explicitly. Hence, the delegation set must be a subset of the investor's updated awareness set. We further assume that if the investor meets with two intermediaries, she chooses the intermediary that discloses more investment products. More specifically, if the set revealed by one intermediary is a strict subset of the set revealed by the other, the investor chooses the latter, and vice versa. If both intermediaries offer the same set of investments or if the sets cannot be ordered by inclusion, the investor chooses either intermediary with equal probability.

The timing of the game can be summarized as follows:

1. The investor is matched with a set of intermediaries $\mathcal{N}$ (where the cardinality of $\mathcal{N}$ is either one or two).

2. Intermediary $n \in \mathcal{N}$ reveals a set of investment products $X_n \subseteq [y_{min}, y_{max}]$.

3. The investor updates her awareness to $Y = \left(\bigcup_{n \in \mathcal{N}} X_n\right) \cup Y^P$.

4. The investor chooses an intermediary in $\mathcal{N}$ and a delegation set $D \subseteq Y$.

5. The selected intermediary observes the state of world θ and chooses an action $y \in D$.

6. Payoffs are realized.

3 Equilibrium Analysis

Having fixed the investor's selection strategy between intermediaries, a symmetric equilibrium is defined by three components. The intermediaries' (random) disclosure strategy is a probability distribution H over the set of closed subsets of $[y_{min}, y_{max}]$, denoted by $\mathcal{Y}$. The investor's delegation strategy, $D : \mathcal{Y} \to \mathcal{Y}$, assigns a delegation set to each updated awareness set. An intermediary's investment policy $y(D, \theta)$ describes an agent's action when the realized state is θ and the agent can choose from actions in D. A symmetric subgame perfect equilibrium is a tuple (H, D, y) such that:

- each disclosure set in the support of H maximizes an intermediary's expected payoff, given that other intermediaries randomise according to H;
- for all $Y \in \mathcal{Y}$, $D(Y)$ solves the problem

$$\max_{D \subseteq \mathcal{Y}} \mathbb{E}[v(y(D,\theta),\theta)];$$

- for all $D \in \mathcal{Y}$, we have $y(D,\theta) = \arg\min_{y \in D} |y-\theta|$.

Throughout the analysis, we will adopt a couple of regularity conditions on the distribution that are common in the delegation literature. Furthermore, we will assume that in each state of the world both the investor's and the intermediary's ideal products are available.[6]

Assumption 1. *$f'(\theta)\beta + f(\theta) > 0$ for all $\theta \in (0,1)$; and $\mathbb{E}[\theta - \beta] > 0$.*[7]

Assumption 2. *$y_{min} < -\beta$ and $y_{max} > 1$.*

We start the analysis by first describing the benchmark case of full awareness, $Y^P = [y_{min}, y_{max}]$. When the investor is fully aware of all feasible investment options, an intermediary's choice of disclosure has no effect on the delegation set the investor chooses. Provided that intermediation is profitable, this means that in equilibrium each intermediary $n = 1, 2, ..., N$ will reveal the set of all available investment products, that is, $X_n = [y_{min}, y_{max}]$. If matched with two intermediaries, the investor picks either intermediary with equal probability and chooses the optimal delegation with respect to full awareness. The existing literature shows that if the density function $f(\theta) \equiv F'(\theta)$ satisfies the first regularity condition in Assumption 1, the optimal delegation set in this case is an interval of the form $[y_{min}, \hat{y}]$ (Martimort and Semenov, 2006, and Alonso and Matouschek, 2008). The second condition in Assumption 1 guarantees that $\hat{y} > 0$ and solves:[8]

[6] The sole purpose of the latter assumption is to reduce the number of cases we need to distinguish.

[7] All expectations are taken with respect to F.

[8] Otherwise, the optimal delegation set is $[y_{min}, \mathbb{E}[\theta - \beta]]$. In this case however, the intermediary will choose the upper bound of the set for all θ, so it is effectively the singleton $\{\mathbb{E}[\theta - \beta]\}$. Hence, delegation is valuable if and only if $\mathbb{E}[\theta - \beta] > 0$.

$$\hat{y} = \mathbb{E}[\theta - \beta | \theta \geq \hat{y}]. \tag{1}$$

Given this delegation set, the intermediary chooses his preferred product $y = \theta$ for all $\theta < \hat{y}$ and the product $\hat{y}$ in all remaining states. The investor effectively imposes an upper cap on the intermediary's choice. For instance, the investor might allow the intermediary to choose from all investments that are less risky than a certain threshold.

Delegation choice. If the investor remains unaware of some products in $[y_{min}, y_{max}]$, she must find the best delegation set within her awareness. In Auster and Pavoni (2020) we show that under Assumptions 1 and 2, the optimal delegation set can be described by a threshold below which all products in the investor's awareness are permitted—just like in the case with full awareness. Moreover, the optimal threshold is the investment product in the investor's awareness that is closest to the optimal threshold under full awareness, $\hat{y}$. The optimal delegation set is thus described by

$$\left\{ y \in Y : y \leq \arg\min_{y' \in Y} \{|y' - \hat{y}|\} \right\}.$$

Given the limits of her awareness, the investor chooses the closest approximation of the optimal delegation interval under full awareness. When the investor is aware of $\hat{y}$, this approximation consists of all products in the investor's awareness that are weakly smaller than $\hat{y}$. If the investor is unaware of $\hat{y}$, she uses as a threshold the closest product to $\hat{y}$ in her awareness set. In this case, the investor permits all products smaller than $\hat{y}$ and at most one product greater than $\hat{y}$.

Disclosure Choice Next we turn to the question of which investment products intermediaries want to reveal. For the case where intermediaries act as monopolists competition ($\pi = 0$), we show in our previous work that an intermediary optimally induces an awareness set of products that has a symmetric gap around the optimal threshold under full awareness,

$\hat{y}$:

$$Y^*(\Delta) \equiv [y_{min}, \hat{y} - \Delta] \cup [\hat{y} + \Delta, y_{max}],$$

with $\Delta \geq 0$. In other words, the intermediary optimally discloses investment products at the extreme (e.g. very risky and very safe options) but leaves the investor unaware of intermediate ones. The investor's initial awareness imposes constraints on the set of awareness sets an intermediary can induce. Letting $\bar{\Delta}(Y^P) \equiv \min_{y \in Y^P} |y - \hat{y}|$ be the distance between $\hat{y}$ and the closest product in Y^P to $\hat{y}$, an intermediary facing an investor with initial awareness set if Y^P can choose an awareness sets of the form $Y^*(\Delta)$, provided that $\Delta \leq \bar{\Delta}(Y^P)$ holds.

We now show that disclosing a set of actions parametrised by Δ is also a best response when intermediaries face competition.

Proposition 1. *Let Assumptions 1 and 2 be satisfied. Disclosing a set of the form* $Y^*(\Delta), \Delta \geq 0$ *constitutes a best response for intermediaries.*

Proposition 1 states that—not matter what other intermediaries disclose—and intermediary's best response is always described by a set that is parameterised by a gap parameter Δ. Since the investor permits all investment products smaller than the closest product to $\hat{y}$, an intermediary revealing a set that contains a product whose distance to $\hat{y}$ is Δ weakly prefers to disclose products with a distance greater than Δ: products greater than $\hat{y} + \Delta$ will not change the delegation set, products below $\hat{y} - \Delta$ will be permitted and thus expand the intermediary's choice.

Remark 2: *A natural question is whether the investor, even if unaware of an interval* $(y^* - \Delta, y^* + \Delta)$*, could replicate investment products in that interval by diversifying her investment across different products within her awareness. For instance, if* y *captures the riskiness of the different investment options, an investor who is aware of* $y^* - \Delta$ *and* $y^* + \Delta$ *might generate intermediate levels of risk by investing parts of her savings in* $y^* - \Delta$ *and others in* $y^* + \Delta$*. Notice, however, that the Markowitz frontier describing the efficient com-*

binations in the risk-return spectrum is typically viewed to be concave, implying that the expected return associated to the investment generated as a convex combination of $y^* + \Delta$ and $y^* - \Delta$ will fall below the efficient frontier. Moreover, portfolios of products are often "lumpy," which further imposes restrictions on investors' abilities to diversify. For example, many securities and funds, in particular mutual funds, require a sizable minimum investment. Finally, riskiness is just one of many interpretations applicable to our model. The value of y might, for instance, capture the term to maturity of the investment. Clearly, splitting up the investment into short and long term funds will not replicate an investment option with an intermediate maturity date. Thus, in most situations unawareness will impose important restrictions on the payoffs an investor can achieve.

Given that the investor picks the intermediary that reveals more options, it follows that intermediaries compete over awareness gaps: a smaller value of Δ increases an intermediary's chances of attracting the investor. We define

$$U(\Delta) \equiv -\int_{\hat{y}-\Delta}^{\hat{y}} (\hat{y} - \Delta - \theta)^2 f(\theta)\mathrm{d}\theta - \int_{\hat{y}}^{1} (\hat{y} + \Delta - \theta)^2 f(\theta)\mathrm{d}\theta$$

as the intermediary's conditional payoff when being selected by the investor whose awareness set is $Y^*(\Delta)$. The following lemma establishes some properties of the function $U(\cdot)$.

Lemma 2. *Let Assumptions 1 and 2 be satisfied. The function $U(\cdot)$ is strictly concave on its domain and its unique maximizer, denoted by Δ^{opt}, is strictly positive.*

Lemma 2 shows that—ignoring the constraint imposed by the investor's initial awareness—an intermediary benefits from leaving the investor unaware of an interval of products. Moreover, the optimal size of the awareness gap is uniquely determined.

3.1 Equilibrium Characterization

Let $H(\Delta)$ denote the equilibrium probability with which an intermediary chooses an awareness set parametrised by a value smaller than Δ. An intermediary's expected payoff from disclosing set $Y^*(\Delta), \Delta \leq \bar{\Delta}(Y^P)$ is given by:

$$(1 - \pi H(\Delta))U(\Delta) + \pi H(\Delta)\overline{U}. \tag{2}$$

The probability that the investor meets a second intermediary who discloses a larger set than $Y^*(\Delta)$ is $\pi H(\Delta)$. In this event the intermediary obtains his outside option. With the complementary probability, the intermediary is able to attract the investor. The investor's updated awareness set is then $Y^*(\Delta)$ and the intermediary's conditional expected payoff is $U(\Delta)$. Let $\Delta^* \equiv \min\{\Delta^{opt}, \bar{\Delta}(Y^P)\}$ be the gap parameter that maximizes an intermediary's payoff conditional on being selected by an investor—the monopoly solution. We assume $U(\Delta^*) > \bar{U}$ so that intermediation is profitable, at least for some feasible values of Δ.

A simple undercutting argument implies that H has no atoms on $(0, \bar{\Delta}(Y^P)$. If intermediaries were to choose a strictly positive value of Δ with strictly positive probability, an awareness set with a slightly smaller gap would lead to a discrete increase in the probability of attracting the investor and thus to a strict increase in the intermediary's expected payoff. Hence, in equilibrium intermediaries either disclose everything ($\Delta = 0$) or randomise over a continuum of values of Δ. We show the following.

Proposition 3. *Let Assumptions 1 and 2 be satisfied and let $\underline{\pi}, \overline{\pi} \in [0, 1]$. There exists an equilibrium, characterized by H^*, with the following properties:*

- *if $\pi \leq \underline{\pi}$, the support of H^* is $[\Delta', \Delta^*]$ for some $\Delta' \geq 0$;*
- *if $\underline{\pi} < \pi \leq \overline{\pi}$, the support of H^* is $\{0\} \cup [\Delta', \Delta^*]$ for some $\Delta' > 0$;*
- *if $\overline{\pi} < \pi$, the support of H^* is $\{0\}$.*

We have $\underline{\pi} = \overline{\pi} = 1$ if $U(0) \leq \overline{U}$ and $0 < \underline{\pi} < \overline{\pi} < 1$ otherwise.

Proof. See Appendix A.3. □

Proposition 3 shows that if $U(0) > \overline{U}$, so that intermediation is profitable even when the investor is fully aware, there are three parameter regions to be distinguished. If the degree of competition is sufficiently small, then intermediaries choose awareness gaps parameterized

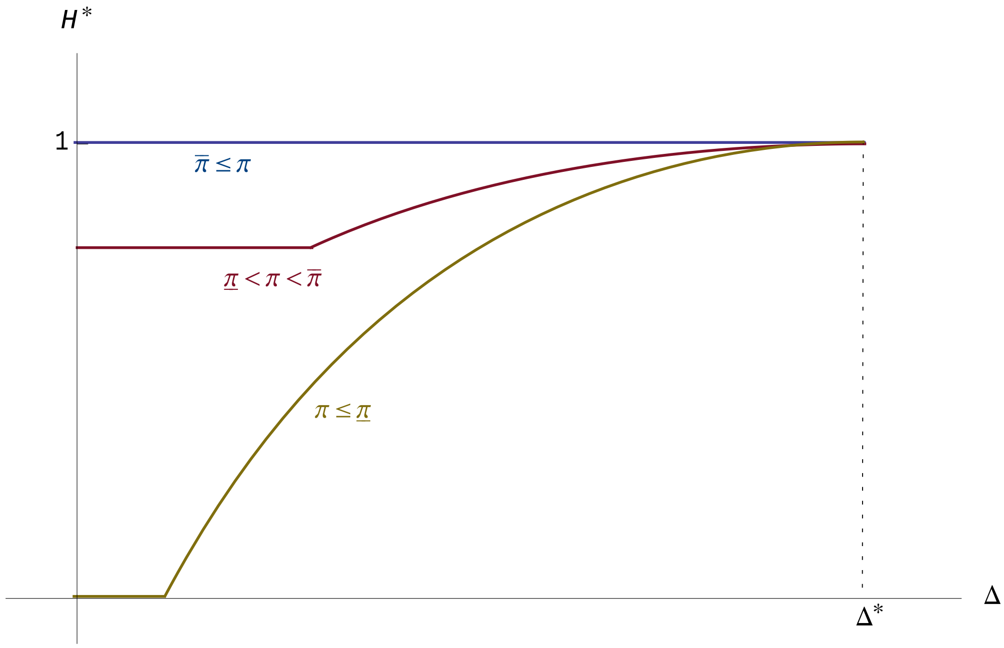

Figure 1: Equilibrium distribution H^* under imperfect competition. The figure displays three possible equilibrium distributions H^* over awareness gaps Δ.

by values of Δ in the interval $[\Delta', \Delta^*]$. As we show in the proof of Proposition 3, the lower bound of this interval is strictly decreasing in the competition parameter π. At the threshold $\underline{\pi}$, we have $\Delta' = 0$, implying that intermediaries randomize over all values of Δ in the interval $[0, \Delta^*]$. When π increases further we observe polarization: there is a strictly positive probability that intermediaries disclose everything ($\Delta = 0$), while otherwise they leave the investor unaware of a significant part of the available investment opportunities. The probability that intermediaries reveal everything increases in the parameter π, up to the point where this probability is one, which happens at the second threshold $\overline{\pi}$. For all values of π greater than this threshold, the investor is made fully aware in equilibrium. Figure 1 depicts the equilibrium distribution for the different regimes of π. When $U(0) < \overline{U}$ only the first parameter region exists, that this, intermediaries always leave the investor unaware of some products.

Key prediction. How much intermediaries reveal in equilibrium depends on the initial awareness of the investor. In particular, it depends on the closest product to $\hat{y}$ in the investor's awareness. Starting from an awareness set Y^P, the monopoly solution Δ^* becomes (weakly) smaller as investment options are added to Y^P. When there is competition, the monotonicity still holds in a stochastic sense, as the following proposition shows.

Proposition 4. *Let Assumption 1 and 2 be satisfied and let $Y_1^P \subset Y_2^P$. The equilibrium distribution $H^*(\,\cdot\,; Y_1^P)$ first-order stochastically dominates $H^*(\,\cdot\,; Y_2^P)$.*

Proof. See Appendix A.4. □

When faced with an investor who is aware of fewer products, the intermediary has more to gain by leaving the investor unaware of more intermediate investment options. Hence, an investor who has little knowledge of the financial market—in particular, is unaware of most investment options—is likely to be offered few and rather extreme investments by the intermediary. In Section 4, we provide empirical support for this prediction.

Other comparative statics. The equilibrium distribution of induced awareness sets not only depends on the investor's initial awareness but also on the degree of competition in the market and the intermediary's outside option. The discussion following Proposition 3 suggests that competition promotes awareness. In fact we can show that equilibrium awareness is stochastically monotonic in the competition parameter π.

Proposition 5. *Let Assumption 1 and 2 be satisfied and let $0 \leq \pi < \pi' \leq 1$. The equilibrium distribution $H^*(\,\cdot\,; \pi)$ first-order stochastically dominates $H^*(\,\cdot\,; \pi')$.*

Proof. See Appendix A.5. □

In our environment, the disclosure of available investment opportunities is an instrument to compete for costumers. As the probability of meeting a second intermediary π increases, competition gets tougher and the equilibrium distribution H^* becomes more concentrated towards small awareness gaps. When $U(0) > \bar{U}$ and competition is sufficiently intense, there is a positive probability with which intermediaries disclose everything. In particular, if $\pi \geq \bar{\pi}$, market competition generates full awareness.

An interesting question is how the extent to which investors are left unaware of certain investment opportunities varies over the business cycle. In our framework the state of the economy might be captured by the profitability of investments: when the economy is doing well, financial market investments yield particularly high returns, some of which are appropriated by the financial intermediaries. In our model, we thus interpret good times as an upward shift of $U(\Delta)$ relative to $\overline{U}$. In Corollary 6 we show that as the difference between $U(\Delta)$ and $\overline{U}$ increases, the equilibrium distribution H^* shifts towards smaller values of Δ, as illustrated in Figure 2. That is, when the gains from intermediation increase, investors become aware of more investment opportunities in equilibrium. Intuitively, as the value of attracting an investor becomes larger, competition for investors increases and this results in smaller awareness gaps. Vice versa, when times are bad and gains from intermediation are small, intermediaries worry less about loosing investors to competitors and hence behave more predatory. Our model thus suggests that in bad times we will observe more banks taking advantage of costumers by hiding certain investment opportunities than in good times.

Proposition 6. *Let Assumption 1 and 2 be satisfies and let* $\overline{U}' < \overline{U}$*. The equilibrium distribution* $H^*(\,\cdot\,;\overline{U}')$ *first-order stochastically dominates* $H^*(\,\cdot\,;\overline{U})$*.*

Proof. See Appendix A.6. □

3.2 Heterogenous Investors

Thus far we have assumed that investors are equally sophisticated. In reality, investors vary widely in their financial literacy, which gives rise to the question of how intermediaries optimally act when they face heterogenous investors and whether the presence of more sophisticated investors is beneficial or detrimental to the welfare of the less sophisticated ones.

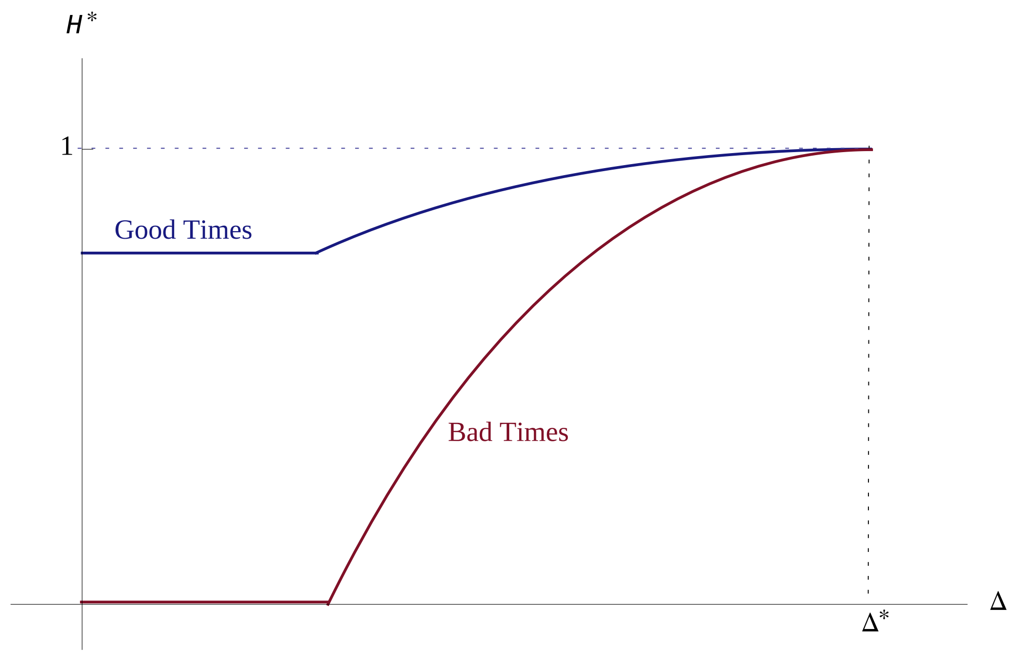

Figure 2: Equilibrium awareness in good and bad times. The figure displays two possible equilibrium distributions H^*, showing that awareness is procyclical. When the average profits per customer increase competition becomes tougher, increasing investors' awareness.

To address these questions in the simplest fashion, we assume that there are two types of investors, more sophisticated ones that are aware of all investment opportunities and less sophisticated ones that are unaware of some. We denote the fraction of sophisticated investors by μ and assume that each investor is privately informed about her type. Upon meeting an investor, an intermediary is then confronted with two unknowns. He does not know whether the investor has access to the second intermediary and he does not know the investor's level of awareness. If the investor is fully aware, she delegates the interval $[0, \hat{y}]$, no matter what the intermediary reveals. Nevertheless, she still rewards an intermediary for disclosure by choosing the one that reveals more. If the investor is unaware of some alternatives, everything remains as above.

We show that our equilibrium characterization for the homogenous case in Proposition 3 continues to hold when investors are heterogenous (see Appendix A.3). In particular, intermediaries choose an awareness gap Δ so as to solve the tradeoff between increasing the probability of attracting the investor and maximizing the payoff with the unaware type. An intermediary's expected payoff as a function of Δ is now given by

$$(1-\pi H(\Delta))[\mu U(0)+(1-\mu)U(\Delta)]+\pi H(\Delta)\overline{U}. \tag{3}$$

We assume $\mu U(0)+(1-\mu)U(\Delta^*)>\bar{U}$, so that *on average* intermediaries make positive profits for some values of Δ.

The equilibrium distribution of Δ depends on the distribution of awareness among investors. The following proposition shows that whether an increase in the fraction of sophisticated investors leads intermediaries to disclose more or less investment opportunities in equilibrium depends on the profits they make with those investors.

Proposition 7. *Let Assumption 1 and 2 be satisfied and let* $0\leq\mu<\mu'\leq 1$. *If* $\overline{U}\leq U(0)$*, the equilibrium distribution* $H^*(\,\cdot\,;\mu)$ *first-order stochastically dominates* $H^*(\,\cdot\,;\mu')$. *If* $\overline{U}>U(0)$*, then* $H^*(\,\cdot\,;\mu)$ *is first-order stochastically dominated by* $H^*(\,\cdot\,;\mu')$.

Proof. See Appendix A.7. □

Whenever an intermediary meets an investor who is aware of all investment opportunities, revealing additional products does not affect the delegation set the investor chooses but increases the probability with which the intermediary is selected. If $\overline{U}\leq U(0)$, intermediaries make weakly positive profits with fully aware investors, thus, conditional on meeting such investor, it is optimal to reveal everything. By implication, the larger the probability an intermediary attaches to that event is, the more attractive disclosing additional products becomes. The presence of *more sophisticated investors in the market consequently leads to more disclosure* and thereby benefits the unaware ones.

Suppose instead that the outside option $\overline{U}$ is greater than $U(0)$, so that intermediaries can make positive profits with unaware investors but not with those that are fully aware. If intermediaries can reject the latter investors, the equilibrium is as if they did not exist. There are, however, situations where it is reasonable to assume that intermediaries cannot avoid negative profits with some types of investors. For example, advising and setting up a contract may imply certain fixed costs. If the investor's type is initially unknown and if the expected profits with fully aware investors do not compensate these costs, intermediaries make losses with such investors. As long as these losses are compensated by the profits with other investors, intermediaries may still find it worthwhile to enter the market.

In our framework this situation is captured by the specification $U(0) < \bar{U} < \mu U(\Delta^*)+(1-\mu)U(0)$ and the assumption that intermediaries cannot reject any delegation sets. In contrast to the previous case, intermediaries are no longer interested in attracting fully aware investors but would rather have them go to competitors. Proposition 7 shows that in this situation, *a larger share of sophisticated investors leads to more unawareness among the other investors.* Given $U(0) < \underline{U}$, there is no 'full awareness' equilibrium. Instead, intermediaries randomize across an interval of values of Δ bounded away from zero. The losses intermediaries make with sophisticates are compensated with the profits they make with unaware investors. The larger the share of sophisticated investors is, the larger this compensation has to be. Hence, as μ increases, the equilibrium distribution shifts towards higher values of Δ. The presence of sophisticated investors in the market thus reduces awareness and, by implication, welfare of the unsophisticated ones.

The feature that there is unawareness in equilibrium - no matter how intense competition is - with cross-subsidization towards sophisticated investors is reminiscent of the shrouding equilibrium in Gabaix and Laibson (2006). In their work firms hide costly add-ons, which in equilibrium will be purchased by naive customers only.[9]

4 Empirical Analysis

In this section, we aim at bringing some empirical support to the model of delegation with limited awareness.

[9] In contrast to our model, Gabaix and Laibson (2006) consider a market with perfect competition where firms compete over prices and customers have access to all firms.

4.1 Data

The data is based on a 30-40 minutes survey we administered online to Italian retail investors. The survey enquires about their experience with the financial intermediary at the moment of taking the investment decision, which occurred between 2007 and 2017.[10] On top of demographics (such as wealth, income, sex, age, education, occupation, etc.) we elicited some proxies for the investor's cognitive abilities, tastes, and other behavioural factors. The survey also contains several questions regarding the knowledge of the investor about the financial sector and the products available in the market.

Some of the main descriptive statistics are summarised in Table 1. The first column reports the statistics for the full sample. The second column displays the same summary statistics of the data restricting the sample to investors that reported having chosen the financial intermediary because of its geographical proximity or because it was the institution where s/he usually conducted other financial transactions. We consider the latter as a relatively 'exogenous' choice of the intermediary. The last column displays the summary statistics for the sample restricted to investors that declared to have received important shocks (such as divorce, layoff, acquisition of new house, etc ..) that might have triggered the choice to invest or borrow in the first place. We indicate them as 'non-economic triggers' and the main aim here is to exclude investment decisions made mainly for speculative motives.[11] Most variables and statistics are self-explanatory. To construct the dummy variable 'sophistication' the respondent were asked to state wether a discount of 10% over a 600 euro TV was larger, equal, of smaller than a 55 euro discount. The discrete variable 'risk propensity' is obtained from the respondent's reported attitude towards taking risk in exchange for higher returns; the variable 'long term propensity' measures the attitude towards investing a larger fraction of wealth in long term versus short term products. Both these variables take increasing numerical integer values starting from the value of 1 for the entries 'No Risk'

[10] An english translation of the complete survey is reported in the Online Appendix.

[11] Investors subject to 'non-economic triggers' are detected using question S1.10 (*'Did any of the following events happen in the 3-4 months prior to arranging or making your investment?'*), where we excludes from the sample all investors that either did not select any of the listed triggers or indicated triggers S1.10.07 (changed job) or S1.10.12 (changed account provider).

and 'Only Short-Term products', respectively. We also asked the respondents how carefully they compiled the MiFiD form. Italian commercial banks are required to propose such questionnaire to potential investors in order to asses some of the client's characteristics (such as his/her propensity to take risk) and, in principle, should 'modulate' the offer in line with the investor's preferences. An accurately compiled MiFiD might also give important information to the intermediary about the level of knowledge of the investor. The only notable difference regards the distribution of the risk propensity for the 'exogenous choice' subsample. The full sample and the 'non-economic triggers' subsample have similar distributions of such index. Within the 'exogenous choice' subsample instead, the proportion of individuals classified into 'high' or 'very high' risk propensity is much larger compared to the other sample selections, while a much smaller fraction of individual declare to be unwilling to take any risk. Moreover, the individuals in the 'exogenous choice' subsample are on average wealthier and earn more compared to the other samples.

The first panel in Figure 4 in Appendix B reports the distribution of products acquired in our sample. The two most popular products in the sample are mortgages and deposit accounts, followed by personal loans and investment in stocks and shares. These 4 products alone, cover almost 60% of investors.

Dependent variable I: 'Number of Products' The first dependent variable we analyse provides a basic measure of the richness of the menu offered by the intermediaries. In question S1.3, the survey contains a question that elicit an ordered categorical variable on the number of products offered. The distribution of this variable is reported in the sixth entry of Table 1. It includes the following bins: 1 to 5; 5 to 20; 20 to 100; 100 and more.

Dependent variable II: 'Extremeness of the Offer' The variable that aims at measuring the extremeness in the menu of products offered by the intermediary to the investor measures extremeness as perceived by the investor. The variable ranges between 1 and 10 and is the linear aggregation of two discrete variables obtained from questions asking the respondent to indicate how much s/he agrees with the indicated statement. The two statements with associated potential answers are reported below.

I was offered very few products with an intermediate levels of risk and return; I would have liked to see more products of this kind.

Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
O	O	O	O	O

I believe that the intermediary or online interface offered me only "extreme" products: either standard/safe products or very risky/exotic products.

Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
O	O	O	O	O

Knowledge index At the beginning of Appendix B, we list the 17 dummy variables used to construct our index of investor's knowledge of available financial products. In the index, all dummies have equal weight. In the total sample, the index ranges between 0 and 16 with a mean of 5.98 and a standard deviation of 3.25. We divided the variables constituting our index into 5 main categories. In the first category - indicated in the appendix with (P) - we find dummies associated to the investor's 'perception' about his/her knowledge. The second set of variable are indicated with (U) and refer to the investor's self-reported 'understanding' of the financial products; while the variables indicated with (S) capture knowledge obtained from more intensive market 'search' activities. The last two block of variables refer to harder information. The block of variables indicated with (B) refers to the investor's 'background' relevant for financial decisions, while the dummies (T) are obtained by directly 'testing' the knowledge of the investor: they are based on multiple choice questions with only one correct answer out of four.

Table 1: **Main Descriptive Statistics**

Variable		Full Sample N = 1362	Exogenous Intermed. Choice N = 443	Non-Econ. Triggers N=698
Gender (S0.2)	Male	47.06	46.95	47.13
	Female	52.94	53.05	52.87
Education (Distribution %) (S2.3)	Elementary	0.22	0	0.14
	Middle School	6.09	4.97	5.87
	High School	51.25	51.69	49.00
	University	33.26	36.12	34.10
	Master/PhD	9.18	7.22	10.89
Sophistication (S2.12)	Naive	21.15	23.48	23.78
	Sophisticated	78.85	76.52	76.22
Risk Propensity (Distribution %) (S2.28)	No Risk	37.96	5.64	32.66
	Middle Risk	32.42	35.67	31.66
	High Risk	15.35	31.38	20.20
	Very High	6.61	17.83	8.60
	No Answer	7.64	9.48	6.88
Long Term Propensity (Distribution %) (S2.22)	Only Short-Term prod.	13.58	16.25	14.33
	Mostly Short-Term	29.00	30.93	29.94
	Half-Wealth Short-Term	25.26	23.25	26.79
	Mostly Long Term	11.89	12.87	10.74
	Only Long term	2.57	3.16	3.01
	No Answer	17.69	13.54	15.19
Number of Products Offered (Distribution %) (S1.3)	1-5 Products	92.44	93.45	91.69
	5-20 Products	5.87	5.19	6.59
	20-100 Products	0.66	0.45	1.00
	100+ Products	1.03	0.90	0.72
Financial Wealth (Distribution %) (S2.20)	No Wealth	21.29	18.74	20.06
	< 20,000 Euro	18.72	17.83	21.63
	20,000 - 50,000 Euro	16.81	17.16	17.19
	50,000 - 150,000 Euro	16.15	17.38	16.62
	150,000 - 300,000 Euro	8.44	10.16	9.31
	> 300,000 Euro	2.94	4.06	2.87
	No Answer	15.64	14.67	12.32
Year of Purchase (Distribution %) (S1.1a)	2017	19.16	23.93	16.05
	2016	12.70	15.35	12.46
	2015	14.54	15.35	16.33
	2014	13.80	12.64	13.75
	2013	7.20	6.32	7.31
	2012	8.88	8.35	9.89
	2011	3.96	2.03	4.30
	2010	4.41	2.48	4.73
	2009	3.89	3.61	4.58
	2008	1.84	0.68	1.86
	2007	9.62	9.26	8.74
Age (S0.1)	Mean	45.61	46.00	43.82
	Std. Dev.	11.03	11.14	10.29
	Min; Max	26; 90	26; 80	26;75
Income (in Euro) (S0.3.1)	Median	32,000	34,000	30,000
	Std. Dev.	42,730.14	35,072.14	51,673.74
	Min; Max	0; 1,000,000	800; 350,000	0;1,000,000
	No Answ. (%)	25.77	20.3	17.77

Table 2: Number of Products Offered: Full Sample

	(1) No Control Poisson	(2) With Controls Poisson	(3) Controls & Products Poisson	(4) No Controls Ord. Probit	(5) With Controls Ord. Probit	(6) Controls & Products Ord. Probit
KnowIndex_total (Std. Deviations)	0.305***	0.230***	0.189***	0.239***	0.212**	0.186**
	(0.0118)	(0.0152)	(0.0154)	(0.0485)	(0.0660)	(0.0679)
Sophisticated Respondent	0.0167	0.0453	-0.0552	0.0627	0.189	0.123
	(0.0310)	(0.0423)	(0.0430)	(0.130)	(0.186)	(0.192)
Female Respondent		-0.226***	-0.196***		-0.160	-0.142
		(0.0354)	(0.0355)		(0.144)	(0.149)
Financial Wealth (Std. Dev.)		0.102*** (0.0181)	0.0855*** (0.0186)		0.0630 (0.0791)	0.0557 (0.0840)
Risk Propensity (Std. Dev.)		0.224***	0.185***		0.263***	0.244***
		(0.0159)	(0.0163)		(0.0676)	(0.0710)
Long Term Propensity (Std. Dev.)		0.0631*** (0.0153)	0.0729*** (0.0156)		0.00752 (0.0671)	0.00484 (0.0702)
MiFiD Responsiveness (Std. Dev.)		0.0513** (0.0176)	0.0419* (0.0176)		-0.0406 (0.0708)	-0.0554 (0.0726)
Additional Socio-Economic Controls		YES	YES		YES	YES
Year of Purchase		YES	YES		YES	YES
Product Purchased		NO	YES		NO	YES
_cons	1.534***	-0.781*	0.203			
	(0.0277)	(0.321)	(0.344)			
cut1						
_cons				1.525***	3.913**	3.326*
				(0.117)	(1.379)	(1.550)
cut2						
_cons				2.238***	4.741***	4.190**
				(0.136)	(1.387)	(1.556)
cut3						
_cons				2.445***	5.089***	4.551**
				(0.149)	(1.393)	(1.560)
N	1362	868†	868†	1362	868†	868†
adj. R^2						

Standard errors in parentheses

$^{+}p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

4.2 Empirical Findings

Table 2 reports the results of Poisson and ordered Probit regressions where the dependent variable is the increasing category of the number of products offered to the investor.[12] In the first three columns we report the results for the Poisson regressions, while the results of the ordered Probit are reported in the last three columns. Consistently with the main idea of the paper, an investor with higher knowledge receives on average a richer menu. This remains true, even after controlling for a number of variables including the year of purchase, the risk propensity of the investor, the propensity to invest in long term assets, a proxy for his/her level of naivete, and the product acquired. Moreover, male, richer, and more risk loving investors tend to receive a richer menu of products. The results are confirmed in Tables 4, 5, 6 and 7 in Appendix B. Table 4 presents the results of the same exercises as in Table 2 with errors clustered at product level. Although, as expected, in most cases the significance is reduced compared to the baseline specification, it is never lost. In Table 5 we use a 'hard' version of the knowledge index. The hard version of the index is constituted by dummies only belonging to the (B) and (T) blocks, that is, variables that tend to provide harder information on investor's knowledge.[13] Table 6 reports the results for the sample restricted to investors that made an 'exogenous choice' of intermediary as described above. In Table 7, the sample is restricted to investors who had 'non-economic triggers' to investment. By conditioning to the different samples we find no noticeable differences in the empirical results.

Tables 3 reports the results of our main regressions, where the dependent variable is the perceived extremeness of the offer. In all regressions, a higher level of reported knowledge is associated to menus with a lower level of perceived 'extremeness'. The coefficient associated to the total knowledge index is remarkably stable across specifications, including the last column where we control for the type of product purchased. Since we normalized both the dependent variable and the index, a coefficient of -0.25 means that an increase in the

[12]In the Poisson regressions, we associated to each category the number of products resulting from the arithmetic average of the extremes.

[13]Only in the very last column of Table 5 the coefficient associated to (the hard version of) the knowledge index looses significance. While keeping the right sign, in that case, the p-value is 11.8%.

Table 3: Extremeness of Offer (Std. Deviations)

	(1) No Controls	(2) With Controls	(3) Controls & Years	(4) Controls & Products	(5) All
KnowIndex_total (Std. Deviations)	-0.264***	-0.262***	-0.251***	-0.266***	-0.257***
	(0.0261)	(0.0326)	(0.0323)	(0.0324)	(0.0321)
Sophisticated Respondent	-0.256***	-0.207*	-0.198*	-0.190*	-0.186*
	(0.0639)	(0.0853)	(0.0844)	(0.0854)	(0.0848)
Female Respondent		-0.100	-0.0989	-0.105	-0.104
		(0.0718)	(0.0711)	(0.0710)	(0.0706)
Financial Wealth (Std. Dev.)		-0.0463	-0.0314	-0.0286	-0.0170
		(0.0361)	(0.0359)	(0.0359)	(0.0358)
Risk Propensity (Std. Dev.)		0.252***	0.243***	0.249***	0.238***
		(0.0335)	(0.0332)	(0.0336)	(0.0334)
Long Term Propensity (Std. Dev.)		-0.0356	-0.0392	-0.0204	-0.0252
		(0.0329)	(0.0325)	(0.0327)	(0.0324)
MiFiD Responsiveness (Std. Dev.)		0.00627	0.00723	0.0183	0.0197
		(0.0344)	(0.0340)	(0.0341)	(0.0338)
Additional Socio-Economic Controls	NO	YES	YES	YES	YES
Product Purchased	NO	NO	NO	YES	YES
Year of Purchase: 2017			-0.183		-0.121
			(0.133)		(0.136)
Year of Purchase: 2016			0.196		0.192
			(0.145)		(0.146)
Year of Purchase: 2015			0.212		0.208
			(0.143)		(0.145)
Year of Purchase: 2014			0.406**		0.397**
			(0.142)		(0.143)
Year of Purchase: 2013			0.0634		0.0707
			(0.166)		(0.166)
Year of Purchase: 2012			0.0462		0.0209
			(0.152)		(0.152)
Year of Purchase: 2011			-0.0408		-0.0133
			(0.201)		(0.201)
Year of Purchase: 2010			-0.177		-0.167
			(0.196)		(0.195)
Year of Purchase: 2009			0.144		0.119
			(0.205)		(0.205)
Year of Purchase: 2008			-0.169		-0.183
			(0.266)		(0.265)
_cons	0.202***	0.944	0.608	0.444	0.188
	(0.0566)	(0.656)	(0.668)	(0.707)	(0.721)
N	1362	868†	868†	868†	868†
adj. R^2	0.086	0.180	0.206	0.207	0.226

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

knowledge index by one standard deviation reduces the level of extremeness by one fourth of its standard deviation. Furthermore, in all specifications, risk propensity is positively correlated with offer extremeness, while female and more sophisticated investors receive less extreme menus.

In our regressions, in addition to the ones explicitly shown in the tables, we have some recurrent socio-demographic and economic control variables. In particular: age of the respondent and age squared, neither of which is significant; education of the respondent, always negatively correlated with extremeness but not always significantly so; reported income, which is never significant; a series of dummies on the occupation of the respondent, the majority of which result not to be significant. When introducing time dummies we find that, in the year 2014, investment retailers increased the extremeness of their menus.[14]

In Tables 8, 9, 10 and 11 in Appendix B we performed the same robustness exercises as we did for the regressions with the number of offered products. Table 8 reports the results for the errors clustered at the product level and we have no noticeable difference to report compared to the baseline regressions. Table 9 considers the 'hard' version of the index. Although the coefficient decreases compared to the total index and is a bit less stable across specifications, it always remains significantly larger than zero with a p-value of 1% or lower. In Tables 10 and 11 we restrict the sample according to the 'exogenous choice' of the intermediary (Table 10) and the presence of 'non-speculative triggers' to investment (Table 11). Our result are again fully confirmed for the different sample selections.

5 Policy Implications and Conclusion

We studied a financial market with imperfect competition and investors who have limited awareness of the available investment opportunities. We showed that intermediaries may

[14]This year the BCE started the quantity easing program, drastically reducing the spread between Italian and German bonds. Moreover, in Italy, in July 2014 the taxation of capital gains increased from 20% to 26%. In January 2015, the taxation on pension funds almost doubled, from 11% to 20%. These changes (or their expectation of such changes) might have reduced expected net returns, perhaps increasing the investors' propensity towards more risky and less traditional (and/or less liquid) investments.

find it optimal to leave investors unaware of intermediate investment options. We further demonstrated that competition between intermediaries increases awareness in the market and found that the coexistence of investors with different levels of awareness might generate positive or negative externalities on the other agents, depending on the profitability of intermediation with very sophisticated investors. We collected self-reported data from customers in the Italian retail investment sector and found results in line with the predictions of the theoretical model. The menus offered to less knowledgable investors contained fewer products than those offered to sophisticated investors. At the same time, agents with a lower knowledge index perceived more strongly that their menu contained products at the extremes.

The paper has implications for bank regulation and brokerage practices. Assuming that small investors are those more likely to have limited awareness, our results show that, when interacting with such investors, financial professionals may have incentives to eliminate certain investment opportunities so as to induce investments they prefer, such as risky assets. Of course educating investors about available investment options, thereby expanding Y^P, benefits them in our environment. In reality, however, promoting full awareness in that way might not be feasible or might be very expensive.

Our model suggests that there could exist a much simpler and equally effective intervention. We have seen that—apart from the intensity of competition—what determines the final awareness of investors is not the number of investment products of which she is initially aware but rather how close to the optimal cap under full awareness these products are. In our stylized model, it is sufficient that the investor is aware of $\hat{y}$ and intermediaries will make him fully aware. This in turn implies that all a regulator must do is promoting awareness of exactly that product, e.g. by issuing and publicly propagating a financial product with the characteristics of $\hat{y}$. An intermediary will then find it in his best interest to educate the investor about the remaining investment opportunities. It is not crucial however, that the regulator promotes exactly $\hat{y}$. As long as the issued product is relatively close, the set of investment opportunities of which the investor remains unaware is very small, as we illustrate

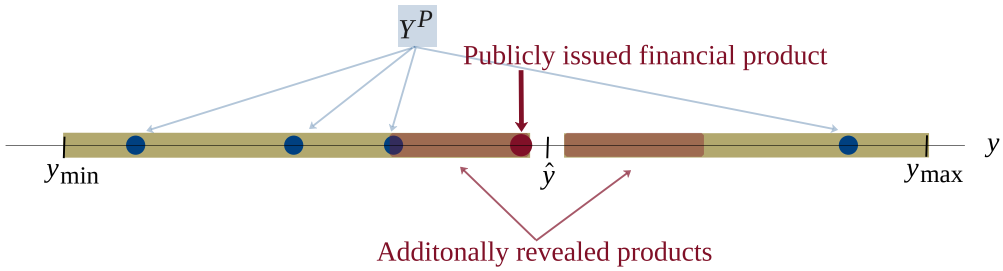

Figure 3: Policy intervention and equilibrium awareness. The yellow area at the extremes represents the equilibrium awareness set when the investor has initial awareness set Y^P, represented by the blue bullets, and intermediaries face no competition ($\pi = 0$). The red subset is added to the yellow set whenever the investor is also aware of the publicly issued financial product indicated by the red bullet near $\hat{y}$.

in Figure 3. Our findings thus point to an important complementarity between the regulator and private actors, suggesting that a relatively simple policy intervention can lead banks to reveal investment opportunities more suitable to the needs of investors. The results of our paper further indicate, that when full awareness for the whole population is unfeasible, the optimal financial training policy is often characterized by a widespread moderate training as opposed to an intensive training policy to a small fraction of potential investors. In particular, consider the equilibrium with competition under the assumption $U(0) < \overline{U}$. Under this specification, trained individuals remain attractive to intermediaries only if they retain some unawareness. Competition for (partially) trained individuals generates then positive spillovers for those that remain unaware, along the lines of Proposition 7.[15] In contrast, an intensive training policy that only affects a fraction of individuals (with, say, full awareness after training) generates a negative market externality on investors with limited awareness.

[15]Let Δ^{tr} be the awareness gap of the trained individuals. The role of $U(0)$ in Proposition 7 is taken by the profit associated to Δ^{tr}. The key requirement for positive spillovers is hence $U(\Delta^{tr}) > \overline{U}$.

References

F. Allen. The market for information and the origin of financial intermediation. *Journal of financial intermediation*, 1(1):3–30, 1990.

R. Alonso and N. Matouschek. Optimal delegation. *The Review of Economic Studies*, 75(1): 259–293, 2008.

M. Amador and K. Bagwell. The theory of optimal delegation with an application to tariff caps. *Econometrica*, 81(4):1541–1599, 2013.

M. Armstrong and J. Vickers. A model of delegated project choice. *Econometrica*, 78(1): 213–244, 2010.

S. Auster. Asymmetric awareness and moral hazard. *Games and Economic Behavior*, 82: 503–521, 2013.

S. Auster and N. Pavoni. Optimal delegation and information transmission under limited awareness. mimeo, 2020.

K. Burdett and K. L. Judd. Equilibrium price dispersion. *Econometrica: Journal of the Econometric Society*, pages 955–969, 1983.

D. W. Diamond. Financial intermediation and delegated monitoring. *The review of economic studies*, 51(3):393–414, 1984.

E. Filiz-Ozbay. Incorporating unawareness into contract theory. *Games and Economic Behavior*, 76(1):181–194, 2012.

G. Foà, L. Gambacorta, L. Guiso, and P. E. Mistrulli. The supply side of household finance. *The Review of Financial Studies*, 32(10):3762–3798, 2019.

X. Gabaix and D. Laibson. Shrouded attributes, consumer myopia, and information suppression in competitive markets. *The Quarterly Journal of Economics*, 121(2):505–540, 2006.

C. Garcia. Financial literacy and portfolio diversification. mimeo, 2008.

C. Garcia. The puzzling, perpetual constancy of safe asset demand. FTAlphavilla, Jan 23, 2012.

K. Gerardi, A. Lehnert, S. M. Sherlund, and P. Willen. Making sense of the subprime crisis. *Brookings Papers on Economic Activity*, pages 69–145, 2008.

L. Guiso and T. Jappelli. Awareness and stock market participation. *Review of Finance*, 9 (4):537–567, 2005.

L. Guiso, A. Pozzi, A. Tsoy, L. Gambacorta, and P. Mistrulli. Distorted advice in financial markets: Evidence from the mortgage market. mimeo, 2017.

B. R. Holmström. On incentives and control in organizations. 1978.

F. Koessler and D. Martimort. Optimal delegation with multi-dimensional decisions. *Journal of Economic Theory*, 147(5):1850–1881, 2012.

E. Kováč and T. Mylovanov. Stochastic mechanisms in settings without monetary transfers: The regular case. *Journal of Economic Theory*, 144(4):1373–1395, 2009.

A. Lei and X. Zhao. Delegation and unawareness. mimeo, 2020.

H. E. Leland and D. H. Pyle. Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*, 32(2):371–387, 1977.

D. Martimort and A. Semenov. Continuity in mechanism design without transfers. *Economics Letters*, 93(2):182–189, 2006.

N. D. Melumad and T. Shibano. Communication in settings with no transfers. *The RAND Journal of Economics*, pages 173–198, 1991.

S. Mullainathan, M. Noeth, and A. Schoar. The market for financial advice: An audit study. Technical report, National Bureau of Economic Research, 2012.

R. T. Ramakrishnan and A. V. Thakor. Information reliability and a theory of financial intermediation. *The Review of Economic Studies*, 51(3):415–432, 1984.

R. Sane and M. Halan. Misled and mis-sold: Financial misbehaviour in retail banks? *Journal of Comparative Economics*, 45(3):429–444, 2017.

M. Van Rooij, A. Lusardi, and R. Alessie. Financial literacy and stock market participation. *Journal of Financial Economics*, 101(2):449–472, 2011.

E.-L. Von Thadden and X. Zhao. Incentives for unaware agents. *The Review of Economic Studies*, 79(3):1151–1174, 2012.

E.-L. Von Thadden and X. Zhao. Multi-task agency with unawareness. *Theory and decision*, 77(2):197–222, 2014.

S. E. Woodward and R. E. Hall. Diagnosing consumer confusion and sub-optimal shopping effort: Theory and mortgage-market evidence. *American Economic Review*, 102(7):3249–76, 2012.

X. Zhao. Framing contingencies in contracts. *Mathematical Social Sciences*, 61(1):31–40, 2011.

Appendix

A Proofs

A.1 Proof of Proposition 1

Consider a general disclosure set Y and let $\tilde{Y} = Y \cup Y^P$. Define $\tilde{\Delta}$ to be the smallest value of Δ such that $\tilde{Y} \subseteq [y_{min}, \hat{y} - \Delta] \cup [\hat{y} + \Delta, y_{max}]$. Clearly, the awareness set $[y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}]$ yields a weakly larger probability for the intermediary to attract an investor. Consider then the intermediary's expected payoff conditional on attracting an investor who also meets the another intermediary. When the investor is sophisticated, she chooses delegation set $[y_{min}, \hat{y}]$, regardless of the intermediary's revelation, hence both disclosure sets yield the same conditional payoff. When the investor is not sophisticated and does not meet a second intermediary, her optimal delegation set given awareness $\tilde{Y}$ is a subset of her optimal delegation set given awareness $[y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}]$. Hence, conditional on this event, the intermediary weakly prefers $[y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}]$ over $\tilde{Y}$. It remains to consider the case where the investor is not sophisticated and meets a second intermediary, revealing set Y. The induced delegation sets from revealing, respectively, $\tilde{Y}$ and $[y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}]$ are then

$$D^*(\tilde{Y} \cup Y) \quad \text{and} \quad D^*([y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}] \cup Y).$$

Towards a contradiction, $D^*(\tilde{Y} \cup Y)$ yields a strictly higher payoff for the intermediary than $D^*([y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}] \cup Y)$. Then there must exist an element $y \in D^*(\tilde{Y} \cup Y)$ that does not belong to $D^*([y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}] \cup Y)$. Suppose this is the case. By Proposition **??** we know that $D^*([y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}] \cup Y)$ includes all products in the interval $[y_{min}, \hat{y} - \tilde{\Delta}]$ and all products in Y weakly smaller than $\hat{y}$. We therefore have $y > \hat{y}$. Proposition **??** further tells us that the optimal delegation set includes at most one product strictly greater than $\hat{y}$. Next, by definition of $\tilde{\Delta}$, the set $\tilde{Y}$ includes a product whose distance to $\hat{y}$ is $\tilde{\Delta}$. This implies that the largest product in $D^*(\tilde{Y} \cup Y)$ is weakly smaller than $\hat{y} + \tilde{\Delta}$, so we have $y \leq \hat{y} + \tilde{\Delta}$. Also, since y belongs to $D^*(\tilde{Y} \cup Y)$, we know that there is no product in Y strictly closer to $\hat{y}$ than y. However, the facts that the distance between y and $\hat{y}$ is smaller than $\tilde{\Delta}$ and that there is no product in Y that is closer to $\hat{y}$ than y imply that y must also belong to $D^*([y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}] \cup Y)$. A contradiction. Hence, the awareness set $[y_{min}, \hat{y} - \tilde{\Delta}] \cup [\hat{y} + \tilde{\Delta}, y_{max}]$ yields a weakly larger expected payoff than $\tilde{Y}$. Choosing an awareness set of the form $[y_{min}, \hat{y} - \Delta] \cup [\hat{y} + \Delta, y_{max}]$ for some $\Delta \geq 0$ therefore constitutes a best response.

A.2 Proof of Lemma 2

Let the intermediary's payoff as a function of Δ be defined by (recall that for $\theta \leq \hat{y}$ the payoff equal is zero):

$$U(\Delta) = -\int_{\hat{y}-\Delta}^{\hat{y}} (\hat{y} - \Delta - \theta)^2 f(\theta)\mathrm{d}\theta - \int_{\hat{y}}^{1} (\hat{y} + \Delta - \theta)^2 f(\theta)\mathrm{d}\theta.$$

The first and second derivative of $U(\Delta)$ are

$$\begin{aligned} U'(\Delta) &= 2\int_{\hat{y}-\Delta}^{\hat{y}} [\hat{y} - \Delta - \theta]\, f(\theta)\mathrm{d}\theta - 2\int_{\hat{y}}^{1} [\hat{y} + \Delta - \theta]\, f(\theta)\mathrm{d}\theta, \quad (4)\\ U''(\Delta) &= -2[1 - F(\hat{y} - \Delta)] < 0. \quad (5) \end{aligned}$$

The function $U(\Delta)$ is strictly concave in Δ. It is easy to see that $U'(\Delta) < 0$ for all $\Delta \geq\equiv 1 - \hat{y}$. Hence, $U(\Delta)$ has a unique maximizer on $[0, 1 - \hat{y})$. Recalling that $\hat{y} = \mathbb{E}[\theta - \beta|\theta \geq \hat{y}]$, the first derivative when evaluated at $\Delta = 0$ can be written as

$$U'(0) = 2[1 - F(\hat{y})]\beta > 0.$$

The derivative is strictly positive, which implies that the maximizer of $U(\Delta)$, characterized by the first-order condition$U'(\Delta) = 0$, is strictly positive.

A.3 Proof of Proposition 3

We will show the statement for the more general case, where a fraction $\mu \in [0, 1)$ of investors is fully aware. Each intermediary chooses a disclosure set parametrised by some Δ in $[0, \bar{\Delta}(Y^P)]$. Let Δ^{**} be the maximizer of $U(\Delta)$, solving $U'(\Delta) = 0$, and define $\Delta^* \equiv \min\{\Delta^{**}, \bar{\Delta}(Y^P)\}$. An intermediary is chosen by an investor if the investor meets no second intermediary or if the second intermediary picked a weakly larger value of Δ. An intermediary's expected payoff conditional on being selected by the investor is thus determined by his choice of Δ. The conditional payoff is increasing on $[0, \Delta^*]$ and, if $\Delta^* < \bar{\Delta}(Y^P)$, decreasing on $[\Delta^*, \bar{\Delta}(Y^P)]$. This implies that the support of H^* is a subset of $[0, \Delta^*]$: offering any $\Delta > \Delta^*$ yields a weakly lower probability of being chosen by an investor and a strictly lower conditional payoff. Standard arguments imply that the equilibrium distribution H^* cannot have any mass points, except possibly at $\Delta = 0$ (Burdett and Judd, 1983). Moreover, if there is some $\Delta' > 0$ that belongs to the support of H^*, all values in the interval $[\Delta', \Delta^*]$ belong to the support as well. Suppose instead there exists an interval $(\Delta_1, \Delta_2) \subset [\Delta', \Delta^*]$ such that Δ_1 belongs to the support of H^* and the values of Δ in the interval (Δ_1, Δ_2) do not. Then choosing an awareness gap parametrized by $\Delta \in (\Delta_1, \Delta_2)$ would yield the same probability of being selected by the investor as Δ_1 but a strictly higher conditional payoff and would, hence, be profitable for the intermediary.

When $\pi = 0$, an intermediary faces no competition and chooses Δ^* so as to maximize his conditional expected payoff. On the other hand, when $\pi = 1$, intermediaries engage in Bertrand competition, hence investors extract all the surplus. If $\bar{U} \leq U(0)$, this implies that intermediaries reveal all products in $[y_{min}, y_{max}]$ with probability one. Otherwise ($\bar{U} > U(0)$) intermediaries choose a disclosure set parametrised by Δ, where Δ solves $\mu U(0) + (1-\mu)U(\Delta) = \bar{U}$. For $\pi \in (0,1)$, we distinguish the following cases:

i.) Consider first the possibility where $H^*(0) = 1$ so that both intermediaries reveal all available products with probability one. Since $\Delta = 0$ maximizes the investors' payoff, any deviating offer will only be accepted if the investor is captive. The best deviating offer is thus characterized by Δ^*. This deviation is not profitable if

$$\pi\bar{U} + (1-\pi)[\mu U(0) + (1-\mu)U(\Delta^*)] \leq \left(1 - \frac{1}{2}\pi\right) U(0) + \frac{1}{2}\pi\bar{U}. \tag{6}$$

If condition (6) is satisfied, the described equilibrium exists. It is satisfied by some value of π if $U(0) \geq \bar{U}$. Assuming $U(0) \geq \bar{U}$ holds, define $\underline{\pi}$ as the value of π satisfying (6) as an equality. Then, condition (6) is satisfied for all $\pi \in [0, \underline{\pi}]$.

ii.) Consider now the possibility where intermediaries choose a non-zero gap with probability one ($H^*(0) = 0$). Then the support of H^* is an interval $[\Delta', \Delta^*]$. Indifference requires that an intermediary's expected payoff is constant across the values of Δ in the interval. Differentiation of (2) yields the following first order conditions:

$$\begin{array}{rclll} (1-\pi H(\Delta))(1-\mu)U'(\Delta) & = & \pi H'(\Delta)(\mu U(0) + (1-\mu)U(\Delta) - \bar{U}) & \text{for} & \Delta > 0; \\ (1-\pi H(\Delta))(1-\mu)U'(\Delta) & \geq & \pi H'(\Delta)(\mu U(0) + (1-\mu)U(\Delta) - \bar{U}) & \text{for} & \Delta = 0. \end{array}$$

Let $\hat{H}(\Delta)$ be the solution of the differential equation defined by the first order condition with border condition $\hat{H}(\Delta^*) = 1$. We obtain

$$\hat{H}(\Delta) = \frac{(1-\mu)U(\Delta) - [\pi\bar{U} - \pi\mu U(0) + (1-\pi)(1-\mu)U(\Delta^*)]}{\pi[\mu U(0) + (1-\mu)U(\Delta) - \bar{U}]}. \tag{7}$$

We further need $\hat{H}(\Delta') = 0$ for some $\Delta' \geq 0$. Since $\hat{H}(\Delta)$ strictly increases in Δ, this requires $\hat{H}(0) \leq 0$, or equivalently:

$$\pi(U(0) - \bar{U}) \leq (1-\pi)(1-\mu)(U(\Delta^*) - U(0)) \tag{8}$$

For $U(0) \leq \bar{U}$, this inequality holds for all π. For $U(0) \geq \bar{U}$ let $\overline{\pi}$ be the value of π at which (8) holds as an equality. Then (8) is satisfied for all $\pi \in [\overline{\pi}, 1]$. In this case, the equilibrium distribution is given by

$$H^*(\Delta) = \begin{cases} 0 & \text{if} \quad \Delta < \Delta' \\ \hat{H}(\Delta) & \text{if} \quad \Delta' \leq \Delta < \Delta^* \\ 1 & \text{if} \quad \Delta^* \leq \Delta \end{cases} \tag{9}$$

with Δ' such that $(1-\mu)U(\Delta') = [\pi\bar{U} - \pi\mu U(0) + (1-\pi)(1-\mu)U(\Delta^*)]$. Deviating to some Δ strictly smaller than Δ' yields the same probability of attracting the investor as Δ' but a strictly lower conditional payoff and is hence not profitable.

iii.) Finally, we consider an equilibrium where $H^*(0) \in (0,1)$. We can first show that the intermediaries' strategy cannot have a mass point at zero and at the same time positive density arbitrarily close to zero. This follows from the fact that an intermediary's probability of being selected by an investor drops discontinuously at $\Delta = 0$ (there is a strictly positive probability that the other intermediary chooses $\Delta = 0$). The support of $H^*(\Delta)$ thus has a gap and is described by $\{0\} \cup [\Delta', \Delta^*]$ for some Δ' strictly positive. On the interval $[\Delta', \Delta^*]$ indifference requires $H^*(\Delta) = \hat{H}(\Delta)$ as before. Moreover, the intermediary must be indifferent between disclosure sets parametrised by Δ' and $\Delta = 0$. That is:

$$\left(1 - \pi\hat{H}(\Delta')\right)[\mu U(0) + (1-\mu)U(\Delta')] + \pi\hat{H}(\Delta')\bar{U} = \left(1 - \pi\frac{1}{2}\hat{H}(\Delta')\right)U(0) + \pi\frac{1}{2}\hat{H}(\Delta')\bar{U} \tag{10}$$

The left hand side is equal to $(1-\pi)[\mu U(0) + (1-\mu)U(\Delta^*)] + \pi\bar{U}$ and thus constant in Δ', while the right hand side is strictly decreasing in Δ'. At $\Delta' = 0$ the left hand side is strictly larger than the right hand side when condition (8) is violated and at $\Delta' = \Delta^*$ the left hand side is strictly smaller than the right hand side when condition (**??**) is violated. Hence, whenever neither of the above equilibria exists, condition (10) has a unique solution on $(0, \Delta^*)$. In that case the equilibrium is characterized by

$$H^*(\Delta) = \begin{cases} 0 & \text{if} \quad \Delta < 0 \\ \hat{H}(\Delta') & \text{if} \quad 0 \leq \Delta < \Delta' \\ \hat{H}(\Delta) & \text{if} \quad \Delta' \leq \Delta < \Delta^* \\ 1 & \text{if} \quad \Delta^* \leq \Delta \end{cases}$$

where Δ' is defined by (10).

A.4 Proof of Proposition 4

Given $Y_1^P \subset Y_2^P$, we have $\bar{\Delta}(Y_1^P) \geq \bar{\Delta}(Y_2^P)$. Let $\Delta_1^* \equiv \min\{\Delta^{**}, \bar{\Delta}(Y_1^P)\}$ and $\Delta_2^* \equiv \min\{\Delta^{**}, \bar{\Delta}(Y_2^P)\}$ denote, respectively, the monopoly solutions for initial awareness sets Y_1^P and Y_2^P. When $\Delta_1^* = \Delta_2^*$, the equilibrium distribution H^* is the same, so we are interested in the case $\Delta_1^* > \Delta_2^*$. Setting $\mu = 0$, we can write (7) as

$$\hat{H}(\Delta) = \frac{U(\Delta) - [\pi\bar{U} + (1-\pi)U(\Delta^*)]}{\pi(U(\Delta) - \bar{U})}. \tag{11}$$

It is easy to see that the right-hand side is decreasing in Δ^*, which implies $H^*(\Delta; \Delta_1^*) < H^*(\Delta; \Delta_2^*)$ for strictly positive values of Δ in the support of $H^*(\Delta; \Delta_1^*)$. It then remains to show $H^*(0; \Delta_1^*) \leq H^*(0; \Delta_2^*)$. When $U(0) \leq \bar{U}$, $H^*(0; \Delta^*) = 0$ for all Δ^*, so the requirement is satisfied. For the case $U(0) > \bar{U}$, consider $H^*(\Delta'; \Delta^*)$ with Δ' determined by (10). The condition pinning down Δ' can be written as

$$(1-\pi)U(\Delta^*) + \pi\overline{U} = \left(1 - \pi/2 \cdot \hat{H}(\Delta'; \Delta^*)\right) U(0) + \pi/2 \cdot \hat{H}(\Delta'.\Delta^*)\bar{U}, \tag{12}$$

The left-hand side is strictly increasing in Δ^* on $[0, \Delta^{**}]$ and independent of $\hat{H}(\Delta'; \Delta^*)$, while the right-hand side is decreasing in $\hat{H}(\Delta'; \Delta^*)$ (recall $U(0) > \bar{U}$) and independent of Δ^*. This implies that an increase in Δ^* must lead to a decrease in $\hat{H}(\Delta', \Delta^*)$ and, hence, that $H^*(0, \Delta_1^*) \leq H^*(0, \Delta_2^*)$ holds, completing the proof. □

A.5 Proof of Proposition 5

For $\pi > \bar{\pi}$, we have $H^*(\Delta; \pi) = 1$ for all $\Delta \geq 0$, so a marginal change in π does not affect the equilibrium distribution. For the case $\pi \leq \bar{\pi}$, we will show that both the function $\hat{H}(\Delta; \pi)$, as specified in (11), as well as $\hat{H}(0; \pi)$ are increasing in π. The first property can be seen by taking the first derivative of $\hat{H}$ with respect to π:

$$\frac{\partial \hat{H}(\Delta; \pi)}{\partial \pi} = \frac{U(\Delta^*) - U(\Delta)}{\pi^2[U(\Delta) - \bar{U}]}. \tag{13}$$

Notice that for all values of Δ in the support of H^* the expected payoff for the intermediary is equal to the payoff at Δ^* and thus equal to $\pi\bar{U} + (1-\pi)U(\Delta^*)$. Since this payoff is strictly greater than $\bar{U}$ for all $\pi < 1$, we have $U(\Delta) > \overline{U}$ for all Δ in the support of H^*, so $\hat{H}$ is increasing in π for positive values of Δ belonging to the support. Next, we consider $H^*(0; \pi)$. Given that for $\pi \leq \underline{\pi}$, $H^*(0; \pi)$ equals zero, what remains to show is that $H^*(0; \pi)$ is increasing on $(\underline{\pi}, \overline{\pi})$. Setting $\mu = 0$, we can solve the intermediary's indifference condition (10) for $U(\Delta')$:

$$U(\Delta';\pi) = \frac{\frac{1}{2}(\pi\overline{U} + (1-\pi)U(\Delta^*))(U(0)+\overline{U}) - U(0)\overline{U}}{\pi\overline{U} + (1-\pi)U(\Delta^*) - \frac{1}{2}(\overline{U}+U(0))}.$$

The first derivative with respect to π is given by

$$\frac{\partial U(\Delta';\pi)}{\partial \pi} = \frac{\frac{1}{4}(U(\Delta^*)-\overline{U})(U(0)-\overline{U})^2}{(\pi\overline{U} + (1-\pi)U(\Delta^*) - \frac{1}{2}(\overline{U}+U(0)))^2} > 0.$$

Since U strictly increases in Δ on $[0,\Delta^{**}]$, it follows that Δ' strictly increases in π. This, together with the fact that $H(\Delta;\pi)$ increases in π and Δ, implies that $H^*(0;\Delta^*) = \hat{H}(\Delta';\pi)$ increases in π. □

A.6 Proof of Proposition 6

To prove the statement we start by showing that $\hat{H}(\Delta)$, as specified in (11), is decreasing in $\overline{U}$. Differentiating $\hat{H}$ with respect to $\overline{U}$ yields:

$$\frac{\partial \hat{H}(\Delta;\overline{U})}{\partial \overline{U}} = -\frac{1}{U(\Delta)-\overline{U}} - \frac{(U(\Delta^*)-U(\Delta))\left(U(\Delta^*)-\overline{U}\right)}{\pi[U(\Delta)-\bar{U}]^2}. \tag{14}$$

As we argue above, we have $U(\Delta) > \bar{U}$ for all positive values of Δ belonging to the support of H^*. This, together with $U(\Delta^*) > U(\Delta) > \overline{U}$, implies that the derivative is negative. Next we need to show that $\hat{H}^*(0;\overline{U})$ is weakly decreasing in $\overline{U}$. It is constant for values of π below $\underline{\pi}$ and above $\overline{\pi}$, so we consider $\pi \in (\underline{\pi},\overline{\pi})$. Rewriting (10) as

$$(1-\pi)U(\Delta^*) + \pi\overline{U} = \left(1-\pi/2\cdot\hat{H}(\Delta')\right)U(0) + \pi/2\cdot\hat{H}(\Delta')\bar{U}, \tag{15}$$

we take the total derivative and obtain

$$\frac{\mathrm{d}\hat{H}(\Delta')}{\mathrm{d}\overline{U}} = -\frac{\pi\,(1-H(\Delta')/2)}{\pi/2\left(U(0)-\bar{U}\right)}. \tag{16}$$

Recalling that for $\pi \in (\underline{\pi},\overline{\pi})$ we have $U(0) > \overline{U}$, the derivative is strictly negative. Hence, $H^*(0;\overline{U})$ is weakly decreasing in μ. □

A.7 Proof of Proposition 7

Consider the derivative of $\hat{H}$ with respect to μ:

$$\frac{\partial \hat{H}(\Delta;\mu)}{\partial \mu} = -\frac{(1-\pi)(U(\Delta^*)-U(\Delta))(U(0)-\bar{U})}{\pi[\mu U(0)+(1-\mu)U(\Delta)-\bar{U}]^2}. \tag{17}$$

Given $U(\Delta^*) > U(\Delta)$ for $\Delta < \Delta^*$, this derivative is positive if $\bar{U} > U(0)$ and negative if $\bar{U} < U(0)$. When $\bar{U} > U(0)$, intermediaries never choose a zero gap. Hence, for $\bar{U} > U(0)$, the property $\partial \hat{H}(\Delta;\mu)/\partial\mu > 0$ is sufficient to prove the claim.

For $\bar{U} < U(0)$, we need to consider a potential mass point at $\Delta = 0$. We want to show that when $\bar{U} < U(0)$ and $\pi \in (\underline{\pi}, \overline{\pi})$, the probability $H^*(0;\mu)$ increases in μ. We can rewrite the intermediary's indifference condition (10) as follows:

$$(1-\pi)[\mu U(0)+(1-\mu)U(\Delta^*)] + \pi\bar{U} = \left(1-\pi\frac{1}{2}\hat{H}(\Delta';\mu)\right)U(0) + \pi\frac{1}{2}\hat{H}(\Delta';\mu)\bar{U}.$$

The left-hand side is decreasing in μ and independent of Δ'. Hence, as μ increases, both sides of the equality must decrease. Since the right-hand side does not depend on μ, this requires that $H(\Delta';\mu)$ increases, as required.

Finally, when $U(0) = \underline{U}$, a change in μ does not affect the equilibrium distribution. $\square$

B Additional Tables and Knowledge Index Variables

In this section, we report some of the the descriptive statistics and a few robustness checks. Before that, we list the 17 variables constituting our 'knowledge index' with a brief description. For each dummy we also indicate the location of the question within the survey.[16]

(P) S1.13: investor reports to be well informed on financial products

(P) S1.44.9: investor says s/he knew what product was best for her/him

(P) S1.44.10: investor reports to knew well the products available on the market

(P) S2.11.15: investor likes to be informed on every option before taking any decision

(P) S1.45.8: investor says s/he did not only consider types of product suggested by others

(U) S1.44.12: investor had no troubles understanding what the products were

(U) S1.44.13: investor understood the terminology in products' description

(U) S1.44.16: investor understood the information on the products offered

(U) S1.52: investor understood all the aspects of the operation

(S) S1.15: investor visited 3 or more institutions

(S) S1.44.6: investor has been searching with care before choosing

(S) S1.47.1: investor independently (from the intermediary) collected information

(B) S1.12.8: investor is a professional in financial sector

(B) S1.12.9: investor attended courses on financial sector

(T) S2.14: investor knows which financial instruments is less liquid

(T) S2.15: investor knows that the return of a financial instrument in foreign currency depends on the exchange rate

(T) S2.16: investor knows what is a derivative product

[16] An english translation of the complete survey is reported in the online appendix.

Figure 4: The figure summarises the average investors' characteristics by products. The first panel reports the distribution of products acquired in our sample. The second panel reports the average index of risk aversion of the investors who purchased the products indicated in the first panel. The index has mean 1.898 and standard deviation 0.924. The third panel reports the average values of the index measuring the attitude of the investor towards investing in long term products. The index has mean 2.524 and standard deviation 1.028. The last panel reports the average values of our knowledge index. The index has mean 5.98 and standard deviation 3.25.

Table 4: Number of Products Offered: Full Sample - Cluster(Product)

	(1) No Control Poisson	(2) With Controls Poisson	(3) Controls & Products Poisson	(4) No Controls Ord. Probit	(5) With Controls Ord. Probit	(6) Controls & Products Ord. Probit
KnowIndex_total (Std. Deviations)	0.305^{*}	0.230^{**}	0.189^{**}	0.239^{*}	0.212^{*}	0.186^{+}
	(0.145)	(0.0700)	(0.0674)	(0.112)	(0.0992)	(0.104)
Sophisticated Respondent	0.0167	0.0453	-0.0552	0.0627	0.189	0.123
	(0.163)	(0.228)	(0.224)	(0.150)	(0.241)	(0.244)
Female Respondent		-0.226	-0.196		-0.160	-0.142
		(0.151)	(0.153)		(0.176)	(0.185)
Financial Wealth (Std. Dev.)		0.102^{*}	0.0855^{*}		0.0630	0.0557
		(0.0466)	(0.0419)		(0.0642)	(0.0666)
Risk Propensity (Std. Dev.)		0.224^{**}	0.185^{***}		0.263^{***}	0.244^{***}
		(0.0717)	(0.0536)		(0.0447)	(0.0446)
Long Term Propensity (Std. Dev.)		0.0631	0.0729		0.00752	0.00484
		(0.0577)	(0.0584)		(0.0578)	(0.0627)
MiFiD Responsiveness (Std. Dev.)		0.0513	0.0419		-0.0406	-0.0554
		(0.0689)	(0.0691)		(0.0595)	(0.0619)
Additional Socio-Economic Controls		YES	YES		YES	YES
Year of Purchase		YES	YES		YES	YES
Product Purchased		NO	YES		NO	YES
_cons	1.534^{***}	-0.781	0.203			
	(0.0976)	(1.057)	(1.113)			
cut1						
_cons				1.525^{***}	3.913^{***}	3.326^{**}
				(0.108)	(1.122)	(1.147)
cut2						
_cons				2.238^{***}	4.741^{***}	4.190^{***}
				(0.126)	(1.121)	(1.145)
cut3						
_cons				2.445^{***}	5.089^{***}	4.551^{***}
				(0.107)	(1.134)	(1.149)
N	1362	$868^{\dagger}$	$868^{\dagger}$	1362	$868^{\dagger}$	$868^{\dagger}$
adj. R^2						

Standard errors in parentheses

$^{+}p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 5: Number of Products Offered: Hard Index

	(1) No Control Poisson	(2) With Controls Poisson	(3) Controls & Products Poisson	(4) No Controls (Ord. Probit)	(5) With Controls (Ord. Probit)	(6) Controls & Products (Ord. Probit)
KnowIndex_hard (Std. Deviations)	0.234***	0.201***	0.157***	0.156**	0.151*	0.115
	(0.0121)	(0.0161)	(0.0164)	(0.0493)	(0.0704)	(0.0737)
Sophisticated Respondent	-0.00154	0.0401	-0.0586	0.0581	0.173	0.110
	(0.0314)	(0.0423)	(0.0431)	(0.130)	(0.184)	(0.191)
Female Respondent		-0.207***	-0.189***		-0.149	-0.137
		(0.0354)	(0.0355)		(0.144)	(0.148)
Financial Wealth		0.111***	0.0912***		0.0729	0.0600
(Std. Dev.)		(0.0180)	(0.0185)		(0.0785)	(0.0835)
Risk Propensity (Std. Dev.)		0.228***	0.189***		0.261***	0.243***
		(0.0158)	(0.0162)		(0.0673)	(0.0707)
Long Term Propensity		0.0485**	0.0654***		0.00263	0.00244
(Std. Dev.)		(0.0155)	(0.0158)		(0.0674)	(0.0703)
MiFiD Responsiveness		0.0511**	0.0452*		-0.0352	-0.0473
(Std. Dev.)		(0.0182)	(0.0181)		(0.0727)	(0.0746)
Additional Socio-Economic Controls		YES	YES		YES	YES
Year of Purchase		YES	YES		YES	YES
Product Purchased		NO	YES		NO	YES
_cons	1.569***	-0.723*	0.413			
	(0.0277)	(0.319)	(0.342)			
cut1						
_cons				1.498***	3.713**	2.957
				(0.116)	(1.364)	(1.529)
cut2						
_cons				2.198***	4.529***	3.808*
				(0.134)	(1.371)	(1.534)
cut3						
_cons				2.398***	4.873***	4.165**
				(0.146)	(1.377)	(1.538)
N	1362	868†	868†	1362	868†	868†
adj. R^2						

Standard errors in parentheses

$^{+}p < 0.1$, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 6: Number of Products Offered: Sample Restricted to Exogenous Choice of Intermediary

	(1) No Control Poisson	(2) With Controls Poisson	(3) Controls & Products Poisson	(4) No Controls Ord. Probit	(5) With Controls Ord. Probit	(6) Controls & Products Ord. Probit
KnowIndex_total (Std. Deviations)	0.293***	0.338***	0.215***	0.334***	0.552**	0.525**
	(0.0225)	(0.0303)	(0.0330)	(0.0953)	(0.177)	(0.197)
Sophisticated Respondent	-0.185***	0.168*	-0.0920	0.0779	0.878+	0.615
	(0.0504)	(0.0738)	(0.0794)	(0.234)	(0.492)	(0.636)
Female Respondent		-0.114+	-0.108+		-0.268	-0.245
		(0.0626)	(0.0642)		(0.301)	(0.321)
Financial Wealth (Std. Dev.)		0.214***	0.198***		0.427*	0.461*
		(0.0342)	(0.0358)		(0.189)	(0.212)
Risk Propensity (Std. Dev.)		0.162***	0.0902**		0.342*	0.269
		(0.0269)	(0.0285)		(0.137)	(0.153)
Long Term Propensity (Std. Dev.)		-0.141***	-0.0854**		-0.236	-0.217
		(0.0289)	(0.0295)		(0.147)	(0.157)
MiFiD Responsiveness (Std. Dev.)		0.0666+	0.0725+		0.0449	0.0948
		(0.0367)	(0.0387)		(0.189)	(0.206)
Additional Socio-Economic Controls		YES	YES		YES	YES
Year of Purchase		YES	YES		YES	YES
Product Purchased		NO	YES		NO	YES
_cons	1.623***	0.188	2.821***			
	(0.0435)	(0.569)	(0.743)			
cut1						
_cons				1.660***	4.871	-12.29
				(0.211)	(3.079)	(2817.2)
cut2						
_cons				2.396***	5.813	-11.21
				(0.250)	(3.093)	(2817.2)
cut3						
_cons				2.558***	6.109*	-10.82
				(0.267)	(3.102)	(2817.2)
N	443	304†	304†	443	304†	304†
adj. R^2						

Standard errors in parentheses

$^{+}p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 7: Number of Products Offered: Sample Restricted to non-economic triggers to invest/borrow

	(1) No Control Poisson	(2) With Controls Poisson	(3) Controls & Products Poisson	(4) No Controls Ord. Probit	(5) With Controls Ord. Probit	(6) Controls & Products Ord. Probit
KnowIndex_total (Std. Deviations)	0.259***	0.269***	0.229***	0.168*	0.194*	0.160^{+}
	(0.0173)	(0.0216)	(0.0219)	(0.0693)	(0.0921)	(0.0970)
Sophisticated Respondent	-0.00354	-0.0989^{+}	-0.179***	0.158	0.163	0.111
	(0.0411)	(0.0529)	(0.0540)	(0.171)	(0.230)	(0.242)
Female Respondent		-0.0551	-0.0160		-0.0152	0.0581
		(0.0470)	(0.0475)		(0.189)	(0.201)
Financial Wealth (Std. Dev.)		0.0930***	0.0636*		0.115	0.123
		(0.0246)	(0.0257)		(0.108)	(0.117)
Risk Propensity (Std. Dev.)		0.132***	0.116***		0.173^{+}	0.185^{+}
		(0.0218)	(0.0223)		(0.0927)	(0.0987)
Long Term Propensity (Std. Dev.)		0.00758	0.0266		-0.0381	-0.0125
		(0.0209)	(0.0214)		(0.0948)	(0.102)
MiFiD Responsiveness (Std. Dev.)		-0.0587**	-0.0852***		-0.184*	-0.223*
		(0.0225)	(0.0229)		(0.0914)	(0.0953)
Additional Socio-Economic Controls		YES	YES		YES	YES
Year of Purchase		YES	YES		YES	YES
Product Purchased		NO	YES		NO	YES
_cons	1.570***	-0.582	0.736			
	(0.0359)	(0.440)	(0.467)			
cut1						
_cons				1.518***	2.692	1.436
				(0.153)	(1.819)	(2.031)
cut2						
_cons				2.263***	3.538	2.349
				(0.180)	(1.827)	(2.036)
cut3						
_cons				2.611***	4.095*	2.941
				(0.214)	(1.841)	(2.046)
N	698	475	475	698	475	475
adj. R^2						

Standard errors in parentheses

$^{+}p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 8: Extremeness of Offer (Std. Deviations) - Cluster(Product)

	(1) No Controls	(2) With Controls	(3) Controls & Years	(4) Controls & Products	(5) All
KnowIndex_total (Std. Deviations)	-0.264***	-0.262***	-0.251***	-0.266***	-0.257***
	(0.0272)	(0.0344)	(0.0306)	(0.0356)	(0.0333)
Sophisticated Respondent	-0.256**	-0.207*	-0.198*	-0.190*	-0.186*
	(0.0753)	(0.0745)	(0.0648)	(0.0759)	(0.0698)
Female Respondent		-0.100+	-0.0989*	-0.105+	-0.104*
		(0.0460)	(0.0379)	(0.0488)	(0.0418)
Financial Wealth (Std. Dev.)		-0.0463	-0.0314	-0.0286	-0.0170
		(0.0387)	(0.0342)	(0.0375)	(0.0331)
Risk Propensity (Std. Dev.)		0.252***	0.243***	0.249***	0.238***
		(0.0194)	(0.0207)	(0.0191)	(0.0204)
Long Term Propensity (Std. Dev.)		-0.0356	-0.0392	-0.0204	-0.0252
		(0.0261)	(0.0242)	(0.0285)	(0.0268)
MiFiD Responsiveness (Std. Dev.)		0.00627	0.00723	0.0183	0.0197
		(0.0358)	(0.0381)	(0.0367)	(0.0384)
Additional Socio-Economic Controls	NO	YES	YES	YES	YES
Product Purchased	NO	NO	NO	YES	YES
Year of Purchase: 2017			-0.183		-0.121
			(0.144)		(0.101)
Year of Purchase: 2016			0.196		0.192
			(0.146)		(0.126)
Year of Purchase: 2015			0.212		0.208
			(0.123)		(0.114)
Year of Purchase: 2014			0.406**		0.397**
			(0.117)		(0.0986)
Year of Purchase: 2013			0.0634		0.0707
			(0.139)		(0.148)
Year of Purchase: 2012			0.0462		0.0209
			(0.177)		(0.172)
Year of Purchase: 2011			-0.0408		-0.0133
			(0.271)		(0.270)
Year of Purchase: 2010			-0.177		-0.167
			(0.112)		(0.121)
Year of Purchase: 2009			0.144		0.119
			(0.199)		(0.184)
Year of Purchase: 2008			-0.169		-0.183
			(0.310)		(0.313)
_cons	0.202**	0.944	0.608	0.444	0.188
	(0.0650)	(0.606)	(0.649)	(0.631)	(0.687)
N	1362	868†	868†	868†	868†
adj. R^2	0.086	0.180	0.206	0.207	0.226

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 9: Extremeness of Offer: Hard Index (Std. Deviation)

	(1) No Controls	(2) With Controls	(3) Controls & Years	(4) Controls & Products	(5) All
KnowIndex_hard (Std. Deviations)	-0.152***	-0.194***	-0.174***	-0.183***	-0.169***
	(0.0270)	(0.0350)	(0.0348)	(0.0352)	(0.0351)
Sophisticated Respondent	-0.263***	-0.184*	-0.176*	-0.173*	-0.169+
	(0.0662)	(0.0872)	(0.0863)	(0.0875)	(0.0869)
Female Respondent		-0.139+	-0.134+	-0.143+	-0.139+
		(0.0736)	(0.0730)	(0.0730)	(0.0726)
Financial Wealth		-0.0559	-0.0396	-0.0393	-0.0261
(Std. Dev.)		(0.0368)	(0.0367)	(0.0368)	(0.0368)
Risk Propensity (Std. Dev.)		0.254***	0.246***	0.249***	0.240***
		(0.0341)	(0.0338)	(0.0344)	(0.0342)
Long Term Propensity		-0.0201	-0.0258	-0.00815	-0.0144
(Std. Dev.)		(0.0336)	(0.0332)	(0.0335)	(0.0332)
MiFiD Responsiveness		0.00615	0.00479	0.0152	0.0150
(Std. Dev.)		(0.0352)	(0.0348)	(0.0350)	(0.0347)
Additional Socio-Economic Controls	NO	YES	YES	YES	YES
Product Purchased	NO	NO	NO	YES	YES
Year of Purchase: 2017			-0.199		-0.152
			(0.136)		(0.139)
Year of Purchase: 2016			0.174		0.164
			(0.148)		(0.149)
Year of Purchase: 2015			0.165		0.157
			(0.146)		(0.149)
Year of Purchase: 2014			0.405**		0.394**
			(0.145)		(0.147)
Year of Purchase: 2013			0.0615		0.0634
			(0.169)		(0.170)
Year of Purchase: 2012			0.0128		-0.0155
			(0.155)		(0.156)
Year of Purchase: 2011			-0.0384		-0.0138
			(0.205)		(0.206)
Year of Purchase: 2010			-0.170		-0.163
			(0.200)		(0.200)
Year of Purchase: 2009			0.0771		0.0474
			(0.209)		(0.209)
Year of Purchase: 2008			-0.190		-0.209
			(0.272)		(0.271)
_cons	0.207***	1.018	0.699	0.636	0.383
	(0.0585)	(0.668)	(0.682)	(0.724)	(0.738)
N	1362	868†	868†	868†	868†
adj. R^2	0.039	0.148	0.174	0.169	0.189

Standard errors in parentheses

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 10: Extremeness of Offer : Exogenous Selection (Std. Deviations)

	(1) No Controls	(2) With Controls	(3) Controls & Years	(4) Controls & Products	(5) All
KnowIndex_total (Std. Deviations)	-0.188***	-0.215***	-0.181**	-0.208***	-0.181**
	(0.0488)	(0.0552)	(0.0559)	(0.0542)	(0.0554)
Sophisticated Respondent	-0.513***	-0.363**	-0.322**	-0.299*	-0.264*
	(0.109)	(0.124)	(0.124)	(0.122)	(0.124)
Female Respondent		-0.270*	-0.262*	-0.186	-0.184
		(0.113)	(0.115)	(0.111)	(0.113)
Financial Wealth		-0.0637	-0.0471	-0.0271	-0.0154
(Std. Dev.)		(0.0543)	(0.0546)	(0.0539)	(0.0545)
Risk Propensity (Std. Dev.)		0.236***	0.240***	0.228***	0.225***
		(0.0505)	(0.0507)	(0.0505)	(0.0511)
Long Term Propensity		-0.114*	-0.112*	-0.0950	-0.0954*
(Std. Dev.)		(0.0501)	(0.0498)	(0.0483)	(0.0484)
MiFiD Responsiveness		0.102+	0.106+	0.105+	0.108+
(Std. Dev.)		(0.0589)	(0.0590)	(0.0573)	(0.0579)
Additional Socio-Economic Controls	NO	YES	YES	YES	YES
Product Purchased	NO	NO	NO	YES	YES
Year of Purchase: 2017			-0.0719		0.0528
			(0.213)		(0.214)
Year of Purchase: 2016			0.337		0.357
			(0.220)		(0.217)
Year of Purchase: 2015			0.498*		0.514*
			(0.227)		(0.225)
Year of Purchase: 2014			0.343		0.331
			(0.234)		(0.231)
Year of Purchase: 2013			0.282		0.193
			(0.271)		(0.269)
Year of Purchase: 2012			0.157		0.106
			(0.251)		(0.247)
Year of Purchase: 2011			0.246		0.341
			(0.404)		(0.395)
Year of Purchase: 2010			0.155		0.152
			(0.353)		(0.348)
Year of Purchase: 2009			0.246		0.205
			(0.323)		(0.315)
Year of Purchase: 2008			-0.293		-0.0404
			(0.693)		(0.673)
_cons	0.481***	0.103	-0.364	-2.232+	-2.419+
	(0.0954)	(1.104)	(1.120)	(1.257)	(1.265)
N	443	362†	362†	362†	362†
adj. R^2	0.078	0.196	0.211	0.265	0.270

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.

Table 11: Extremeness of Offer : Trigger Selection (Std. Deviations)

	(1) No Controls	(2) With Controls	(3) Controls & Years	(4) Controls & Products	(5) All
KnowIndex_total (Std. Deviations)	-0.208***	-0.226***	-0.217***	-0.224***	-0.216***
	(0.0390)	(0.0439)	(0.0437)	(0.0436)	(0.0434)
Sophisticated Respondent	-0.269**	-0.191^{+}	-0.207*	-0.150	-0.160
	(0.0874)	(0.0990)	(0.0995)	(0.0988)	(0.0995)
Female Respondent		-0.0697	-0.0676	-0.0910	-0.0929
		(0.0917)	(0.0917)	(0.0915)	(0.0916)
Financial Wealth (Std. Dev.)		-0.0111	-0.00778	-0.00906	-0.00448
		(0.0445)	(0.0445)	(0.0446)	(0.0446)
Risk Propensity (Std. Dev.)		0.295***	0.277***	0.291***	0.270***
		(0.0420)	(0.0421)	(0.0423)	(0.0426)
Long Term Propensity (Std. Dev.)		0.0264	0.0350	0.0322	0.0372
		(0.0418)	(0.0417)	(0.0419)	(0.0417)
MiFiD Responsiveness (Std. Dev.)		-0.0135	-0.0144	-0.0310	-0.0305
		(0.0477)	(0.0474)	(0.0475)	(0.0472)
Additional Socio-Economic Controls	NO	YES	YES	YES	YES
Product Purchased	NO	NO	NO	YES	YES
Year of Purchase: 2017			-0.0414		0.0546
			(0.183)		(0.188)
Year of Purchase: 2016			0.398*		0.445*
			(0.191)		(0.196)
Year of Purchase: 2015			0.372*		0.444*
			(0.184)		(0.190)
Year of Purchase: 2014			0.320^{+}		0.381*
			(0.186)		(0.191)
Year of Purchase: 2013			0.0540		0.0907
			(0.210)		(0.214)
Year of Purchase: 2012			0.112		0.194
			(0.196)		(0.201)
Year of Purchase: 2011			-0.0354		0.0258
			(0.256)		(0.262)
Year of Purchase: 2010			-0.0582		-0.00759
			(0.254)		(0.256)
Year of Purchase: 2009			0.285		0.280
			(0.259)		(0.260)
Year of Purchase: 2008			-0.220		-0.200
			(0.352)		(0.352)
_cons	0.345***	0.586	0.329	1.136	0.0599
	(0.0764)	(0.870)	(0.896)	(0.919)	(0.933)
N	698	545†	545†	545†	545†
adj. R^2	0.054	0.163	0.179	0.185	0.200

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† sample decreases since some individuals refused report some relevant information.