Biased Financial Advisers, Regulation, and Transparency*

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Abstract

We study the effects of transparency and investor sophistication over the incentives of a financial adviser to provide honest and suitable financial advice to partially informed consumers. The novel aspect of our analysis is the inclusion of courts as a costly mechanism to provide incentives to reduce incorrect advice, where the cost arises from judicial errors due to imperfect evidence. We show that the cost of using courts to provide appropriate incentives is decreasing in investor sophistication and transparency. However, the judicial system may not be able to implement the first best without appropriate regulation when advisers can choose their level of transparency. In such a case, advisers with strong incentives to provide incorrect advice may be tempted to reduce transparency if it increases the prevalence of judicial error. The analysis sheds lights on the structure of legal duties of investment services firms, such as those under the recent European MiFID II scheme.

Keywords: Transparency, Retail Investors, Financial Advice and Liability.

JEL classification numbers: L51, H57, H24, D44, K13, K23, L51.

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1 Introduction

Financial decisions are hard to make. Most individuals, even those with some knowledge of financial matters, are subject to mistaken beliefs, biases and inadequate information. All of these lead them to make poor choices in the financial sphere. The behavioral economics literature has unearthed some of the shortcomings resulting in far from desirable decisions, as in Benartzi and Thaler (2007) and Gomes et al. (2021).

Given the above, it comes as no surprise that financial advice from experts plays a large role in "helping" people to make better choices.[1] Advisers, however, sometimes fail to do a proper job. Investment decisions that turn out badly for investors are found in abundance.[2] Among the different reasons for poor advice, the literature has primarily focused on conflicts on interest, and, more recently, on a lack of personalization of advice to clients' needs.

Another important factor is investor sophistication and financial literacy, and whether and how the their absence leaves investors exposed to bad advice and manipulation.[3]

Correspondingly, the provision of financial advice is heavily regulated, and financial advisers are subject to a strict set of duties and liabilities.[4] Courts play an important role in providing incentives for honest financial advice, one that has been often overlooked in the finance literature. Courts intervene when there is an infringement of the adviser's duties that gives rise to liabilities

[1] Although as shown in Bhattacharya et al. (2012) , the mere presence of unbiased financial advice is necessary but not sufficient to lead to better decisions.

[2] Hackethal et al. (2012) find that advised accounts exhibit lower net returns and inferior Sharpe ratios, and higher portfolio turnover. In Chalmers and Reuter (2020) clients of brokers earn significantly lower alphas and Sharpe ratios than matched target-date-fund (TDF) portfolios that provide similar risk and avoid brokerage fees; Hoechle et al. (2018) , in turn, document that advisers employed by a large bank advice clients to choose the investments that are more profitable for the bank and that these investments perform poorly vis-á-vis independently chosen ones.

[3] Lusardi and Mitchell (2014) provide an extensive overview of the literature on financial literacy that addresses the role of financial advice. Calcagno and Monticone (2015) also show that financial literacy increases the probability of consulting a financial adviser, and reduces the probability of making independent investments; Egan et al. (2019) find that adviser misconduct is more present in locations with low education, and with older and wealthier populations; Guiso et al. (2022)'s model of banks selling mortgages estimates the cost of the distortion from bank's recommendations to unsophisticated borrowers to be equivalent to an increase in the annual mortgage payment by 11%.

[4] For example, in the EU context, the MIFID II Directive, the main regulatory instrument in this area, imposes upon firms offering investment services to customers a broad legal duty to act honestly, fairly, and in the best interests of the client (art. 24 (1)), while in the US Regulation Best Interest plays a similar role.

and can review fines and other sanctions imposed by regulatory agencies.

In this paper we analyze the role of Courts in disciplining financial advisers. We mainly focus on the problem of conflict of interest but later in the paper, we also analyze the lack of personalization of the advise. Conflict of interest arises when financial advisers receive different commissions from the sale of different instruments.[5] The advice may cover instruments from both inside and outside the investment firm which again distorts the incentives of the adviser.[6] The importance of this problem was specially visible both before and after the financial crisis, when investors suffered substantial losses giving rise to serious concerns about the mis-selling of certain financial investments to customers. In many cases, this has led to important numbers of lawsuits filed against firms providing the investment services. Battiston et al. use data from a Spanish investment firm to estimate the losses to investors from distortions in advice, and find that these losses amount to between 6 and 9%.

Spain and Italy provide clear illustrations of the problem.[7] In Spain, banks and specially savings banks sold large amounts of "preferentes" to their clients. Preferentes are equivalent to perpetual junior debt, repayable only at the discretion of the issuer and without voting rights to the holder. Savings banks found in the preferentes a valuable tool to recapitalize, because preferentes qualify as regulatory capital, so they started marketing them to their own depositors. Many of those recapitalization efforts failed in the end, and the savings banks had to be rescued by the taxpayer. Investors in preferentes saw their investments wiped out or subject to a substantial haircut. According to the regulator the face value of preferentes issued only by two of the rescued savings banks (Bankia and Caixa Catalunya) approached €8 bn, affecting 400,000 investors. Over 78% of them brought legal claims against the savings banks who sold them the preferentes.[8]

[5]The literature provides numerous evidence on conflicts of interest in financial advice: Anagol et al. (2017) , Christoffersen S. E. and K. (2013) , Hackethal et al. (2012) , Hoechle et al. (2018) . Chalmers and Reuter (2020) find that brokers are more likely to recommend products with higher commissions; Egan et al. (2019) find that brokers are incentivized to sell the dominated bonds, typically earning two times greater fees for selling them.

[6]Pool et al. (2016) find that mutual fund families acting as service providers in 401(k) plans display favoritism toward their own affiliated funds; Foà et al. (2019) find that banks bias households choosing a mortgage towards those more beneficial to the bank.

[7]See on the details of the schemes both in Italy and Spain, Della Negra (2014).

[8]For further details see Santos (2017) and Comisión de Seguimiento de Instrumentos Híbridos de Capi-

Similarly, in Italy many depositors were seriously exposed to the banks' risk through subordinated debt sold by banks to their customers, and a similar wave of investor losses and lawsuits took place (Enriques and Gargantini (2017).

The goal of the paper is to analyze the role of transparency in the behavior of financial advisers subject to liabilities for the provision of incorrect advice to partially informed clients. In doing so we also explore the potential contribution of regulation to improve the provision of investment advice, as well as the limits to what legal regulation may add. For this, we build a simple agency model of financial advice under the shadow of potential legal liabilities, where these liabilities arise from the penalties imposed by the court based on imperfect observation of the financial advice provided by the firm. Our basic model is presented in a setting where there is only one type of adviser, while the main results are established in a setting of heterogeneous advisers.

There is also evidence pointing at advisers not tailoring their advice to the various profiles, preferences and relevant characteristics of clients. Advisers, instead, appear to give investment recommendations that reflect both their own (or their companies') self-interest, or their misguided beliefs about investment strategies.[9]

The main finding is that the level of stringency of court-imposed liability on financial advisers for the lack of fairness and honesty in the advice decreases optimally with the experience and sophistication of the investor, and with the level of transparency of the overall informational instruments that the firm uses to communicate with customers. The court's role is limited in cases where the court's observation of the adviser's behavior is too noisy, or when the adviser can choose between advising methods that differ in terms of transparency. In such cases, regulation has a role to play by limiting advisers both in terms of the products on which they may advice,

tal y Deuda Subordinada (2015).

[9]Foerster et al. (2017) find that advisers do relatively little to tailor their advice on risk-taking to clients' risk tolerance or other characteristics associated with varying risk preferences, but rather project their own beliefs and predispositions; Mullainathan et al. (2012) find that financial advice fails to de-bias behaviorally impaired investors, and even amplifies some of the prevailing biases among financial customers that are in the financial advantage of the adviser; Linnainmaa et al. (2021), find that advisers do not display personalized recommendations but rather recommend a similar investment profile to their various client categories, one, in fact, that is strikingly close to their own personal choices as investors.

as well as in terms of the transparency choices available to them, to ensure an adequate policing by the courts.

Our paper contributes to several strands of the literature. Bolton et al. (2007) provide an early analysis of the conflicts of interest that arise in the provision of financial advice, while Campbell (2016) discusses the challenges for regulators in the context of a stylized model. A number of papers explore specific aspects of conflicts of interest in financial advice, how alert and naïve consumers would react differently to the advice, and the welfare consequences of various policy interventions: Inderst and Ottaviani (2009, 2012a,b,c); Inderst et al. (2010), Stoughton et al. (2011), Guiso et al. (2022). Other contributions explore similar issues in a long-term setting, where cancelling the contract ex post is a relevant feature (Inderst and Ottaviani (2012c)). Others have analyzed experimentally how the disclosure of conflicts of interest affects both sides of the interaction, that is, the reactions by investors and advisers to the disclosure: Cain et al. (2005, 2011), Loewenstein et al. (2011), and Sah et al. (2013). A different perspective is provided by Gennaioli et al. (2015) where the adviser acts as a source of information but also as 'money doctor' by providing a trusted channel for investors to invest in risky assets with less anxiety about the outcome.

Other than Carlin and Gervais (2012), the previous literature does not consider the role of liability in the provision of incentives to give honest financial advice, nor the contribution and limits of an ex post regulatory scheme in the functioning of investment services firms. In contrast, the current paper explicitly incorporates the social welfare costs from the court's involvement (or by regulators more generally) via imperfect observation of the underlying adviser's behavior, something that is absent in the literature, and focuses on the importance of transparency.

In terms of the modelling approach our paper builds on previous literature that has analyzed how courts set liability standards in order to minimize judicial errors: Demougin and Fluet (2005, 2006), Artigot et al. (2018) and Ganuza et al. (2022), among others.

The paper is organized as follows. Section 2 presents the basic model of financial advice and

potential firm misbehavior, as well as how standards of liability are set in the presence of evidentiary uncertainty as to the kind of financial advice actually provided. Section 3 defines the optimal policy by the court in fixing the standards for liability. Section 4 explores how standards should depend on the transparency of the overall marketing and advisory policies displayed by firms, and on the sophistication of the client receiving the advice. Section 5 deals with an important extension of our basic setting, namely that of heterogeneous advisers. Section 6 considers three extensions, namely when transparency enhances the quality of the evidence that courts may use, the endogeneity of transparency and the characteristics of the client base of the investment firm, with the presence of forward-looking investors. Section 7 derives implications for understanding legal and regulatory policy in this area. Section 8 briefly concludes.

2 The model

2.1 Financial advice, transparency and revenue

We device a very simple agency model of financial advice. Consider an adviser (a financial institution, or, more generally, a firm) who sells assets and provides recommendations to an investor and potential client.

The investor has access to three possible assets: a riskless asset S, that generates zero return and zero rents to the financial institution (the supply of such an asset is perfectly competitive) and two risky assets, S_1 and S_2, that generate rents $r_1 < r_2$ for the financial institution.

The return of the risky asset to the investor depends on the matching between the assets payoffs and the preferences of the investor. If the match is bad (state B), the net return of the asset to the investor (discounting the price) is negative and generates a loss of L with probability 1. If the match is good (state G), then with probability p the return is negative and generates a loss of L but with probability $1-p$ the project generates a net return of 1. We focus on the case where the expected return of the risky asset when the match is good is higher than that of the

riskless asset, i.e, $1 - p - pL > 0 \Rightarrow p < \frac{1}{1+L}$.

Assets are perfectly negatively correlated in the sense that if asset 1 is a good match (state G) then asset 2 is a bad match and viceversa.[10] The probability that asset S_1 (S_2) is a good match is α $(1-\alpha)$. The financial adviser knows how the asset matches with the investor, and decides to recommend either S_1 or S_2. The investor decides between the riskless asset and the recommended risky asset. To make this decision, the investor uses the effective information available to her.

The effective information available to the investor is captured by the accuracy parameter γ. A higher value of γ, represents better, more effective information. The effectiveness of the investor's information, $\gamma(\theta, \delta)$, positively depends on two factors: the level of sophistication of the investor, θ, and the amount, quality, and clarity of the information provided by the adviser, δ, that we label as transparency for short. More effective information should lead to better decisions by the investor. To capture this we introduce the outcome of the investor's decision process in reduced form: Let $p^G(\gamma)$ be the probability that the investor buys the asset when it is a good match, and $p^B(\gamma)$ the probability that the investor buys the asset when it is a bad match. With complementary probability the investor decides to buy the riskless asset S.

We assume that $p^G(\gamma) > p^B(\gamma)$ for all positive levels of accuracy, since it seems intuitive to imagine that it is always more likely that a product that is a good match will be sold and bought rather than a financial product that is a bad match.[11] Furthermore, the higher the accuracy parameter γ, the higher (the lower) the probability that the client buys a good product (a bad

[10] We are implicitly assuming, as Inderst and Ottaviani (2009), a Hotelling environment in which investors are located either close to asset 1 or close to asset 2.

[11] This assumption is intuitive, but it is not necessary for our results.

product), $p^G(\gamma)' > 0$ and $p^B(\gamma)' < 0$.[12,13] As an example we will use the following parametrization:

$$p^G(\gamma) = \frac{1}{2} + \gamma \quad \text{and} \quad p^B(\gamma) = \frac{1}{2} - \gamma.$$

An additional issue is how aligned the interests of adviser and investor are. With probability $1 - \alpha$ the incentives of the financial adviser and the investor are aligned, since S_2, which is the most profitable recommendation for the financial institution, is in fact also the best product for the investor. However, with probability α, there is a conflict of interest and the financial adviser may follow one of two policies, $P \in \{H, D\}$, where H stands for honesty, that is, advising the investor to buy S_1, and D for dishonesty, that is, advising the investor to buy S_2. In the latter case, we assume that the financial adviser incurs a moral or reputational cost β.[14]

Then, the expected revenues for the financial adviser from honest and dishonest policies are

$$R(H, \gamma) = (1 - \alpha)p^G(\gamma)r_2 + \alpha p^G(\gamma)r_1,$$
$$R(D, \gamma) = (1 - \alpha)p^G(\gamma)r_2 + \alpha(p^B(\gamma)r_2 - \beta),$$

respectively.

Depending on the value of the parameters, the difference may be positive or negative and with it the incentives of the financial adviser to provide honest advice:

$$R(H, \gamma) - R(D, \gamma) = \alpha(p^G(\gamma)r_1 - p^B(\gamma)r_2 + \beta)$$

It is important to analyze how this difference between both revenue functions depends on the accuracy parameter γ and indirectly on the level of the buyer sophistication θ and the level of

[12]This assumption allows us to incorporate in reduced form a number of approaches in the literature. For example, it incorporates the case where agents receive the advice and review it or receive additional information, which they later incorporate into whether or not to make the investment. Alternatively, as in Campbell (2015), it allows for a fraction of the population, who is less sophisticated, to overstate the value of the recommended option. Our assumption then reflects the reduction in revenue difference from providing honest advice that would result for an increase in the proportion of rational/sophisticated investors in the population.

[13]Collins (2012) and Finke (2013) argue that financial literacy and financial advice are complements. Our setting is flexible enough to allow them to be complements or substitutes. For the investor, the expected utility difference between good (honest) and bad (dishonest) advise is $p^G(\gamma)(1-p-pL)+p^B(\gamma)L > 0$. This expression may increase or decrease with γ (and hence with the sophistication and literacy of the investor) because $p^G(\gamma)' > 0$ and $p^B(\gamma)' < 0$. Later in the paper, we discuss several specific models of investor behavior consistent with the characterization of $p^G(\gamma)' > 0$ and $p^B(\gamma)' < 0$.

[14]This moral or reputational cost is a common assumption in the literature on corruption, see Burguet et al (2018) for a recent review of this literature.

transparency δ. As the benefits from selling a good product increase with γ and the benefits from selling a bad product decrease with γ, the difference of revenues between honest and dishonest policies is increasing with γ or, in other terms, the revenue function is supermodular in honesty and accuracy (and sophistication and transparency). This supermodularity means that more effective information makes it more likely that following a policy of honesty is optimal for the adviser.

Given the importance of this property of the revenue function for the subsequent analysis we state it as a proposition.

PROPOSITION 1 *The revenue function, $R(x, \gamma)$, is supermodular in the honesty decision and accuracy.*

An immediate corollary of this result is that the adviser's incentives depend on the level of γ. If the adviser's decision is not trivial, and absent other factors such as liability and litigation, he will choose to be dishonest for lower values of γ and honest for higher values of γ.

2.2 The litigation phase: the evidence available to the court

Regardless of the adviser's behavior, we assume the investor will bring a case before the court whenever she suffers a loss. In order to simplify the analysis we disregard litigation costs, the possibility that the victim does not bring the case before the court, and the possibility of settlement. These are non-trivial assumptions, but ones that allow us to abstract from other dimensions of the problem.

The court's role is to determine whether the adviser has been dishonest or not. If the court finds the adviser to have been dishonest the court will rule for the adviser to pay an amount L to the investor, and nothing otherwise. The court makes this ruling with knowledge of both the level of sophistication of the investor, θ, and the level of transparency in the information provided by the adviser, δ, (we believe this is plausible since the characteristics of the investor can be ex post

assessed by the court, and the information materials used by the firm are likely to have produced hard evidence as to their content and properties) but without direct observation of the honesty of the advice.

In order to establish the nature of the adviser's behavior, the court has to rely on the evidence brought before it by the parties in any admissible form: examination and cross-examination of experts and witnesses, looking into the exchanges and communications between investor/client and adviser, etc. Let the total evidence available to the court be represented by a generic signal $\pi \in [0,1]$, which summarizes an index of the amount of evidence indicating honesty. Formally, a signal π is a realization of a random variable Π with distribution function $f(\pi|P)$. This distribution depends on the type of advice, $P = H$ or D, but not on γ, θ or δ. It is quite natural for the financial literacy of the investor not to influence the court's ability to rule on the quality of the advice. However, prior information and the transparency of the advice may do so, and we consider this possibility after the main results are established. For convenience, we assume that f is differentiable and non-zero on $[0,1]$.[15] Let $F(\pi|P)$ denote the cumulative distribution function corresponding to the court's signal.

A higher value of π represents greater evidence that in the particular case before the court the advice was honest. To ensure that honesty translates into more evidence of good behavior, we assume that signals are monotone, that is, $f(\pi|P)$ satisfies the Monotone Likelihood Ratio Property (MLRP):

$$\frac{f(\pi|H)}{f(\pi|D)} \quad \text{is increasing in } \pi.$$

This condition ensures that more evidence is "good news" about honesty (Milgrom (1981)), that is, $\Pr(H|\pi)$ is increasing in π.

[15] One of the implications of having full support on $[0,1]$ is that the evidence before the court is insufficient to identify the honesty of the advice with certainty.

2.3 The court's decision problem

We focus on the interesting case where it is not in the financial adviser's self-interest to follow a policy of honesty in the absence of potential liability, that is when $R(H,\gamma) \leq R(D,\gamma)$. Under this assumption, the incentives provided by the court are needed for financial advisers to act honestly. We also assume that the court is concerned about social welfare, which in this setting is affected by judicial errors when honest advisers are sanctioned.

The court can commit to a decision rule that is based on the evidence presented when the investors suffer losses. We assume that the court uses a threshold decision rule which is defined as follows: if the evidence brought before the court π is above a given threshold level (the evidentiary standard) , $\bar{\pi}$, then the court finds that there is sufficient evidence that the advice was honest, and rules that there is no liability. On the other hand, if $\pi < \bar{\pi}$, then the court finds the financial adviser liable.[16]

For any level of accuracy in the client's signal and court's threshold rule characterized by the evidentiary standard, $\bar{\pi}$, the adviser will choose the honest policy if the profits from doing so are greater than those of being dishonest. This is summarized by the following incentive compatibility condition:

$$R(H,\gamma) - pF(\bar{\pi}|H)L \ \geq R(D,\gamma) - F(\bar{\pi}|D)L. \tag{IC}$$

The court has to set an evidentiary standard, $\bar{\pi}$ that satisfies (IC) and induces honest behavior. Among all evidentiary standards that satisfy (IC), the Court prefers the one generating fewer judicial errors. Given that (IC) is satisfied, there is no dishonest behavior in equilibrium, and minimizing judicial errors is equivalent to minimizing the liabilities imposed on honest advisers[17].

[16] The assumption that the court uses a threshold rule is harmless, as Ganuza et al. (2022) show in a more general setting that the court's optimal decision rule in this informational setup (monotone signals) is a threshold rule. Additionally, threshold rules such as negligence, or the infringement of a legal duty, seem to be pervasive in most legal systems, though obviously the specific threshold and the factors underlying it vary greatly across legal systems and settings.

[17] With a single type of adviser, finding an innocent adviser liable (Type I error) is the only type of judicial error that can arise in equilibrium. In a subsequent section we will consider the general case, with heterogeneous advisers, in which both Type I and Type II (acquitting a dishonest adviser) errors may arise in equilibrium.

Then, the court's problem can be written as:

$$\min_{\bar{\pi}} p\ F\left(\bar{\pi}|H\right) \quad \text{subject to} \quad \text{(IC)}. \tag{1}$$

2.4 Timing when γ is given

The timing of the model is as follows: 1) Given γ, the court sets the evidentiary standard, $\bar{\pi}$. 2) The financial adviser chooses the nature of the advice, $x \in \{H, D\}$, and the investor makes her decision. 3) Nature determines returns (and, eventually losses) from the asset, as well as the court's signal π according to the probabilities and information structures described above. 4) Finally, if the client incurs a loss she files a lawsuit and the adviser will pay L to the investor if the realized evidence, π, is below the court's evidentiary standard, $\bar{\pi}$.

3 The equilibrium: Minimizing errors and maximizing incentives

We can rewrite the court's problem in terms of judicial errors. Judicial errors can take two forms: Type I, and Type II error. Type I error is the probability that the court mistakenly holds an honest adviser liable and Type II error is the probability that the court mistakenly acquits a dishonest adviser. We use the notation $\mathbb{T}_I\left(\bar{\pi}\right) = F\left(\bar{\pi}|H\right)$ to denote the probability of Type I errors committed by a court that imperfectly observes the adviser's actions and uses an evidentiary standard $\bar{\pi}$. Similarly, Type II errors occur with probability $\mathbb{T}_{II}\left(\bar{\pi}\right) = 1 - F\left(\bar{\pi}|D\right)$. We depict these errors in Figure 1.

The court's problem, on Equation (1), is equivalent to the following, more convenient, error

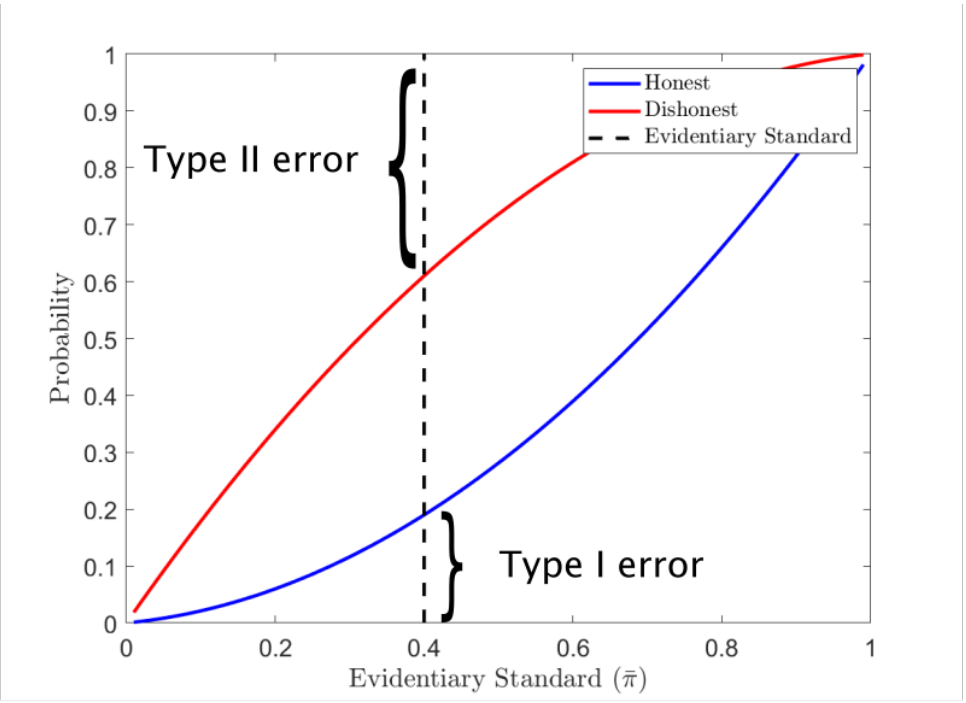

Figure 1: Decision errors and the evidentiary standard.

minimization problem[18]:

$$\begin{aligned} &\min_{\bar{\pi}} \mathbb{T}_I(\bar{\pi}) \\ &\text{s.t.} \quad p\mathbb{T}_I(\bar{\pi}) + \mathbb{T}_{II}(\bar{\pi}) \leq 1 + \frac{R(H,\gamma) - R(D,\gamma)}{L}. \end{aligned} \tag{2}$$

On the left hand side of equation (2) we find the errors generated by the court's choice of evidentiary standard, $\bar{\pi}$, which can be described more compactly using the weighted error function $\Phi(\bar{\pi}) = p\mathbb{T}_I(\bar{\pi}) + \mathbb{T}_{II}(\bar{\pi})$. The next result characterizes the function $\Phi(\bar{\pi})$.

LEMMA 1 *The weighted error function is positive, continuous, and convex, and has a unique minimum on the interval* $[0,1]$ *at* $\pi_{\min}$. *The function takes values* $\Phi(0) = 1$ *and* $\Phi(1) = p$.[19]

Let $\Phi_{\mathbb{D}}$ be the error function defined on the set $\mathbb{D} = [0, \pi_{\min}]$, so that $\Phi_{\mathbb{D}}$ is a decreasing function (and a higher standard increases the incentives to invest in product quality).

[18] This method was proposed by Ganuza et al. (2022). In the Appendix we provide further details about the transformation of the court's problem.

[19] Although for completeness we provide a formal proof in the appendix, this result is known. This characterization was stated in Ganuza et al. (2022) and can be also derived from Demougin and Fluet (2005, 2006).

Figure 2 illustrates the shape of the Φ function (for $p = 0.75$) as well as $\pi_{\min}$, the interval $\mathbb{D}$, and the function $\Phi_{\mathbb{D}}$.[20]

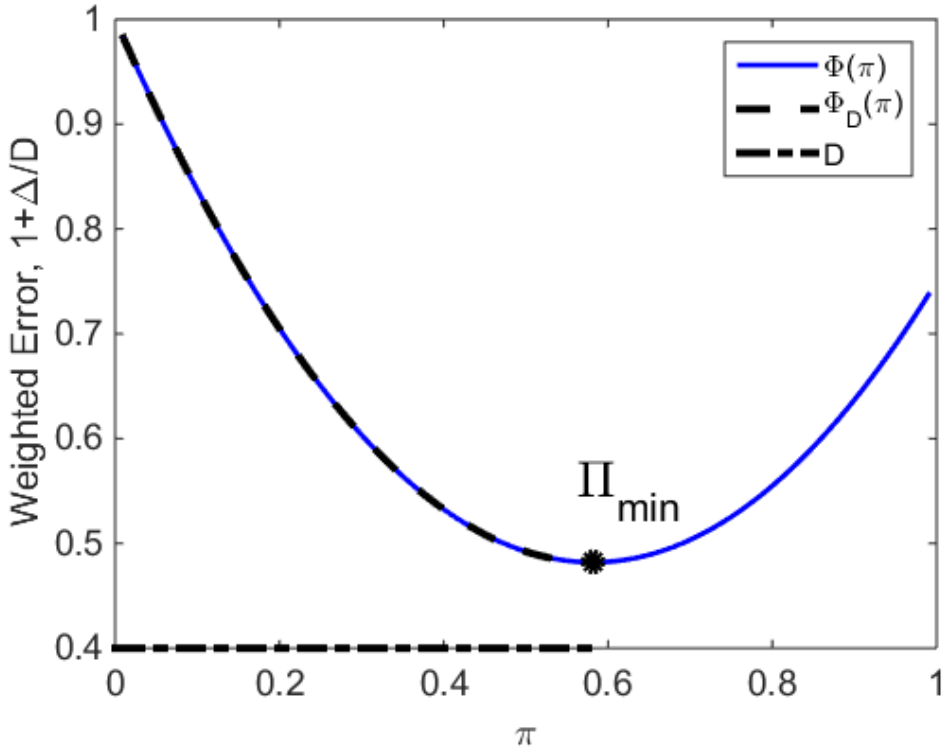

Figure 2: The weighted error function.

On the right hand side of the equation 2 we find a key parameter of the model which we will denote by $\Delta(\gamma) = R(H,\gamma) - R(D,\gamma)$. We can interpret $\Delta(\gamma)$ as the financial adviser's expected revenue difference when switching from dishonesty to honesty (without taking into account legal liabilities). Recall that we have assumed that $\Delta(\gamma)$ is negative for all values of γ and by the supermodularity of the revenue function it is increasing in γ, so that when γ increases $\Delta(\gamma)$ decreases in absolute value. The next proposition characterizes the solution to the court's problem:

[20]This figure is generated using signals with the following linear information structure which satisfies MLRP:

$$f(\pi|H) = 1 - \frac{\gamma}{2} + \gamma\pi, \quad F(\pi|H) = \pi - \frac{1}{2}\gamma\pi(1-\pi),$$
$$f(\pi|D) = 1 + \frac{\gamma}{2} - \gamma\pi, \quad F(\pi|D) = \pi + \frac{1}{2}\gamma\pi(1-\pi),$$

where $\gamma = 1.75$).

PROPOSITION 2 *For all γ, there exists a cut-off level, $\Delta_{\min} = (\Phi(\pi_{\min}) - 1)L$, such that if $\Delta \geq \Delta_{\min}$ then the optimal standard is $\bar{\pi}^*(\Delta) = \Phi_{\mathbb{D}}^{-1}\left(1 + \frac{\Delta}{L}\right)$ which is decreasing in Δ. If $\Delta < \Delta_{\min}$ the court cannot induce honesty from advisers.*

The intuition of this proposition is as follows: for a given $\Delta(\gamma)$, there is a set of evidentiary standards for imposing liability on an adviser that generates enough incentives for honest behavior. As Type I error is monotonically increasing in the evidentiary standard, the court chooses the minimum of these standards. When $\Delta(\gamma)$ increases (honesty is less costly in terms of lost revenue), it becomes easier to induce good behavior. The right hand side of the incentive compatibility constraint is greater, more evidentiary standards satisfy the constraint, and the court's optimal standard (the minimum of the incentive compatible standards) decreases. However, if the lost revenue from being honest is too large or the minimal amount of the weighted error function is high, then courts cannot generate sufficient incentives for honest advice. This leaves direct regulation as the alternative: for example, prohibiting the sale of certain complex financial products to unsophisticated retail investors.

Figure 3 illustrates Proposition 2 by characterizing the optimal evidentiary standard when $p = 0,75$, and $\frac{\Delta'}{L} = -0.23$.

In Figure 3 we can observe the set of standards inducing honesty, $\mathbb{H}(\Delta')$, and the optimal standard, π^*–the lowest in this set. A higher Δ (corresponding to the higher green horizontal line at $\frac{\Delta}{L} = -0.2$), larger market incentives to be honest imply a more lenient optimal evidentiary standard, $\pi^{**} < \pi^*$.

4 INVESTOR INFORMATION AND SOPHISTICATION: OPTIMAL COURT POLICY

The court's optimal evidentiary standard as characterized in Proposition 2 depends on the losses of the investors but also on the amount and quality of information available to clients and on their level of financial sophistication. An increase in transparency (the amount and quality of

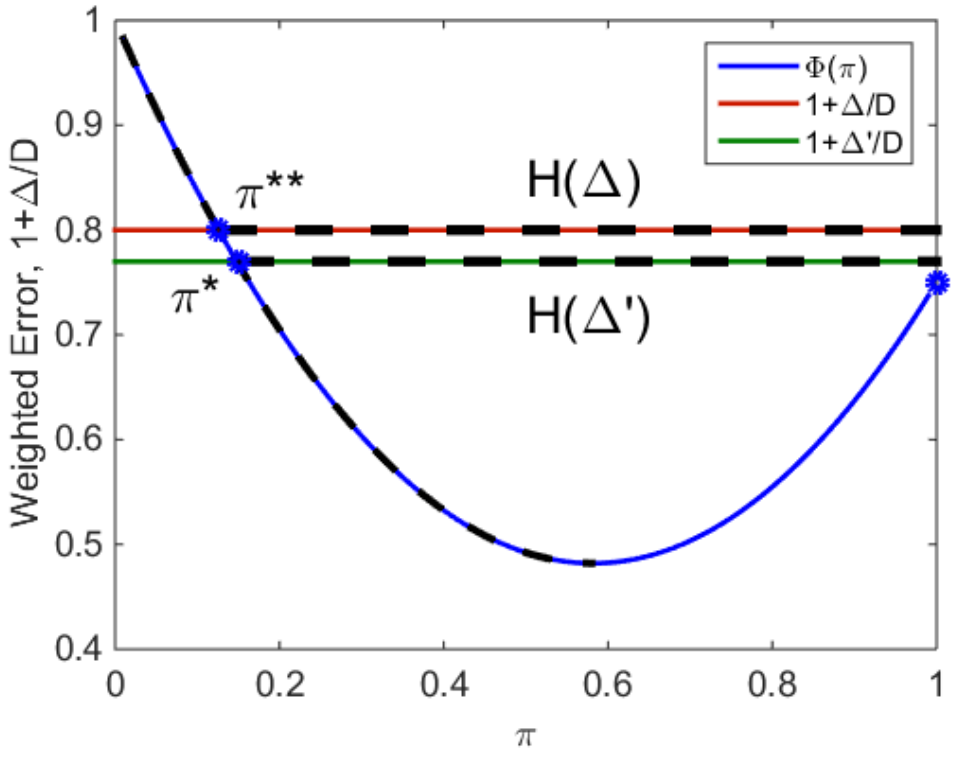

Figure 3: Changing transparency (Δ).

available information parameterized by δ) helps investors to better distinguish between suitable and unsuitable investments. This, in turn, given the supermodularity of the revenue function, increases revenues for an honest adviser, and reduces revenue for a dishonest one, and thereby reduces the losses from being honest (Δ increases). This translates into an increase in the adviser's incentives for honesty–even in the absence of liability–and reduces the need for court intervention. Then, rulings can become more lenient and courts optimally impose a lower evidentiary standard. A similar analysis applies if θ, the level of sophistication of the investor, increases.

PROPOSITION 3 *With a single type of financial adviser, the court's optimal evidentiary standard depends on the quality of information available to investors and their sophistication. Higher levels of adviser's transparency and investor sophistication result in lower court optimal evidentiary standards.*

The fundamental idea behind Proposition 3 applies generally and is key in the regulation of consumer finance. Courts should be more lenient under market conditions that provide more incentives for appropriate behaviour. In a context with asymmetric information, any enforcement mechanism will generate costly implementation errors. When market conditions enhance incentives for appropriate behavior, part of this burden can be saved since the need for more stringent enforcement measures is lower. Applying this principle, Proposition 3 states that if the information over financial assets held by investors and their capacity for interpreting such information increases, the expected payoffs for dishonest advice decrease, thereby decreasing financial advisers' incentives for misbehaving, and allowing the courts to implement honest behavior with more lenient standards.

Proposition 3 has been obtained under the assumption that there is a single type of adviser. Consequently, the court's objective is to provide enough incentives to be honest and minimize the possibility of Type I error as much as possible. In the next section we extend our model to a heterogenous population of advisers, where for a given standard typically some advisers will be honest while other advisers will not.[21] Nevertheless, in this more complex setting the main insights of Proposition 3 are still valid.

5 Adviser Heterogeneity

We introduce heterogeneity in the form of a population of advisers with different reputational cost, β (or a single adviser with private information on his/her type).[22] These costs are distributed uniformly in an interval $[\underline{\beta}, \overline{\beta}]$. In such a case, typically, for a given standard, some advisers with

[21] The basic model considers a single type of adviser. This generates the classic paradox found in similar principal-agent models with imperfect information, where the court (principal) will penalize the adviser (agent) with some probability despite knowing that the adviser's optimal policy is to "do the right thing" (which in this case is to give honest advice), and hence, is always innocent. If the court does not penalize the adviser, then the adviser would no longer have incentives to do the right thing and then the court would have to reinstate sanctions. By introducing a heterogeneous population of advisers we allow for a richer set of possible judicial errors where this paradox need not arise.

[22] Advisers may also differ in other dimensions such as their degree of conflict of interest or the rents from the sale of each of the risky assets. A similar analysis would apply.

a high reputational cost β would be honest while other advisers, facing a lower reputational cost, would be dishonest.

Suppose that the court sets a standard $\bar{\pi}$ for a given level of effective information, γ. Then, there will be a marginal type, β^*, characterized by the incentive compatibility constraint, who will be indifferent between being honest and dishonest. This marginal type is characterized by the solution to the following equation:

$$p\mathbb{T}_I(\bar{\pi}) + \mathbb{T}_{II}(\bar{\pi}) = 1 + \frac{R(H,\gamma) - R(D,\gamma,\beta^*)}{L}.$$

Using the resulting solution we obtain that advisers with reputational cost higher than β^* where

$$\beta^*(\bar{\pi},\gamma) = \frac{(\Phi(\bar{\pi}) - 1)L}{\alpha} - (p^G(\gamma)r_1 - p^B(\gamma)r_2),$$

will be honest, while the rest will be dishonest. Notice that $\beta^*(\bar{\pi},\gamma)$ is decreasing in $\bar{\pi}$ and γ.

Then, the proportion of advisers who are honest, which we label as the compliance level η, is given by

$$\eta(\bar{\pi},\gamma) = \frac{\overline{\beta} - \beta^*(\bar{\pi},\gamma)}{\overline{\beta} - \underline{\beta}},$$

which is increasing in γ. If the level of accuracy increases, the marginal type decreases and then there is more compliance–a higher proportion of advisers are willing to follow a policy of honesty.

The problem for the court becomes more complex as its actions will have consequences along a number of different dimensions. The court, when choosing a standard, is concerned both with the level of Type I and Type II errors as well as with the general compliance level. We capture the court's objective when balancing the consequences of its legal standards using a social welfare function, $W(\eta, \mathbb{T}_I, \mathbb{T}_{II})$. Then, the court will set its optimal standard, $\bar{\pi}^*$, as the solution to the following problem:

$$\bar{\pi}^* \in \arg\max W(\eta, \mathbb{T}_I, \mathbb{T}_{II}).$$

To address this problem, rather than using a specific functional form, we think that studying a class of welfare functions with a set of plausible characteristics is preferable. Assume that W is

twice differentiable in its arguments. Let W_i denote the derivative of W with respect to its i-th argument, and W_{ij} as the second derivative of W with respect to its i-th and j-th argument. We assume the following two types of conditions:

(i) Welfare is increasing in compliance ($W_1 > 0$), concave ($W_{11} < 0$), and decreasing in $\mathbb{T}_I$ and $\mathbb{T}_{II}$, ($W_2 < 0$ and $W_3 < 0$),

(ii) More compliance makes $\mathbb{T}_I$ [$\mathbb{T}_{II}$] more [less] socially costly ($W_{12} < 0$ [$W_{13} > 0$]).

An example of a social welfare function that satisfies these conditions is the following:

$$W(\eta, \mathbb{T}_I, \mathbb{T}_{II}) = \eta - \alpha_1(\eta)\mathbb{T}_I - \alpha_2(\eta)\mathbb{T}_{II},$$

where $\alpha_1(\eta)$ is increasing and $\alpha_2(\eta)$ is decreasing in compliance η. Such a welfare function will satisfy our properties: it is increasing and concave in compliance, decreasing in court errors, and more (less) sensitive to Type I (Type II) error as compliance increases.

In addition, we assume that the relative social importance from a change in $\mathbb{T}_I$ is everywhere greater than from a change in $\mathbb{T}_{II}$. This additional condition is formalized as:

(iii) A change in $\mathbb{T}_I$ is uniformly greater than a change in $\mathbb{T}_{II}$:

$$p\left|\frac{\partial W}{\partial \mathbb{T}_I}\right| \geq \left|\frac{\partial W}{\partial \mathbb{T}_{II}}\right|. \tag{3}$$

This assumption reflects the general fairness concern with the problem of convicting the innocent in legal discourse and practice ("it is better to let a guilty person go unpunished than to condemn an innocent"). In our previous example of a social welfare function this condition would require that $\alpha_1(\eta)$ is sufficiently larger than $\alpha_2(\eta)$. This should be easily satisfied if we interpret $\alpha_1(\eta)$ and $\alpha_2(\eta)$ as being related to the population weight of honest and dishonest agents, respectively, and we are in a situation where being dishonest is the exception and not the rule in the population.

With this assumption we can concentrate on the decreasing section of the $\Phi(\bar{\pi})$ weighted error function, as for two standards, $\bar{\pi}$ and $\bar{\pi}'$, that generate the same error, $\Phi(\bar{\pi}) = \Phi(\bar{\pi}')$, the lower standard is preferred: $\bar{\pi} < \bar{\pi}' \Rightarrow W(\bar{\pi}) > W(\bar{\pi}')$.

From this, we can prove that amongst the relevant evidentiary standards (those that dominate other standards that generate the same errors), the compliance level $\eta(\bar{\pi}, \gamma) = \frac{\overline{\beta} - \beta^*(\bar{\pi}, \gamma)}{\overline{\beta} - \underline{\beta}}$ is increasing in $\bar{\pi}$.

Rewriting the social welfare function as a function of (π, γ):

$$f(\bar{\pi}, \gamma) = W(\eta(\pi, \gamma), \mathbb{T}_I(\pi), \mathbb{T}_{II}(\pi)),$$

We can now prove that the social welfare function has a key property, namely, that $f(\pi, \gamma)$ is submodular in (π, γ):

$$\frac{\partial^2 f(\pi, \gamma)}{\partial \pi \partial \gamma} = \eta_y(\pi, \gamma)[\eta_\pi(\pi, \gamma) W_{11} + \mathbb{T}'_I(\pi) W_{12} + \mathbb{T}'_{II}(\pi) W_{13}] < 0$$

From this we obtain the same result as in the baseline model (Proposition 3), namely that the optimal standard $\bar{\pi}^* \in \arg\max W(\eta, \mathbb{T}_I, \mathbb{T}_{II})$ is decreasing in γ.

PROPOSITION 4 *With heterogeneous types of financial adviser, a court with a social welfare function that satisfies conditions (i)-(iii) above, will set an optimal evidentiary standard that depends on the quality of information available to investors and their sophistication. Higher levels of adviser's transparency and investor's sophistication result in lower court optimal evidentiary standards.*

The intuition behind Proposition 4 is as follows: more effective information implies that the marginal type will have lower reputational costs, and hence there will be more compliance. This means that a higher proportion of advisers are willing to be honest. A higher compliance level makes less stringent standards more appealing for two reasons: i) as more advisers are giving honest advice, the weight of Type I error in the objective function increases, and ii) given the concavity in compliance of the objective function, the court is less willing to increase the standard (and type I error) in order to increase compliance further.

6 Applications and extensions

6.1 Transparency and the quality of evidence

First, we have assumed that the evidence available to the court, the informativeness of Π, is constant, and does not depend on the accuracy of the investor's signal or, indirectly, on the transparency level provided by the firm. Ganuza et al. (2022) shows that optimal standards are lower when the quality of evidence (informativeness of the signal held by the court) is higher. In our setting, this effect may lead to even further reductions in the optimal evidentiary standards when investors receive more accurate signals about the assets, which in turn happens when clients are more sophisticated and when the information that advisers provide to investors is more transparent.

We come back to our dichotomous setting in which the court's decision problem is written in terms of minimizing decision errors. If higher transparency or more sophistication increase the quality of evidence before the court, this implies less errors in imposing liability for any given standard, i.e if $\gamma' > \gamma$ then $\Phi(\bar{\pi}, \gamma') \leq \Phi(\bar{\pi}, \gamma)$. Then, the set of standards that satisfy the incentive compatibility constraint is larger and, consequently, the minimum of such set, the optimal one that minimizes type one error, is lower.

To illustrate this, Figure 3 reproduces Figure 2 and includes what would happen to the error function if the increase from $\Delta'/L = -0.23$ to $\Delta/L = -0.2$ (the revenue loss from being honest is reduced due to an increase in transparency) is accompanied by an increase in the quality of evidence before the court.[23] The increase in the quality of evidence is represented by a new error function (the dashed line) which is below the previous error function for all values of π. This implies that the previous optimal standard, π^{**}, is in the interior of the set of feasible standards, and consequently, the new optimal standard, $\widehat{\pi}^{**}$, will be smaller than (to the left of) π^{**}, and

[23] In our parameterized example, the parameter γ captures the informativeness of the signal, and the figure 3 captures an increase in γ from a value of 1.75 to one of 2.10.

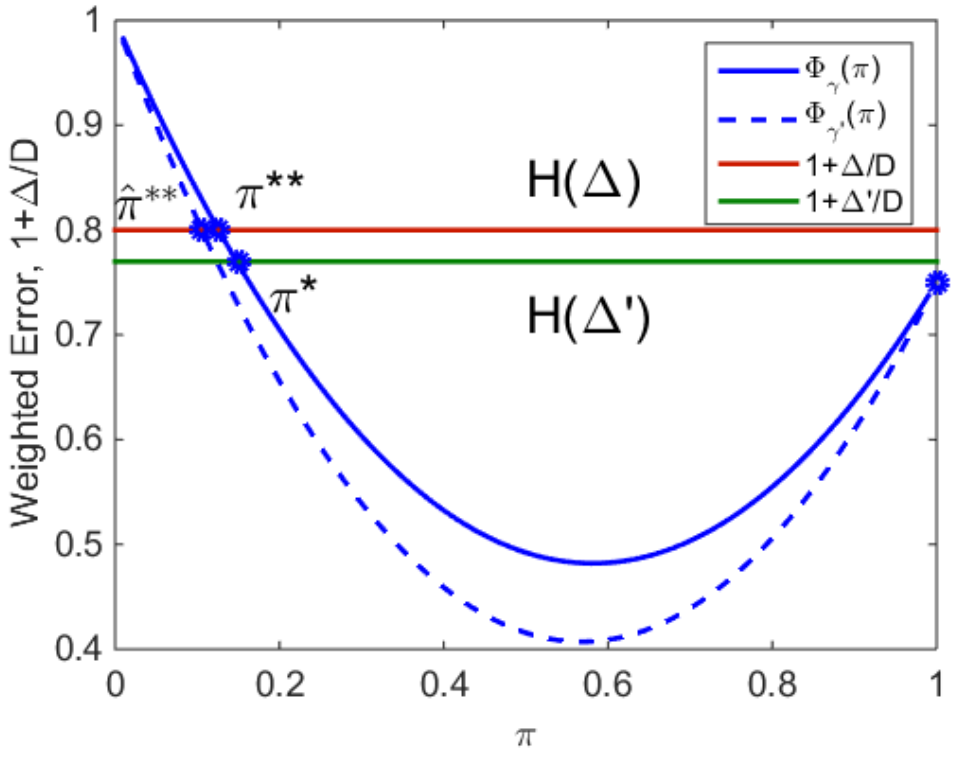

Figure 4: Changing transparency and the quality of the court's information.

even more so than π^*. The court policy is to apply a standard that is even more lenient.

If we consider the case of heterogeneous advisers, in which we expect both types of errors in equilibrium, the shift in the weighted error function means that we cannot guarantee that the new standard will be more lenient without additional assumptions on how the accuracy level determines the shape of $\Phi(\bar{\pi}, \gamma)$. However, we can provide a local argument to prove that if accuracy improves, a lower standard may increase welfare.

In particular, consider the case where a change in transparency only changes the accuracy of the evidence (shifts the error function down), keeping the revenue loss from being honest unaltered. Let $\bar{\pi}^*$ be the original optimal standard (before, under γ, i.e $\bar{\pi}^* \in \arg\max W_\gamma(\eta, \mathbb{T}_I, \mathbb{T}_{II})$. Now consider standards with the new, more accurate evidence, γ'. In particular we consider two standards $\hat{\pi}_I$ and $\hat{\pi}_c$. Because γ' generates more accurate information to the court, there are fewer errors. This allows the court to achieve the same level of Type I error with lower Type II

error and greater compliance, or achieve the same level of compliance with less errors. Let $\hat{\pi}_I$ be the first of these, the standard that achieves the same level of Type I error, and $\hat{\pi}_c$ the second, the one that generates the same level of compliance.

With evidence γ' and standard $\hat{\pi}_I$ welfare is greater than with be the original optimal standard $\bar{\pi}^*$ under γ, as Type I error is the same, Type II error is lower and compliance greater. We can make the standard more lenient than $\hat{\pi}_I$, which will gradually lower Type I error and decrease compliance, until the point where we reach $\hat{\pi}_c$. At $\hat{\pi}_c$ we know that welfare is also greater than with $\bar{\pi}^*$ under γ, as compliance is the same and Type I error is lower. Although Type II error is greater than under $\bar{\pi}^*$, given that we are assuming that Type I error is socially more costly than Type II error, the overall welfare is necessarily greater. So, at both extremes of the interval $[\hat{\pi}_c, \hat{\pi}_I]$ welfare is greater. Then, for all other standards in the interval, Type I error is lower and compliance is greater than with $\bar{\pi}^*$ under γ.Hence, welfare is also larger.

We have characterized a set of standards under γ' that are more lenient and generate more welfare for all welfare functions satisfying our original set of assumptions. Outside of this set, whether the standard under γ' generates more or less welfare than $\bar{\pi}^*$ under γ depends on the particular welfare function being considered, and in particular how it evaluates the trade-off between compliance and judicial errors.

We can now incorporate into the analysis the effect of transparency on the incentives for being honest. As we found in Figure 4, more transparency reduces the revenue loss from being honest and increases the incentives of the advisers to provide honest advice for any standard. This will further reduce the need to use a harsher standard even when compliance is socially very valuable.

6.2 Endogenous transparency

Thus far, we have not considered that the investor's level of sophistication and the transparency level of the financial adviser may be choice variables. In reality, subject to certain constraints and costs, both are within the ability of the adviser to choose or, at least, to influence.

Regarding transparency, it appears to be the case that the financial adviser may take many steps to enhance the amount, quality and transparency of the investment information she provides to her current or prospective clients. For instance, the firm providing investment services may prepare information and marketing materials in ways that are reasonably clear and accessible, and that also address some of the relevant issues pertaining to a (larger or smaller) number of the investment products that are offered to various groups of investors. The information can also attempt to correct some of the biases and shortcomings that investors may frequently incur. With the size, clarity, and quality of that information, the ability of investors to assess the suitability of financial products would increase, given the level of experience and sophistication of the investor, even in the absence of investment advice explicitly or implicitly addressed to them. Obviously, these measures are costly, since they involve training of personnel, research, and time and effort in producing and presenting the information.

Customers' degree of sophistication is also a variable that may be influenced by the financial adviser. First, because the target population of potential customers depends on the marketing strategies used by the firm, and these may cater to different groups that vary in terms of their investment experience and sophistication. Second, because investment firms may engage in some educational efforts to expand the financial acumen in their client base. Third, and more importantly, a financial adviser may devote resources to try to "know its customers". In fact, legal regulation of investment advice emphasizes firms' duties in this area. Art. 25.2 MiFID II Directive, determines that, "[when providing investment advice or portfolio management the investment firm shall obtain the necessary information regarding the client's or potential client's knowledge and experience in the investment field relevant to the specific type of product or service, that person's financial situation including her ability to bear losses, and her investment objectives including her risk tolerance [...]." By engaging in these efforts, the financial adviser would have better knowledge of the level of sophistication of a given client before providing advice. With the help of such knowledge, the firm may design the general investment information in a way that is

better tailored to the profile of its clients, so that the perceptions that investors will derive from such information become more accurate, since they have a better fit with the investors' level of sophistication.

Thus, in the world of our model, when firms may take costly measures to increase investors' sophistication and informational transparency, they will trade off the cost of these measures against the benefits that will accrue to them in terms of lower liability standards to be applied in ex post litigation when investors incur losses. More lenient liability standards applied to investment advisers with more sophisticated clients and who produce more transparent general investment information will not only reduce the "penalty" on "good"financial advisers, but will also provide incentives for firms to channel resources into increasing the level of sophistication of investors in their client base, and to produce information for their clients that allows them to better assess the suitability of alternative investment instruments, even without the help of the firms' financial advice.

6.3 Forward-looking investors

We were assuming that investors are myopic regarding the liability system, and revenue functions $R(H, \gamma)$ and $R(D, \gamma)$, are independent of the standard chosen by courts. In other words, that the payments imposed on advisers do not translate directly into compensation to investors. In general, under tort or contract (but not under regulatory sanctions and fines, that accrue to the agency or the Government) it is likely that investors get some amount of compensation. Thus, their willingness to pay for financial assets may be affected by the liability system in place. Revenue functions may depend on the optimal liability standard $R(H, \gamma, \bar{\pi})$ and $R(D, \gamma, \bar{\pi})$. This complicates the analysis as liability payments will reduce the expected costs for investors when they receive poor advice, leading them to be less selective in terms of avoiding a bad match with an investment product. This, in turn, is likely to make $R(H, \gamma, \bar{\pi}) - R(D, \gamma, \bar{\pi})$ even more negative, and to decrease the incentives of advisers to follow a policy of honesty. Therefore, introducing

tort or contract compensation to clients generates an efficiency loss relative to the benchmark case consisting on pure sanctions imposed on advisers.

Nevertheless, although the incentives for good behaviour could be lower with forward looking investors, it would still be true that the incentives to give honest advice are higher when the effective information in the hands of investors is higher. In our setup, this implies that $R(H, \gamma, \bar{\pi}) - R(D, \gamma, \bar{\pi})$ continues to be increasing in the effectiveness of the information, γ, which is the key property driving our results.

6.4 Know your customer and money doctors

Our analysis is also relevant in a context where the adviser acts as a money doctor (Gennaioli et al. (2015)) or a source of trust in the stock market (Guiso et al. (2008)). In such a setting the source of poor advice does not arise from an explicit misalignment of incentives but from a simple moral hazard problem, where the adviser, whose mere presence is a source of value to the investor, needs to exert effort in order to learn the customer's type to provide suitable advice.

Adapting the model to the moral hazard problem involves the following changes: First let $r_1 = r_2$. This will eliminate the misalignment of incentives via commissions or differential rents accruing to advisers. Second, introduce moral hazard by giving the agent no initial information on the customer's type, and allow him to learn the customer's type perfectly by investing an amount of effort equal to e. In addition, assume for simplicity that the agent's default recommendation prior to learning the investor's type is S_2. With these changes, the expected revenues for the financial adviser from informed (H) and uninformed (D) policies are the following:

$$R(H, \gamma) = (1 - \alpha) p^G(\gamma) r_2 + \alpha p^G(\gamma) r_2 - e,$$
$$R(D, \gamma) = (1 - \alpha) p^G(\gamma) r_2 + \alpha (p^B(\gamma) r_2), c\,,$$

respectively. Then, if the advisor invests in learning the asset that best matches customers' preferences, the probability of selling is always $p^G(\gamma)$. If the advisor does not exert the effort,

then he always recommends asset 2. This is good advice only with probability $(1-\alpha)$. The key dimension for our results is the difference in revenues between both strategies, Δ_E:

$$\Delta_E(\gamma) = R(H,\gamma) - R(D,\gamma) = \alpha([p^G(\gamma) - p^B(\gamma)]r_2) - e.$$

As in this version of the model we are assuming that $p^G(\gamma) - p^B(\gamma)$ is increasing with γ, we can conclude that the incentives for honest/informed behaviour are increasing in the accuracy parameter γ. As in our benchmark model the revenue function is supermodular in the decision about being honest and in accuracy, so that all our results continue to hold. The intuition is that when the investor is better informed or is more sophisticated, the adviser needs to invest less to provide accurate advice in order to increase the probability of a sale probability and revenue from it. This is the driving force behind our results, as the courts, not being able to observe the adviser's effort directly, anticipates that greater accuracy generates greater incentives to the adviser to behave well.

7 Implications for regulatory policy

Financial advice is heavily regulated in most countries. An extensive set of duties of behavior and regulatory constraints are imposed. These mandates have liabilities -monetary and other- attached to their infringement. Analyzing how these affect the behavior of investment services firms appears to be helpful in improving our understanding of financial advice.

The legal and regulatory scheme and its implementation are not in the hands of omniscient lawmakers and adjudicators. The legal and regulatory apparatus typically possesses only incomplete information about the behavior of the regulated investment advisers. Thus, issues of information are of great importance to design and implement desirable laws and regulations in this area. In our simple model, we highlight a number of dimensions that we believe fit closely with plausible accounts of the interaction between advisers and clients.

For instance, what amounts to "advice" as an action that should trigger liabilities vis-à-vis

investors is trickier than it seems. Sometimes the financial advice will be "hard", in the sense of falling squarely under the legal term of "financial advice", i.e. a specific recommendation by the firm to make a given choice and addressed to a particular client. In other circumstances, it may be a "softer" or more subtle form of advice, through which the firm conveys an implicit recommendation, or presents the choices to the client in a way that hints to what constitutes the preferred alternative. Obviously, such financial advice, either in a "hard" or a "soft" version, may be more or less "honest", in the sense that it may or may not correspond with what the firm observes as the best interest of the client in terms of the match between the long-term profitability and riskiness of the investment and the needs of the client.

Part of that investment information may become available to the client through various sources, but a substantial fraction of it would be provided -or not- by the financial adviser, in the form of, among others, easily readable reports on past returns and volatility from a range of products or a set of issuers of financial instruments, accessible information provided by the firm on certain general features of investment decisions and alternatives (diversification, hedging, risk profile, adjustment of characteristics to different age- and income-profiles, etc.), and other similar pieces of information. These may contribute to making the information investors possess on alternative investment products more accurate. The information elaborated and communicated by the investment firm, moreover, may be drafted and presented with varying degrees of clarity and comprehensibility, and may be more or less complete in terms of coverage. In the model we labeled as "transparency" the overall quality of that general information affecting the accuracy with which investors perceive the match of a product with her own preferences or characteristics.

It should be noticed that we do not include within the notion of transparency used in the model other pieces of information that would allow investors to directly assess the honesty of the advice and the existence and severity of a conflict of interest afflicting the financial adviser. Think of the presence of third-party inducements or commissions, the dependent or independent nature of the financial advice, the incentive scheme of employees or agents performing the advisory

services. These are factors that surely have an important and immediate bearing on the perception by clients of the presence and magnitude of conflicts of interest and how they will influence the honesty and fairness of the financial advice to the investor. Obviously, we do not consider these issues in the paper, not because we think they are uninteresting or unimportant (quite the opposite), but they have already been extensively analyzed in the literature.[24] Moreover, the legal and regulatory regime governing financial advice has grown in size and importance in view of the concerns with problems in the marketing and sale of financial products to retail investors, comprising the financial advice linked to the distribution of financial instruments.

In the EU and in other places, unsurprisingly, the increased public distrust of the functioning of financial markets in the aftermath of the financial crisis reached the area of financial advice. Some of the important modifications in the legal and regulatory framework governing financial institutions and financial activities have touched this area, in addition to others (such as regulation and supervision of financial institutions, and increased regulation of some "sensitive" markets, such as the mortgage market).

Prior to the financial crisis, the EU had adopted a comprehensive framework for investment services trying to ensure that high standards be observed by investment firms in their dealings with their clients,[25] and especially, with retail investors. The uneasiness about the ability of these rules to deter misconduct in the area of marketing and financial advice to retail investors led to new and ambitious legislative scheme in this area, the MiFID II framework.[26]

The new regulatory architecture for investment services comprises Directive 2014/65/EU (MiFID II) and Regulation 600/2014/EU (MiFIR), together with a very large number of detailed measures implemented through the European Securities and Markets Authority (ESMA). A crucial portion of these new regulatory tools tries to subject the firms involved in providing investment services of various kinds (transmission and execution of orders, management of investment port-

[24] Inderst and Ottaviani (2009, 2012a,b,c); Inderst et al. (2010), although without an ex-post imperfect liability system in place.

[25] This is the so-called MiFID I, resulting from Directive 2004/39/EC (MiFID I), Directive 2006/73/EC (MiFID I Implementing Directive), and Regulation 1287/2006/EC (MiFID I Implementing Regulation).

[26] See generally on MiFID II, Busch and Ferrarini (2017).

folios, commercialization of financial products, investment advice) to certain duties and rules of conduct that would (or at least have such aims) improve investor protection and secure stable financial markets. The goal of consumer protection and market stability are explicit in the recitals of MiFID II.

The overarching legal duty presiding over the behavior of a firm that provides investment services is that of acting "honestly, fairly and professionally in accordance with the best interests of its clients". Other more specific duties, with requirements that depend on various circumstances -type of service, type of client, type of financial instrument, etc.- arise in connection with information disclosure, knowledge and assessment of the client -Know Your Customer Rules, leading eventually to tests of appropriateness and suitability of the product to the investor-, management of conflicts of interest, execution of instructions, recording and communication, and so forth. Even beyond the boundaries of this extensive set of duties under MiFID II, the implications of our model are relevant, for how the law deals with the provision of financial advice to investors by experts, be they explicitly framed as advice, personally addressed to a customer, or as a vaguer and less explicit "nudge" towards a given investment product. These more "subtle" or "covered" forms of implicit recommendation actually complicate the ex post observation by courts of the underlying adviser's behavior, and thus neatly match the setting we explore.

Our model focuses precisely into such a setting, where investors' perceptions as to the suitability of financial instruments, the advice provided by the expert financial advisers, and the decisions by courts who impose liability ex post with only informative signals about the firms' actual compliance with their legal duties, intersect.

8 Conclusions

Financial advice, both explicit and implicit, is a pervasive phenomenon in the area of household finance, which includes key financial decisions such as borrowing, stock market participation, investment products, insurance, and pensions. Moreover, it is an activity subject to extensive

regulation in terms of the legal duties imposed on firms that engage in it. Our model focuses on the interaction between the legal system and the incentives of financial advisers. More specifically, we address an scenario where investors' observations about financial instruments, the honesty of the advice provided by the expert financial advisers, and legal sanctions administered by imperfectly informed courts, interact.

In this setting we have provided a theoretical analysis of how clients' sophistication, and the transparency of general investment information from the firm should affect the stringency of the court-imposed liability regime that applies to financial advisers . We find that transparency and investor sophistication generally improve the incentives of advisers to provide honest and suitable advice. As such an advice may be too costly to provide, courts and supervisory entities can play a role by introducing penalties to align private incentives with social incentives to induce honest advice. Given the unavoidable costs arising from judicial errors linked to the imperfect observation of advisers' behavior, we find that it is optimal to apply more lenient standards in settings with greater transparency and/or investor sophistication. However, with insufficient transparency or low investor sophistication, or if judicial errors are too frequent, the justice system may not be able to induce adequate financial advice. At this point, direct regulation of the activity, in the form, among others, of the selective prohibition of recommendations for certain assets to certain types of investors, may become necessary.

We also find that private incentives for increasing transparency are aligned with social ones as greater transparency not only reduces court penalties but also increases the private revenue from providing honest advice. However, advisers with reputational costs that are too low or with high costs of learning about her client's specific financial needs may prefer a less transparent regime. In this case, additional measures will be required. For example, courts could impose a much higher standard on less transparent advisers–even strict liability for investors' losses–or regulation could impose minimum transparency standards, or a combination of both.

We believe our analysis is relevant for an improved economic understanding of how the im-

plementation of the regulatory solutions (the new EU new MiFID II regime or some others) may prove economically desirable to improve incentives for fair financial advice.

Naturally, we are fully aware that the current analysis is just a first step in the effort to clarify how various parameters involved in the interaction between investors and financial advisers should impact the implementation of the regulatory regimes intending to improve market outcomes in the area of investment services.

A Appendix

Transformation of the court's decision problem:

The court's problem can be written as:

$$\begin{aligned} & \min_{\overline{\pi}} pF(\overline{\pi}|H) \\ s.t. \quad & R(H,\gamma) - pF(\bar{\pi}|H)L \ \geq R(D,\gamma) - F(\bar{\pi}|D)L. \end{aligned}$$

Then, the objective function is directly $p\mathbb{T}_I(\bar{\pi})$. The incentive compatibility constraint (IC) can be rewritten using the definitions of decision errors:

$$\begin{aligned} R(H,\gamma) - pF(\bar{\pi}|H)L \ &\geq R(D,\gamma) - F(\bar{\pi}|D)L. \\ -F(\bar{\pi}|D)L + pF(\bar{\pi}|H)L \ &\leq R(H,\gamma) - R(D,\gamma). \\ L - F(\bar{\pi}|D)L + pF(\bar{\pi}|H)L \ &\leq L + R(H,\gamma) - R(D,\gamma) \\ p\mathbb{T}_I(\bar{\pi}) + \mathbb{T}_{II}(\bar{\pi}) &\leq 1 + \frac{R(H,\gamma) - R(D,\gamma)}{L}. \end{aligned}$$

Proof of Lemma 1: We include this proof for completeness since it can be also found in Ganuza et al. (2022). The values of Φ are obtained by direct computation while the existence and uniqueness of the minimum is obtained by looking at the derivative of Φ:

$$\Phi'(\pi) = f(\pi|q_L)[p\frac{f(\pi|q_H)}{f(\pi|q_L)} - 1].$$

As the likelihood ratio integrates to one (with respect to $f(\pi|q_L)$) and is monotone, Φ has at most one sign change (from negative to positive). As the likelihood ratio is increasing it starts

off negative so that the minimum of Φ is either in the interior of $[0,1]$ or at $\pi = 1$. Uniqueness comes from the differentiability of f.

PROOF OF PROPOSITION 2: The level $\Delta_{\min}$ is determined as the solution to $\Phi(\pi_{\min}) = 1 + \frac{\Delta_{\min}}{D}$. In case of $\Delta < \Delta_{\min}$, for all $\pi \in [0,1]$, $\Phi(\pi) > 1 + \frac{\Delta}{D}$ so that it is not possible to induce high quality. For $\Delta > \Delta_{\min}$, let $\mathbb{H}(\Delta)$ be the set of π that satisfy the incentive compatibility constraint for a given Δ. The set $\mathbb{H}(\Delta)$ is a closed interval such that for all $\pi \in \mathbb{H}(\Delta)$, $\Phi(\pi) < 1 + \frac{\Delta}{D}$, and the minimum of $\mathbb{H}(\Delta)$ is $\Phi_{\mathbb{D}}^{-1}\left(1 + \frac{\Delta}{D}\right)$. As $\Phi_{\mathbb{D}}$ is decreasing and $1 + \frac{\Delta}{D}$ is increasing in Δ , $\Phi_{\mathbb{D}}^{-1}$ is decreasing in Δ.

PROOF OF PROPOSITION 3: From Proposition 2 we know that the optimal standard $\bar{\pi}^*$ is decreasing in Δ, and $\Delta(\delta, c) = R(q_H, \delta) - c - R(q_L, \delta)$ is increasing in δ, which implies that $\bar{\pi}^*$ is decreasing in δ.

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B NOT FOR DISTRIBUTION

B.1 Microfoundations: restricted investments, fixed types with full financial adviser (FA) information

Consider the situation where the population is made up of sophisticated and unsophisticated investors. Let θ be the proportion of sophisticated investors and $1-\theta$ that of unsophisticated investors. Also, suppose that initially the investor is only aware of the existence of the riskless asset, and will only become aware of the risky asset that the adviser recommends (and never know of the existence of the other risky asset). The investors' optimal action will depend on their type, defined by their level of sophistication. Assume the unsophisticated investors will follow the recommendation of the adviser. On the other hand, sophisticated investors will follow the given advice if it coincides with the signal they receive when they request advice. Then, the expected revenues from honest and dishonest policies are

$$\begin{aligned} R(H,\gamma) &= \alpha(\theta\gamma+(1-\theta))r_1+(1-\alpha)(\theta\gamma+(1-\theta))r_2 \\ R(D,\gamma) &= \alpha(\theta(1-\gamma)+(1-\theta))r_2+(1-\alpha)(\theta\gamma+(1-\theta))r_2)-\alpha\beta. \end{aligned}$$

Then, the revenue difference between the two honesty policies is:

$$R(H,\gamma)-R(D,\gamma) = \alpha(\theta\gamma+(1-\theta))r_1-\alpha(\theta(1-\gamma)+(1-\theta))r_2+\alpha\beta.$$

Let

$$p^G(\gamma)=\theta\gamma+(1-\theta), \quad p^B(\gamma)=\theta(1-\gamma)+(1-\theta),$$

so that the difference can be rewritten as follows:

$$R(H,\gamma)-R(D,\gamma) = \alpha(p^G(\gamma,\theta)r_1-p^B(\gamma,\theta)r_2+\beta),$$

where p^G is increasing in γ and p^B is decreasing in γ. However, both are decreasing in θ and the

overall effect of an increase in θ may be negative:

$$\begin{aligned}\frac{\partial}{\partial\theta}R(H,\gamma)-R(D,\gamma) &= \alpha((\gamma-1)r_1-((1-\gamma)-1)r_2)\\ &= \alpha(r_2-(1-\gamma)(r_1+r_2))\end{aligned}$$

B.2 Microfoundations: restricted investments, Nash equilibrium with full FA information

Consider the situation where the population is made up of sophisticated and unsophisticated investors. Let θ be the proportion of sophisticated investors and $1-\theta$ that of unsophisticated investors. Also, suppose that initially the investor is only aware of the existence of the riskless asset, and will only become aware of the risky asset that the adviser recommends (and never know of the existence of the other risky asset). The investors' optimal action will depend on their level of sophistication. Assume the unsophisticated investors will follow the recommendation of the adviser. On the other hand, in equilibrium the sophisticated investor will condition the interpretation on the FA's optimal action and hence, will believe (and follow) the recommendation if in equilibrium the FA is honest, and will ignore the recommendation of the adviser if in equilibrium the FA is dishonest. Note, however, that the sophisticated investor obtains information just from visiting the adviser, namely, the investor learns of the existence of the risky asset and obtains the signal, s, with precision γ regarding the expected return of the risky asset. With this information, if the adviser is being dishonest, the investor will compare the expected return from the recommended risky asset (after observing the signal) with the riskless asset. Let q_i, $i\in\{1,2\}$, denote the posterior probability that the match with the recommended asset is good. This implies that the investor will invest in the risky asset only if:

$$\begin{aligned}0 &\leq q_i\left(1-p-pL\right)+\left(1-q_i\right)\left(-L\right)\\ \iff &\frac{q_i}{1-q_i}\geq\frac{L}{1-p\left(1+L\right)}:=\mathcal{L}.\end{aligned}$$

The ratio of posterior expectations depends on both the informativeness of the signal, γ, as well as the prior, α, namely:

$$\frac{q_1}{1-q_1} = \frac{\alpha\gamma}{(1-\alpha)(1-\gamma)}, \quad \frac{q_2}{1-q_2} = \frac{(1-\alpha)\gamma}{\alpha(1-\gamma)}.$$

To simplify the analysis, consider that γ is sufficiently high such that the sophisticated investor will choose the recommended asset if the signal received suggests it is a good match. Then, the expected revenues from honest and dishonest policies are

$$\begin{aligned} R(H,\gamma) &= \alpha(\xi(q\gamma+(1-q))r_1 + (1-\xi)(1-q\gamma))r_2 \\ &\quad +(1-\alpha)(\xi(q\gamma+(1-q))r_2 + (1-\xi)(1-\gamma q))r_1, \\ R(D,\gamma) &= \alpha(q(1-\gamma)+(1-q))r_2 + (1-\alpha)(q\gamma+(1-q))r_2) \\ &\quad -(1-\alpha)(1-\xi)\beta - \alpha\xi\beta \end{aligned}$$

$$\begin{aligned} R(H,\gamma) &= \alpha r_1 + (1-\alpha)r_2 \\ R(D,\gamma) &= \alpha(\theta(1-\gamma)+(1-\theta))r_2 + (1-\alpha)(\theta\gamma+(1-\theta))r_2) - \alpha\beta. \end{aligned}$$

If $\xi = 1$, this simplifies as $\hat{\gamma}_\xi = \hat{\gamma}_1 = q + (1-q)\gamma$, so that: Consider the deviations: $R(H,\gamma,d)$, the revenue from deviating from a policy of honesty, and $R(D,\gamma,h)$, the revenue from deviating from a policy of dishonesty (where after observing s_1 out-of-equilibrium, the sophisticated investor believes the FA is being honest):

$$\begin{aligned} R(H,\gamma,d) &= \alpha r_2 + (1-\alpha)r_2 - \alpha\beta. \\ R(D,\gamma,h) &= \alpha r_1 + (1-\alpha)(\theta\gamma+(1-\theta))r_2). \end{aligned}$$

$$\begin{aligned} R(H,\gamma) &= \alpha(\xi(q\gamma+(1-q))r_1 + (1-\xi)(1-q\gamma))r_2 \\ &\quad +(1-\alpha)(\xi(q\gamma+(1-q))r_2 + (1-\xi)(1-\gamma q))r_1, \\ R(D,\gamma) &= \alpha(q(1-\gamma)+(1-q))r_2 + (1-\alpha)(q\gamma+(1-q))r_2) \\ &\quad -(1-\alpha)(1-\xi)\beta - \alpha\xi\beta \end{aligned}$$

Then, for honesty to be an equilibrium outcome we require

$$\begin{aligned} R(H,\gamma) - R(H,\gamma,d) &= \alpha(r_1 - r_2) + \alpha\beta \geq 0 \\ \iff \beta &\geq r_2 - r_1. \\ R(D,\gamma) - R(D,\gamma,h) &= \alpha(\theta(1-\gamma) + (1-\theta))r_2 - \alpha r_1 - \alpha\beta \geq 0. \\ \iff \beta &\leq (1-\gamma\theta)r_2 - r_1. \end{aligned}$$

B.3 Microfoundations: unrestricted investments, partial FA information

Suppose the investor receives a private signal of the state, s, with precision γ. The adviser also receives a signal with precision ξ. The adviser sends a message to the investor, m. Suppose that this message is equal to her signal with probability h and equal to the adviser's preferred asset with probability $1-h$. Notation: let Gi, $i \in \{1,2\}$, denote the state where asset i is a good match. Similarly, let mi and si represent the events "the message sent by the FA is that asset i is a good match" and "the signal received by the investor is that asset i is a good match". **Unknown bias** Suppose the investor does not know which asset is preferred by the FA and assumes the FA prefers each asset with equal probability. Then the investor believes a dishonest message recommends assets 1 and 2 with equal probability. The posterior after observing $m1$ is

$$\begin{aligned} \Pr\{G1|m1\} &= \frac{\Pr\{m1|G1\}\alpha}{\Pr\{m1\}} \\ \Pr\{m1|G1\} &= h\xi + (1-h)\frac{1}{2} \\ \Pr\{m1\} &= h(\alpha\xi + (1-\alpha)(1-\xi)) + (1-h)\frac{1}{2} \\ \Pr\{G1|m1\} &= \frac{\left(h\xi + (1-h)\frac{1}{2}\right)\alpha}{h(\alpha\xi + (1-\alpha)(1-\xi)) + (1-h)\frac{1}{2}} \\ \frac{\Pr\{G1|m1\}}{1-\Pr\{G1|m1\}} &= \frac{\alpha(h\xi + (1-h)\frac{1}{2})}{(1-\alpha)(h(1-\xi) + (1-h)\frac{1}{2})} \end{aligned}$$

With unknown bias, the "precision" of the message is $h\xi + (1-h)\frac{1}{2}$ which is directly comparable with the precision of the signal γ. Then, the investor would always follow the signal rather than

the message if

$$\gamma_i > h\xi + (1-h)\frac{1}{2},$$

and follow the message over the signal if the inequality is reversed. With $\xi = 1$, the inequality is

$$\gamma_i > \frac{1+h}{2}.$$

Known bias Suppose that the investor knows that the FA prefers to sell asset 2. Then, the honest FA will communicate the message truthfully but the dishonest one will always recommend asset 2. If the investor observes $m1$, then it comes from the truthful type for sure, and the precision of the signal is ξ. If the investor observes $m2$, then the posterior is obtained as follows:

$$\begin{aligned}
\Pr\{m2|G2\} &= h\xi + (1-h) \\
\Pr\{m2\} &= h((1-\alpha)\xi + \alpha(1-\xi)) + (1-h) \\
\Pr\{G2|m2\} &= \frac{(h\xi + (1-h))(1-\alpha)}{h(\alpha(1-\xi) + (1-\alpha)\xi) + (1-h)} \\
\frac{\Pr\{G2|m2\}}{1-\Pr\{G2|m2\}} &= \frac{(1-\alpha)(h\xi + (1-h))}{\alpha(h(1-\xi) + (1-h))} \\
&= \frac{(1-\alpha)\frac{h\xi+(1-h)}{2-h}}{\alpha(1-\frac{h\xi+(1-h)}{2-h})}
\end{aligned}$$

With known bias, the "precision" of the message depends on the bias. If the FA-preferred option is 2 then upon observing $m1$ the investor would follow the signal if

$$\gamma_i > \xi,$$

that is, always if $\xi = 1$. While, upon observing $m2$ the investor would follow the signal if

$$\gamma_i > \frac{h\xi + (1-h)}{2-h}.$$

The FA's optimal action To obtain a strategy where the FA mixes between being honest and dishonest we can appeal to two possibilities: (i) the FA is following a mixed strategy in a Nash Equilibrium [see above section on Nash equilibrium with full FA information]; (ii) another possibility is that the FA is mixing in response to a random signal on the investor's type (γ_i). A

particular version of case (ii) is as follows: the FA receives a signal σ that is informative about the investor's level of sophistication, with values $\{H, L\}$ where H refers to the case where the investor has a higher γ_i and will ignore the FA's advice, and L refers to the case where the investor has a lower γ_i and will follow the FA's advice. The following argument points at the hypothesized supermodularity of the revenue function without reference to the exact informational content of the signal or whether we assume the FA's bias is known or unknown. Let $q(\sigma)$ be the FA's posterior that the investor is unsophisticated (and will follow the FA's advice) and $1 - q(\sigma)$ that the investor is sophisticated (and will ignore the message and follow si)–we obviate the σ when it is inferable from the context. Let $\hat{\gamma}_\xi = q\xi + (1-q)\gamma$, where γ is the average precision on the parameter of sophisticated investors, so that $\hat{\gamma}_1 = q + (1-q)\gamma$. The expected revenues from honest and dishonest policies are

$$\begin{aligned}
R(H, \gamma, \sigma) &= \alpha(\hat{\gamma}_\xi r_1 + (1 - \hat{\gamma}_\xi) r_2) + (1 - \alpha)((\hat{\gamma}_\xi r_2 + (1 - \hat{\gamma}_\xi) r_1)), \\
R(D, \gamma, \sigma) &= \alpha((\hat{\gamma}_1 - q) r_1 + (1 - \hat{\gamma}_1 + q) r_2) \\
&\quad + (1 - \alpha)(\hat{\gamma}_1 r_2 + (1 - \hat{\gamma}_1) r_1) \\
&\quad - (1 - \alpha)(1 - \xi)\beta - \alpha\xi\beta
\end{aligned}$$

If $\xi = 1$, this simplifies to $\hat{\gamma}_\xi = \hat{\gamma}_1 = q + (1-q)\gamma$, so that:

$$\begin{aligned}
R(H, \gamma, \sigma) &= \alpha(\hat{\gamma}_1 r_1 + (1 - \hat{\gamma}_1) r_2) + (1 - \alpha)(\hat{\gamma}_1 r_2 + (1 - \hat{\gamma}_1) r_1), \\
R(D, \gamma, \sigma) &= \alpha((\hat{\gamma}_1 - q) r_1 + (1 - \hat{\gamma}_1 + q) r_2) \\
&\quad + (1 - \alpha)(\hat{\gamma}_1 r_2 + (1 - \hat{\gamma}_1) r_1) - \alpha\beta.
\end{aligned}$$

Let $\Delta = r_2 - r_1$. Depending on the value of the parameters, the difference may be positive or negative, and so will be the incentives of the financial adviser:

$$
\begin{aligned}
R(H,\gamma) - R(D,\gamma) &= (1-\alpha)((\hat{\gamma}_\xi - \hat{\gamma}_1)r_2 - (\hat{\gamma}_\xi - \hat{\gamma}_1)r_1)) \\
&\quad +\alpha((\hat{\gamma}_\xi - \hat{\gamma}_1 + q)r_1 - (\hat{\gamma}_\xi - \hat{\gamma}_1 + q)r_2) \\
&\quad +(1-\alpha)(1-\xi)\beta - \alpha\xi\beta R(H,\gamma) - R(D,\gamma) \\
&= (1-\alpha)(\hat{\gamma}_\xi - \hat{\gamma}_1)(r_2 - r_1) \\
&\quad -\alpha(\hat{\gamma}_\xi - \hat{\gamma}_1 + q)(r_2 - r_1) \\
&\quad +(1-\alpha)(1-\xi)\beta + \alpha\xi\beta R(H,\gamma,\sigma) - R(D,\gamma,\sigma) \\
&= \Delta\left((1-2\alpha)(\hat{\gamma}_\xi - \hat{\gamma}_1) - \alpha q\right) \\
&\quad +(1-\alpha)(1-\xi)\beta + \alpha\xi\beta.
\end{aligned}
$$

Which, for $\xi = 1$, simplifies to:

$$R(H,\gamma,\sigma) - R(D,\gamma,\sigma) = \alpha(\beta - q\Delta).$$

So that (with $\xi = 1$) we can generically write

$$R(H,\gamma,\sigma) - R(D,\gamma,\sigma) = \alpha(\beta + p^G(\gamma)r_1 - p^B(\gamma)r_2),$$

where $p^G = p^B$. It is natural to assume that the posterior probability $q(\sigma)$ is decreasing in the distribution of γ, and hence the revenue of the FA is supermodular in γ and honesty. The signal σ parametrizes the FA's types. As long as σ is good news (in the sense of Milgrom) about the probability of meeting a sophisticated investor, then the FA's incentives to be honest will also be increasing in σ. This will occur if higher types are more likely to ignore the message, and for this to be true one needs that the incentives for honesty of the adviser increase more rapidly than the investor's level of sophistication.