Ethics and Trust in the Market for Financial Advisors*

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Abstract

We construct an overlapping generations model of financial advisors, who have ethics, are hired competitively, interact with strategic investment funds, and are regulated. Misconduct is the outcome of the tension between the endogenous career concerns created by a competitive labour market rewarding good advisor behaviour and the strategic investment fund which can frustrate clients' inference by paying commissions to alter advisor incentives. We characterise market conditions leading to high misconduct. We offer a prediction as to the pattern of misconduct as wealth inequality increases. And we establish when, over the course of a career, financial advisors are most trustworthy.

JEL Codes: G41, G20, D91

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1. Introduction

The market for financial advice is large with some estimating that assets under management will top $145 trillion by 2025.[1] The market for financial advice is important: in the US, almost all purchasers of mutual funds or equities have sought investment advice; in Germany 80% do (Chater, Huck, and Inderst, 2010, §3.2). Yet despite the market's prominence, misconduct amongst financial advisors is widespread. Between 2005 and 2015 in the US, over 12% of financial advisors acquired a misconduct record (Egan, Matvos, and Seru, 2019). It is also the case that 60% of financial advisory firms employing more than 1,000 advisors have a higher frequency of blemished financial advisors than one in 20, and in some firms approaching one in five of employed advisors have been guilty of misconduct; these include some of the best known banks in the United States.[2] The misconduct captured by these statistics is most frequently misrepresentation of investments and selection of unsuitable investments.[3] Further, the transgressions are large with average payouts to clients of around $500,000 (Dimmock, Gerken, and Graham, 2018, Egan, Matvos, and Seru, 2019).

It is perhaps surprising, given the ubiquity of financial advisor use, that financiers are some of the least trusted, and best paid, professionals in our economy. Sapienza and Zingales (2012) document that brokers in the US are less trusted than the government, than big corporations, and certainly less trusted than random members of society. And prominent research has identified evidence suggesting that bankers are prone to lying (Cohn, Fehr, and Maréchal, 2014). Nonetheless Philippon and Reshef (2012) document that the pay premium senior financiers enjoy is two and half times that of other professionals,[4] with the lion's share of this increase coming when the financier has acquired experience and an unblemished record (Oyer, 2008).

The coincidence of widespread misconduct, high pay, low trust and yet continued client business in such an important market raises some critical questions which we seek to address. Why do career concerns created by high wages for good financiers not discipline financial advisors? Why isn't regulatory enforcement with a public record of misconduct sufficient to deter misconduct? If wealth inequality amongst clients increases, which prominent scholars suggest is likely[5], will misconduct increase? And if so, who will suffer it? When, over the course of their career, are advisors most unethical, and when most ethical and so most trustworthy?

[1] See https://www.pwc.com/ng/en/press-room/global-assets-under-management-set-to-rise.html.

[2] For example Morgan Stanley (13.1% of advisors with misconduct records) and UBS Financial Services (15.1% with a record) – Egan, Matvos, and Seru (2019), Table 6, misconduct as of May 2015.

[3] The three leading categories of misconduct in the Egan, Matvos, and Seru, 2019 data (Table 2) are: customer initiated complaints and civil suits which resulted in the client winning a financial settlement; employment termination after allegations of regulatory or criminal offenses; and the conclusion of a regulator-initiated complaint into violations of regulations. As an example of the latter see *SEC Charges 16 Wall Street Firms with Widespread Recordkeeping Failures*, SEC Press Release #2022-174.

[4] The pay premium is calculated by comparing wages to the non-farm private payroll controlling for education. See Philippon and Reshef (2012) and the discussion around the paper's Figure X.

[5] See for example Piketty (2020).

To address these questions we develop a theoretical model of the labour market for financial advice. We construct an overlapping generations model of financial advisors, who have ethics, are hired competitively, interact with strategic investment funds, and are regulated. Our model is as parsimonious as possible given these elements. Some of our financial advisors are ethical in that they are motivated by appropriate ethical considerations seeking to best serve their clients in accordance with the information available. This reflects, for example, adherence to the required *suitability standard*.[6] The remainder of our advisors are opportunistic and prone to cheating if it is in their financial interest. In our model financial advisors assist clients in directing their wealth towards a standard product or a specialised fund. Which is best for the client is identified by the advisor, but is not visible to the client, permitting scope for misinvestment. We allow the specialised fund to be strategic, optimally setting incentive schemes to (mis-)encourage advisors. This reflects the fact that bonuses and commissions to brokers are significant; for example, in the US, they average above 2.3% of invested sums.[7] But regulators may catch wrongdoing and so too in our model. Clients are aware of any misconduct record in the advisor's history, which then affects the trust clients have in such an advisor and so alters the amount clients are willing to pay for such an advisor.

At the heart of our model is a tension between two forces. The first force occurs in the labour market. Clients value trustworthy advisors, and so advisors with a clean record earn higher wages in the competitive labour market. This creates endogenous career concerns for the advisors whereby honest behaviour is rewarded with increased future pay. The second force is that the strategic investment fund can incentivise mis-investment by offering high commissions or bonuses to advisors who direct their client's wealth into the fund. These bonuses frustrate clients' inferences by altering the effectiveness of the career concerns. But bonuses are also paid to honest advisors who may have invested their clients' money into the fund in any case. It follows that the cost of bonuses to the fund can become prohibitively large.

We show that the strategic fund chooses to use bonuses only when the regulatory environment is sufficiently lax. If the regulatory detection technology is weak then the fund chooses bonuses high enough to encourage significant mis-investing. With a weak regulator career concerns are small as many misconduct episodes escape public exposure. This allows bonuses to be kept low, which mitigates the cost of bonuses paid to honest advisors. However improvements in the regulatory environment increase the pay advisors will receive from the competitive labour market if they keep a clean record. We show that this follows because better enforcement causes clients to trust clean advisors more. Such clients are willing to pay more to firms who employ an advisor with

[6] See for example *FINRA Rule 2111*.

[7] See Christoffersen, Evans, and Musto, 2013 Table I who document this as the average front load paid by the funds in their sample to unaffiliated brokers; data is of US funds between 1993 and 2009. Egan (2019) (p1221) reports that J.P. Morgan offers brokers a higher bonus than this (3.09%) in the fixed income case study that he considers from 2008.

a clean record to serve them, and in turn the advisory firms bid up the wages of senior advisors with a clean record. This high future pay deters misconduct amongst junior advisors. Bonuses must rise if this career concerns effect is to be countered and investment into the fund preserved. Eventually the bonuses required become too expensive for the fund, given that many of the bonuses go to advisors who would recommend the fund in any case when it was appropriate for the client. So if the regulator skill in identifying misconduct is high enough, then the strategic fund optimally reduces her use of bonuses and so less misconduct is committed by advisors.

The equilibrium of our model offers an answer as to why misconduct is widespread and yet clients still buy from blemished advisors. Some clients are served by advisors with a history of misconduct because of clearing in the labour market. All clients prefer unblemished advisors over blemished ones at the same price. But this fact causes advisory firms to bid the wages of clean advisors up and pass these costs on in higher management fees to clients. Market clearing occurs when wages and prices of clean advisors are raised high enough that advisory firms, reflecting their clients' willingness to pay, are indifferent between blemished and unblemished advisors. This process creates significant career incentives to maintain a clean record. Yet in our model, as in reality, misconduct is widespread despite the endogenously created career concerns. This is because investment funds are strategic and use bonuses to counter the labour market effect and so maintain incentives for unethical advisors to mis-invest.

Commissions, financial advisor pay, trust and misconduct are all endogenous and our model offers empirical predictions if features of the investment environment change. A pertinent example is if high-fee actively managed funds become less likely to be a good match for a typical client as compared to a low-fee technology-driven passive investment vehicle.[8] We predict that in this case we should see the co-movement of commissions to brokers (e.g. front-loads) upwards, joined also by advisor pay and the trust clients have in advisors which should rise also. Though the data is in principle available, such joint predictions have yet to be tested.

If wealth inequality amongst clients increases an entirely new effect arises: the strategic fund optimally chooses to *lower* the bonuses she offers to financial advisors. The wealthiest clients are the most valuable ones for the strategic fund as they generate the largest fees. In a competitive market such clients will be served by the most sought-after advisors. This follows as firms serving these clients will be able to pay more than firms serving less wealthy clients and so secure the services of the best advisors. These sought-after advisors are advisors with a clean track record. If an unethical advisor reaches the latter part of her career without a blemish then she has a chance of securing the richest clients. This would be very valuable for the fund as unethical advisors in the latter part of their careers are always incentivised by fund bonuses as the career-concerns

[8] This seems timely as recent changes in the investment landscape have led to unprecedented sums of managed funds moving from high-fee active to low-fee passive funds. The movement reached a record of nearly $900 bn in 2021 alone (Armour and Evens, 2023).

effect is absent. The strategic fund wishes to maximise the chance of unethical advisors securing the wealthiest clients. To achieve this, lowering the bonus deters some unethical juniors from misinvesting; that is, it encourages *disguise*. Such an unethical advisor will therefore acquire a clean record and may secure a wealthy client later in her career, and she will misinvest then. The lower bonuses which we find are an optimal response to increases in client wealth inequality result in a reduction in overall misconduct. But this reduced misconduct is only enjoyed by the middle class. High net worth individuals suffer increased levels of misconduct as the disguise incentivised by the fund succeeds in matching some unethical advisors with some of the most wealthy clients.

The simplest version of our model has advisors living for two periods, in which case a non-monotonic pattern of misconduct over a career cannot be detected. We extend the model to allow advisors to live for three periods. Doing so we establish that misconduct always becomes more likely as advisors progress through their careers. We show that it is not possible for an unethical advisor to be willing to cheat at the start of her career, but to stop cheating mid-career if she acquires a clean record so as to secure high pay at her career's end. If mid-career advisors with a clean record do not cheat then this is as a result of career effects being strong in the latter part of one's career. But in this case mid-career advisors with a clean record are valuable to clients as they will be honest advisors. The competitive labour market then results in such mid-career advisors with a clean record being paid well. In turn this creates even stronger career incentives at the beginning of an advisor's career as advisors who keep a clean sheet can look forward to high pay in both the middle and the end of their careers. This contradicts the hypothesis that unethical advisors might be dirty at first and then clean if they are not discovered. Hence we show that misconduct amongst advisors open to mis-investing is monotonic over a career; it is always more likely to be perpetrated by those with the most experience. We note strong empirical support for this prediction.

The paper is organised as follows. The literature review follows in Section 2. The model is introduced formally in Section 3. To solve the model we develop some preliminary results in Section 4. We solve the benchmark model when all clients have the same wealth in Section 5. Section 6 solves for misconduct patterns when there exists client wealth inequality. Section 7 establishes the time pattern of misconduct over the course of an advisor's career. Section 8 concludes with omitted proofs in Appendix A.

2. Literature Review

We study misconduct in the market for financial advisors. That such misconduct exists and is significant is now widely established. We have already noted the work of Egan, Matvos, and Seru (2019) and Dimmock, Gerken, and Graham (2018). Their findings of misconduct are corroborated by Law and Zuo (2021), Kowaleski, Sutherland, and Vetter (2020), Yimfor and Tookes (2021), Honigsberg, Hu, and Jr. (2021), Hamdi, Kalda, and Pal (2023), and Parsons, Sulaeman, and Titman (2018). Systematic misconduct has been documented in the sale of bonds (Egan, 2019), and confirmed in field experiments (Mullainathan, Noeth, and Schoar, 2012).

We study misconduct in a career concerns model of financial advice in which ethical and unethical advisors coexist and carry potentially revealing histories. To date financiers' career concerns have predominantly been studied in market microstructure models in which investment decisions interact with the security price formation process. The main effect studied in this literature concerns the incentive for agents to herd and avoid taking risks which might mark them out from the crowd in a bad way (Scharfstein and Stein, 1990; Zwiebel, 1995; Dasgupta and Prat, 2008; Guerrieri and Kondor, 2012).[9] This effect is often referred to as a *sharing-the-blame* effect.[10] Our work differs to this strand of the career concerns literature in two key ways. The first is that we permit unethical agents to disguise their type by behaving honestly — in the prior literature less able types cannot behave as if they are more able. Secondly we additionally model a strategic investment fund which can create selling incentives (e.g. commissions) to inhibit the market's inferences from advisor behaviour and so we endogenise the career incentives created in a new way. This allows us to study an important channel by which misconduct propagates and which has yet to be understood.

Building a model of misconduct in a financial advisory setting with career concerns, and embedding it into a framework with both a competitive labour market and a strategic investment fund is a significant contribution of this work. In settings which abstract from career concerns, and sometimes also from competition between firms, a number of misconduct models have been proposed: Thanassoulis (2023), Inderst and Ottaviani (2009), Carlin and Gervais (2009), Zhou, Keppo, and Jokivuolle (2020), Gui, Huang, and Zhao (2024) and Alger and Renault (2006). Our model of misconduct allows for an advisor to invest her client's wealth, similar to Inderst and Ottaviani (2009). The construction of the competitive labour market is similar to Thanassoulis (2012) whilst the development of the OLG framework and the inclusion of a strategic fund are original to this work.

There are also principal-agent models of settings similar to the market for financial advice, in which agents have the opportunity to misbehave. However these models do not include competition between firms, the competitive labour market, nor strategic investment funds. Examples in this vein include Bénabou and Tirole (2006, 2011), Kartik (2009) and Axelson and Bond (2015).

Our work studies the market-wide equilibrium effect of policy changes (such as better detection) designed to combat misconduct. That regulatory approaches matter for misconduct has been established empirically by Charoenwong, Kwan, and Umar (2019). A significant literature

[9] Agents might increase the variance of their performance to disguise their ability also – Brown and Davies, 2017.

[10] This effect has been identified empirically amongst fund managers (Chevalier and Ellison, 1999) and also amongst equity analysts (Hong, Kubik, and Solomon, 2000).

studies reputational dynamics of infinitely long-lived firms to determine the conditions under which investment into quality can be sustained (see, for example, Mailath and Samuelson, 2001; Board and Meyer-ter-Vehn, 2013; Jullien and Park, 2014; and Liu, 2011). In our work financial advisors acquire reputations courtesy of their histories, but the meaning of these histories depends upon the regulatory technology and the actions of the strategic fund.

That there is a substantial and increasing lack of trust by the public in financial advisors has been documented by Sapienza and Zingales (2012) and a lack of trust generally by Limbach, Rau, and Schürmann (2023). This may affect the willingness of the public to invest (Gurun, Stoffman, and Yonker, 2018; Guiso, Sapienza, and Zingales, 2008; Gelman and Shoham, 2022). Some argue that this lack of trust arises as financiers are more likely to be bad people (Cohn, Fehr, and Maréchal, 2014; Adams, 2020), or that lower income agents are less trusting of wealthy counterparties such as financial advisors (Salgado, Núñez, and Mackenna, 2021), though it is argued that bad people, at least, can be screened out by creating an appropriate work culture (Bunderson and Thakor, 2022). Our work connects trust in financial advisors with the career concerns they face.

3. Model

Here we present our overlapping generations model of financial advisors, with ethics, hired by financial advisory firms in a competitive labour market, regulated, and incentivised by a strategic fund to sell a particular product to their clients. The clients and the available products are described in §3.1. The financial advisory firms and their bidding of wages in the labour market is described in §3.2. The financial advisors and their utility reflecting their potential for (un)ethical behaviour is modeled in §3.3. Regulation and implications for advisor reputation are modeled in §3.4. Finally the objectives of the strategic fund are captured in §3.5.

3.1. Consumers and financial products

We model an economy with an infinite time horizon. Investment decisions take place at integer times, $t = 1, 2, 3, \ldots$. In each period there is a measure 1 of clients who live for one period. Almost all clients have the same wealth x. A small measure μ_H are high net worth (HNW) clients and these have wealth $X_H \geq x$.

Each client has access to one financial advisory firm or broker. Without an advisor/broker, we normalise each client's expected utility to 0. To serve their clients, firms hire financial advisors (one per client). The hiring takes place in a competitive labour market which is described below (§3.2). The role of the financial advisors is to identify one of two financial products for the client: a tailored or targeted product or fund denoted ($\mathbb{t}$) or a standard ($\mathbb{s}$) product/fund. This choice is denoted $\tilde{\rho}_i \in \{\mathbb{t}, \mathbb{s}\}$ and is made by the financial advisor on behalf of client i. The tailored product has a higher fee for the client and generates a commission for the broker. It can be thought of as an active financial investment vehicle like an actively managed fund or a hedge fund, or a more complex financial security such as a set of stock options or basket of crypto-currencies. In contrast, the standard product has a low fee for the client and does not generate a commission for the broker. It might be a set of index funds or a portfolio of stocks and treasury bonds.

We model financial advisors using an overlapping generations technology. We consider two variants of our model. The main study (sections 5 and 6) assumes that advisors live for two periods with a measure $\frac{1}{2}$ of advisors entering each period. In this setting half the available financial advisors are in the first period of their careers, referred to as juniors, and these overlap with the other half in the second period of their careers who we refer to as seniors. We also consider (section 7) the setting in which financial advisors live for three periods with a measure $\frac{1}{3}$ of financial advisors entering each period.

Clients can improve on their outside option utility by hiring an advisor who identifies which financial products sold by the firm are most appropriate for them. Without the financial advisor the client does not have access to these products; alternative products available to the client yield the client's outside option (of 0). Each consumer is better off with either a tailored (targeted) financial product/fund $\mathbb{t}$ or with a standard financial product/fund $\mathbb{s}$. This is the client's type, which is drawn from

$$\tilde{\tau}_i = \begin{cases} \mathbb{t} & \text{prob. } \varphi \\ \mathbb{s} & \text{prob. } 1-\varphi, \end{cases} \tag{1}$$

where $\varphi \in (0,1)$. Consumers do not know their own type, nor can they access the brokered financial products/funds themselves without their broker/advisor. A financial advisor observes the client's type and can access both types of investment product on the client's behalf. These are the two reasons why clients hire an advisor.

The payoff/utility that consumers get from using the standard product (selection $\tilde{\rho} = \mathbb{s}$) is normalized to one per dollar invested:

$$\Pr\left\{ \tilde{u}_i = 1 \mid \tilde{\rho}_i = \mathbb{s}, \tilde{\tau}_i = \mathbb{t} \right\} = \Pr\left\{ \tilde{u}_i = 1 \mid \tilde{\rho}_i = \mathbb{s}, \tilde{\tau}_i = \mathbb{s} \right\} = \Pr\left\{ \tilde{u}_i = 1 \mid \tilde{\rho}_i = \mathbb{s} \right\} = 1.$$

Where $\tilde{u}_i$ is a realisation of client payoff. In contrast, the payoff/utility per dollar invested that consumers get from using the targeted product (selection $\tilde{\rho} = \mathbb{t}$) depends on their type. Specifically, the targeted product is a better match for type $\mathbb{t}$ clients and the quality $q \in (0,1]$ of the product determines the quality of the match:

$$\Pr\left\{ \tilde{u}_i = 2 \mid \tilde{\rho}_i = \mathbb{t}, \tilde{\tau}_i = \mathbb{t} \right\} = \frac{1+q}{2} = 1 - \Pr\left\{ \tilde{u}_i = 0 \mid \tilde{\rho}_i = \mathbb{t}, \tilde{\tau}_i = \mathbb{t}, \right\}, \quad \text{and} \tag{2}$$

$$\Pr\left\{ \tilde{u}_i = 2 \mid \tilde{\rho}_i = \mathbb{t}, \tilde{\tau}_i = \mathbb{s} \right\} = \frac{1}{2} = 1 - \Pr\left\{ \tilde{u}_i = 0 \mid \tilde{\rho}_i = \mathbb{t}, \tilde{\tau}_i = \mathbb{s}, \right\}. \tag{3}$$

That is, while the expected utility that a standard consumer gets from a targeted product is exactly the same as that from a standard product (one), the expected utility that a consumer who is best matched with a targeted product gets from such a product is $1 + q > 1$.

We set the client fee for the standard product to be zero, while the targeted product costs consumers $f \in (0, 1)$ per unit of capital invested in it. The fee f is specified exogenously.[11] This means that consumers for whom the targeted product is appropriate ($\tilde{\tau}_i = \mathbb{t}$) benefit from the targeted product if and only if $1 + q - f > 1$, which is equivalent to

$$f < q. \qquad [4]$$

We assume [4] holds throughout. Clearly, standard consumers never benefit if their advisor assigns them to the targeted product.

The standard product does not generate any commission to an advisor who recommends it, but the targeted product results in a commission of b to the advisor in addition to any wage paid by the firm. The commission (referred to as bonus) b will be derived endogenously; the producer of the targeted product, who we refer to as the targeted fund, will choose the bonus to maximize his expected profits (explained below, §3.5). For example, such a bonus might represent a direct payment (or a kickback) from a fund or security seller as a compensation or reward for the referral.

The existence of a bonus in our model draws from an empirical literature establishing the wide cross-sectional dispersion of broker commissions across financial products as well as the tendency for brokers to more often recommend those products that come with high commissions.[12] Indeed, Inderst and Ottaviani (2012) and Egan (2019) make a similar assumption in their models of intermediaries and brokers. While this assumption creates a conflict of interest between the advisor and her client, it does not automatically lead the advisor to always recommend targeted products. Countervailing this is the possibility that advisors are ethical which will be modeled in §3.3, and career concerns play a role.

3.2. Labour market matching and wages

Each period (denoted by time $t \in \mathbb{N}$) the financial advisory firms are matched with clients and are monopolists when serving them. Before the period begins, the firms hire one financial advisor for each of their clients in a competitive labour market. Firms in this model therefore intermediate between their clients and financial advisors.

Formally our labour market model is an assignment model (see for example Gabaix and

[11] Reflecting competition between funds or market practice.

[12] For example, see Edelen, Evans, and Kadlec (2008), Bergstresser, Chalmers, and Tufano (2009), Woodward and Hall (2012), and Christoffersen, Evans, and Musto (2013).

Landier, 2008, Terviö, 2008, Thanassoulis, 2013). Each firm can offer a given advisor a targeted remuneration package w. The offers are advisor specific – financial advisors with a more desirable history (that is a history which will allow the firm to charge a higher price to her client) can be offered more generous wages. The matching and equilibrium compensation is decided as the outcome of a simultaneous ascending auction for the advisors. Because each advisor is a substitute for another, such auctions deliver the competitive equilibrium assignment (Milgrom, 2000).[13]

Our model therefore establishes equilibrium wage rates conditional on the observable financial advisor history at the beginning of each period. In the most parsimonious version of our model advisors live for two periods and so the set of possible histories is given by $\hbar = \{\emptyset, \mathrm{B}, \mathrm{G}\}$. $\hbar = \emptyset$ denotes an empty history and signifies a junior advisor. Senior advisors who are in the second period of their careers may have received a blemished record from the regulator in response to misconduct the prior period. (This occurs in a manner we will discuss below.) If a blemish exists then the history is denoted $\hbar = \mathrm{B}$. A senior advisor without a blemish has history $\hbar = \mathrm{G}$. There are therefore three equilibrium wages in steady state in the competitive labour market:

$$w_{\emptyset}, w_{\mathrm{B}}, w_{\mathrm{G}}.$$

Firms choose to hire the advisor which will allow them to maximise their profits allowing for the wage which must be paid and the price which the client is willing to pay to be served by the chosen advisor.[14]

We restrict attention to the steady state of this industry. We assume that financial advisors cannot be paid negative wages and so have limited liability. We set the advisors' outside option to be 0. This final assumption permits expositional simplicity, but it is not critical to any of the results which follow. For tractability we allow the firms to have all the bargaining power and so the price each client pays for financial advice is equal to the expected value created for the client over and above the outside option of not using a financial advisor.[15]

[13] Milgrom (2000) requires straightforward (that is nonstrategic) bidding for the simultaneous ascending auction (SAA) to deliver the competitive outcome. Here, as advisors are substitutable, the competitive equilibrium would always be the outcome (in the absence of collusion between the firms) if we implement the SAA as a standard clock auction (Ausubel and Cramton, 2004). Clock auctions have the bids rising continuously until there is no excess demand for any advisor. Such an auction is "a practical implementation of the fictitious 'Walrasian auctioneer' " (Ausubel, Cramton, and Milgrom, 2006 §2.)

[14] After being hired by a firm, the advisor privately observes the type of the firm's client, and chooses a financial product (standard or tailored) on their behalf. Note that this product is not observed by the public; it is known only by the client. In particular we rule out that the first period employing firm has an informational advantage over other firms in assessing the probability that an advisor is ethical at the beginning of the second period.

[15] The division of bargaining power is not a critical feature of the analysis. It will become apparent that allowing the clients some bargaining power, e.g. by introducing search, would not alter the equilibrium allocation of advisors to clients and so would not alter the economics of our analysis. Our formulation allows us to simplify the exposition.

3.3. Advisors and their ethics

We assume that each advisor is ethical (or honest) with probability $\Pr\{\tilde{\varepsilon} = 1\} = \theta_0 \in (0, 1)$ and unethical (or strategic) with probability $\Pr\{\tilde{\varepsilon} = 0\} = 1 - \theta_0$. While advisors know their own type, their type is unobservable to anyone else. Ethical advisors always recommend what is best for their client, taking fees into account. That is, they recommend standard (tailored) products if and only if their client's type is standard (tailored). Unethical advisors are strategic. They make all their recommendations with the objective of maximizing their life-long expected utility. This implies the following. Firstly, given that they no longer have any reputation to protect/enhance in the second period of their lives, they always recommend the targeted product ($\mathbb{t}$) to all consumers at that point (as it comes with a bonus $b > 0$, while the standard product does not). Secondly, in the first period of their lives, unethical advisors always recommend the tailored product to consumers with $\tilde{\tau}_i = \mathbb{t}$ (this is the right thing to do, plus it comes with a bonus of b), but they recommend it only with probability $\sigma \in [0, 1]$ (to be endogenously derived in equilibrium) to consumers with $\tilde{\tau}_i = \mathbb{s}$. In addition we add a trembling hand refinement to avoid sets of zero measure. Unethical advisors are assumed to cheat their clients via a tremble when the opportunity arises with probability $\epsilon \searrow 0$, in addition to any determined strategy. Therefore if unethical advisors intend to randomise by cheating their client with some given probability σ we have:

$$\Pr\left(\rho = \mathbb{t} | \tau = \mathbb{s}\right) = \min\left(\epsilon + \sigma, 1\right).$$

That humans sometimes lie when it is in their interests is consistent with the empirical evidence in the work of Gneezy, Kajackaite, and Sobel (2018), Abeler, Nosenzo, and Raymond (2019), and Janezic (2020). That humans' propensity to lie cannot be predicted, and so may be subject to mixing is evidenced in Fischbacher and Föllmi-Heusi (2013) and in the references cited in Bénabou and Tirole (2011).

3.4. Regulation and reputation

As we will see the financial impact of a junior advisor choosing the tailored product when her client type is $\tilde{\tau} = \mathbb{s}$ is not limited to just the bonus b; it also includes the effect that this choice is expected to have on her compensation in the second period of her life. These considerations are affected by the information that gets publicly revealed in the first period of an advisor's career. In particular, we assume that clients' bad experiences are imperfectly revealed to the public, and that this helps potential clients assess the ethics of senior advisors.

Outcomes of $\tilde{u}_i = 0$ for a client potentially result in a blemished record for the advisor. This is because financial advisors are regulated, and the regulator is often asked to pronounce itself on the appropriateness of some actions taken by advisors on behalf of their clients. For example, in the United States this regulatory task is performed by both the *Financial Industry Regulatory Authority* (FINRA) and the *Securities and Exchange Commission* (SEC), which publicly report the unethical activities of financial advisors and brokers. In our model the probability that utility consistent with misconduct results in a blemished record ($\hbar_j = \mathrm{B}$) for the advisor is β_u if their client is $\tilde{\tau}_i = \mathbb{s}$, and not otherwise. An advisor whose record is not blemished is said to have a good record ($\hbar_j = \mathrm{G}$). It follows that $1 - \beta_u$ is the probability of a type-II error as it measures the probability that the regulator fails to correctly identify an unethical advisor.

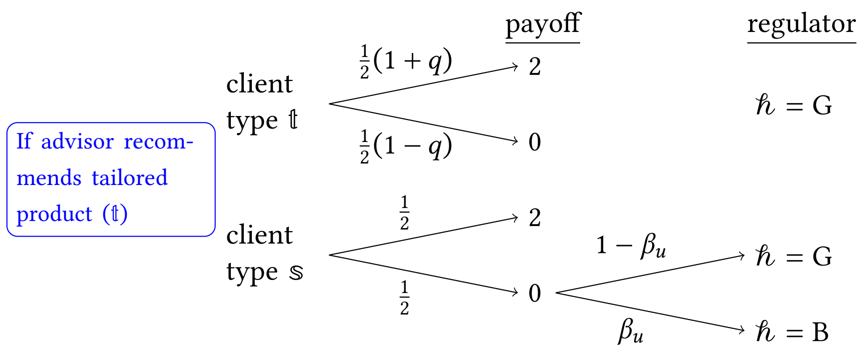

Figure 1: Client Outcomes and Public Information

Notes: The client's utility is presented in equations [2] and [3].

The information structure is illustrated in Figure 1. As we will see, while a blemished record indicates an unethical advisor, it does not necessarily render this advisor useless in the second period of her career. Indeed an advisor with such a blemished record still provides access to a tailored product which may be a good fit for the client.

3.5. Targeted fund

The tailored or targeted fund ($\mathbb{t}$) selects the commission/bonus b it wishes to offer financial advisors so as to incentivise sales and so maximise its profits. This bonus will be a function of the model fundamentals, such as the wealth of clients, the efficacy of the regulator and the extent to which ethics are widespread in the financial advisor population.[16] The bonus b is paid in addition to the wages paid to financial advisors by their employing financial advisory firms.

[16] A monopoly fund is assumed to highlight the strategic forces on commissions which are felt either by funds which have significant market power (an important case (Brown et al., 2023)), or at the sector level creating incentives for tacit collusion between funds.

4. Model Solution Preliminaries

4.1. Bayesian Preliminaries

Let us conjecture that young unethical advisors make biased recommendations to standard consumers with probability $\sigma + \epsilon$ capturing the strategy (to be verified later) and the tremble. The probability that an ethical advisor acquires a blemished record at the end of the first period is

$$\Pr\left\{\hbar_j = \mathrm{B} \mid \tilde{\varepsilon}_j = 1\right\} = 0, \tag{5}$$

while the probability that an unethical advisor ends up with a blemished record is

$$\Pr\left\{\hbar_j = \mathrm{B} \mid \tilde{\varepsilon}_j = 0\right\} = (1-\varphi)\frac{1}{2}\beta_u(\epsilon + \sigma) \equiv \ell_0 \tag{6}$$

Equation [6] captures that an unethical advisor will only need to be unethical if the targeted fund is not in the client's best interests (probability $1-\varphi$), in which case she cheats her client with probability σ. The client of type $\tilde{\tau}_i = \mathbb{s}$ goes on to have a bad experience with probability $\frac{1}{2}$. In this case the regulator is alerted and an investigation results in a blemish for the advisor with probability β_u. Clients of type $\tilde{\tau}_i = \mathbb{t}$ were not the victims of misconduct and so the advisor will not receive a blemish in such cases, whatever the client's realised utility.

Consumers benefit more from hiring ethical advisors, and so will seek to figure out the probability that the advisor hired by their advisory firm is ethical. Since the only observable quantity about a senior advisor is whether or not she has a blemished record, consumers will update the probability that an advisor is ethical based on the history $\hbar_j = \mathrm{B}$ or $\hbar_j = \mathrm{G}$:

$$\theta_{\mathrm{B}} := \Pr\left\{\tilde{\varepsilon}_j = 1 \mid \hbar_j = \mathrm{B}\right\} = 0, \tag{7}$$

$$\theta_{\mathrm{G}} := \Pr\left\{\tilde{\varepsilon}_j = 1 \mid \hbar_j = \mathrm{G}\right\} = \frac{\theta_0}{1-(1-\theta_0)\ell_0} > \theta_0 \tag{8}$$

Let us define $v(x, \theta, \sigma)$ to be the value that a client with wealth x assigns to an advisor who has a probability θ of being ethical and who, if not ethical, is expected to recommend $\tilde{\rho}_i = \mathbb{t}$ with probability σ if she learns that $\tilde{\tau}_i = \mathbb{s}$. Given that firms have all the bargaining power, this is also the price that a firm can charge after hiring such an advisor to serve this client.

If the advisor is a junior (new to the market), then θ will be equal to θ_0 (the prior as to the likelihood that any new advisor is ethical) and σ will be the equilibrium strategy used by junior unethical advisors. If the advisor is senior, then θ will be equal to θ_{B} or θ_{G}, depending on whether or not the advisor has a blemish. As mentioned before, senior unethical advisors recommend $\tilde{\rho}_i = \mathbb{t}$ to all customers and so $\sigma = 1$.

We have, allowing for the tremble (ϵ)

$$
\begin{aligned}
v(x,\theta,\sigma) &= x\left[\theta\left[\varphi(1+q-f)+(1-\varphi)\right]+(1-\theta)\left\{\varphi(1+q-f)+(1-\varphi)\left[(1-\sigma-\epsilon)+(\sigma+\epsilon)(1-f)\right]\right\}\right] \\
&= x\left[1+\varphi(q-f)-(1-\theta)(1-\varphi)f(\epsilon+\sigma)\right]. \qquad [9]
\end{aligned}
$$

By default, advisors improve the utility of consumers by one unit per dollar. Because targeted type clients always end up receiving the targeted product, these customers get an extra $q-f$ in utility. However, when standard type clients are advised by an unethical advisor, they may end up paying f for a targeted product that does not improve their welfare.

Lemma 1. *There exists a positive price clients are willing to pay for any financial advisor.*

Proof. Without financial advice the client's payoff is normalised to zero. Financial advisors have positive value if $v(x,\theta,\sigma)>0\ \forall\ \theta,\sigma\in[0,1]$. Note that

$$v(x,\theta,\sigma)>1+\varphi(q-f)-f>_{\text{by [4]}}1-f>0.$$

The final inequality follows by construction. □

Therefore gains from trade are possible for all the financial advisory firms in the market.

4.2. Labour market preliminaries

Our first preliminary result is to confirm that advisors with history $\hbar=\mathrm{B}$ are the least desired type of advisor and so have wage set by the outside option:

Lemma 2. $w_{\mathrm{B}}=0$.

Proof. We use the client's valuation function [9] to establish that advisors with history $\hbar=\mathrm{G}$ are preferred to B:

$$v(x,\theta_{\mathrm{G}},1)-v(x,\theta_{\mathrm{B}},1)=x(1-\varphi)f\theta_{\mathrm{G}}>0$$

We are using the fact that, as noted, an unethical advisor in the final period of their careers will cheat and recommend the targeted fund ($\mathbb{t}$) with certainty so they can profit from the bonus. Market clearing therefore requires $w_{\mathrm{G}}>w_{\mathrm{B}}$ otherwise no firm would wish to employ B's as opposed to G's.

Similarly we show that new advisors are preferred to senior blemished ones:

$$v(x,\theta_0,\sigma)-x(x,\theta_{\mathrm{B}},1)=x(1-\varphi)f[1-(1-\theta_0)(\sigma+\epsilon)]>0.$$

Market clearing therefore requires $w_\varnothing > w_B$.

Therefore B advisors earn the least. Wage offers are reduced in the competitive labour market until the lowest wage matches the advisors' outside option. That advisors cannot be paid negative wages yields the result. $\square$

Suppose now that all clients have wealth x (that is $X_H = x$). In equilibrium market clearing requires that there are firms serving clients with wealth x who employ all three types of advisor. Therefore indifference for the firms between B and G advisors requires that

$$\begin{aligned} v(x, \theta_B, 1) - \underbrace{w_B}_{=0} &= v(x, \theta_G, 1) - w_G \\ \Rightarrow w_G &= xf(1-\varphi)\theta_G. \end{aligned} \qquad [10]$$

While indifference between B and $\varnothing$ advisors sets

$$\begin{aligned} v(x, \theta_B, 1) &= v(x, \theta_0, \sigma + \epsilon) - w_\varnothing \\ \Rightarrow w_\varnothing &= xf(1-\varphi)[1-(1-\theta_0)(\epsilon+\sigma)]. \end{aligned}$$

5. Model solution and fund optimal commissions

In this section we study the model with all clients having the same wealth x. We build up to the solution in a number of steps. We explore all the different possible fund choices of bonus (i.e. commissions) and evaluate the resultant labour market equilibrium and so fund profit in each case. We then derive the global optimal fund behaviour and so solve the model.

5.1. Region of no junior cheating

Consider first the case in which the targeted fund decides to set a bonus which does not encourage unethical juniors to cheat in the first period of their careers: i.e. $\sigma = 0$. The wage w_G in this case is given by [10] which yields:

$$w_G|_{\sigma=0} = xf(1-\varphi)\frac{\theta_0}{1-(1-\theta_0)(1-\varphi)\frac{1}{2}\beta_u\epsilon} > 0$$

New financial advisors who are unethical prefer not to cheat at the beginning of their careers if

$$w_G + b > 2b + w_G\left(1 - \frac{1}{2}\beta_u\right), \qquad [11]$$

as an unethical advisor will earn the bonus next period for sure, and will earn the bonus this period also if she cheats. However cheating this period will result in a blemish and so a zero wage with probability $\frac{1}{2}\beta_u$, that is if the outcome is poor for the client and the regulator succeeds in spotting the infringement. [11] simplifies to

$$
\begin{aligned}
b &< \frac{w_{\mathrm{G}}\beta_u}{2} && [12]\\
&= \frac{1}{2}\beta_u x f(1-\varphi)\frac{\theta_0}{1-(1-\theta_0)(1-\varphi)\frac{1}{2}\beta_u\epsilon} && [13]
\end{aligned}
$$

In this case of $\sigma = 0$, the measure of customers investing in the fund is given by

$$
V|_{\sigma=0} = \varphi + (1-\theta_0)(1-\varphi)\left(\frac{1}{2}+\frac{\epsilon}{2}\right)
$$

This follows as junior unethical agents only misinvest their client's funds when they tremble, and overall θ_0 of each cohort of advisors are ethical. The profit of the targeted product/fund is therefore

$$
\Pi(b) = (xf - b)\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}(1+\epsilon)\right)
$$

This profit function is declining in b. We have established that

Lemma 3. *In the limit of trembles vanishing* ($\epsilon \searrow 0$) *if*

$$
b \in (0, \underline{b}] = \left(0, \frac{1}{2}\beta_u x f(1-\varphi)\theta_0\right],
$$

then the profit of the targeted fund is maximised by $b = 0_+$ *at a value of*

$$
\Pi(0) = xf\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}\right) \qquad [14]
$$

In this case $\sigma = 0$ *and the wages satisfy:*

$$
\begin{aligned}
w_{\mathrm{G}} &= xf(1-\varphi)\theta_0\\
w_{\emptyset} &= xf(1-\varphi) > w_{\mathrm{G}}.
\end{aligned}
$$

Note that junior advisors are paid more than senior unethical ones in this case. This is so as junior unethical advisors do not cheat at the beginning of their careers so as to earn the highest wage available to seniors.

5.2. Region of all juniors cheating

Consider next the case in which the targeted fund decides to set a bonus which delivers the pure strategy for unethical juniors of always cheating: $\sigma + \epsilon = 1$. In this case the equilibrium wage w_{G}, given by [10], becomes:

$$w_{\mathrm{G}}|_{\sigma+\epsilon=1} = \frac{xf(1-\varphi)\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)}. \quad [15]$$

The financial advisors would all rather cheat if $b \geq \frac{w_G \beta_u}{2}$ (from [12]) and using [15] this requires

$$b \geq \hat{b} := \frac{\frac{1}{2}\beta_u xf(1-\varphi)\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)}.$$

It follows that the profit available to the fund for $b \geq \hat{b}$ is

$$\Pi(b) = (xf - b)\left(\varphi + (1-\theta_0)(1-\varphi)\right). \quad [16]$$

This profit function captures that transfers into the targeted fund ($\mathbb{t}$) arrive from all ethical agents when it is in the client's best interests (φ), and when it is not in the client's best interests then is delivered in any case by all unethical agents, juniors and seniors. Note that the profit function [16] is decreasing in the bonus b. We have shown:

Lemma 4. *In the limit of trembles vanishing ($\epsilon \searrow 0$) if $b \geq \hat{b}$, then the profit of the targeted product/fund is maximised by*

$$b = \hat{b} = \frac{\frac{1}{2}\beta_u xf(1-\varphi)\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)} \quad [17]$$

at a value of

$$\Pi(\hat{b}) = (xf - \hat{b})\left(\varphi + (1-\theta_0)(1-\varphi)\right)$$

In this case $\sigma = 1$ and the wages satisfy:

$$\begin{aligned} w_{\mathrm{G}} &= xf(1-\varphi)\theta_G \\ w_{\varnothing} &= xf(1-\varphi)\theta_0 < w_{\mathrm{G}}. \end{aligned}$$

Note in this case that junior advisors are paid less than senior unblemished advisors. This is because the bonus is such that unethical advisors cheat in both the first and second period of their careers, however fewer, in proportional terms, unethical advisors are contained among senior advisors with $\hbar = \mathrm{G}$ than among junior advisors.

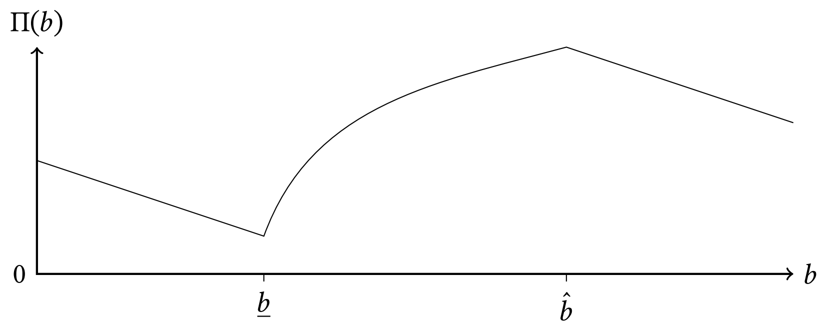

Figure 2: Targeted fund profits as a function of advisor bonus/commission b

5.3. Targeted fund profit function

Sections 5.1 and 5.2 explored the profit function of the targeted fund if the fund selects a bonus/commission which incentivises a pure-strategy on unethical junior financial advisors: a bonus below $\underline{b}$ delivers no cheating amongst juniors, whilst a bonus above $\hat{b}$ delivers cheating amongst unethical juniors. The targeted fund may decide on a bonus intermediate to these two values which delivers a mixed strategy for junior financial advisors. To determine the optimal bonus for the fund, we must establish the global shape of the targeted fund's profit function.

Proposition 1. *The profit of the targeted fund takes the general form given in Figure 2. Formally:*

(i) The profit function $\Pi(b)$ is continuous and characterised by:

$$\Pi'(b) \begin{cases} < 0 & b \in [0, \underline{b}) \\ > 0 & b \in (\underline{b}, \hat{b}) \\ < 0 & b \in (\hat{b}, \infty) \end{cases} \qquad \Pi''(b) \begin{cases} = 0 & b \in [0, \underline{b}) \\ < 0 & b \in (\underline{b}, \hat{b}) \\ = 0 & b \in (\hat{b}, \infty) \end{cases}$$

(ii) The junior financial strategies incentivised by the bonus are:

$$\sigma(b) \begin{cases} = 0 & b \in [0, \underline{b}] \\ \in (0, 1) & b \in (\underline{b}, \hat{b}) \\ = 1 & b \in [\hat{b}, \infty) \end{cases}$$

(iii) The fund's optimal bonus satisfies:

$$\arg\max_{b} \Pi(b) \in \{0, \hat{b}\}.$$

Proof of Proposition 1. Figure 2 plots the general shape of the profit function as given by part (i)

of the proposition. By inspection one can see that the optimal bonuses must either be 0 or $\hat{b}$, so $(i) \Rightarrow (iii)$.

The pure strategy cases which arise for $b \leq \underline{b}$ and $b \geq \hat{b}$ have been established in Lemmas 3 and 4.

It remains to study the model equilibrium when $b \in (\underline{b}, \hat{b})$ so that unethical junior financial advisors have a mixed strategy. Suppose therefore that $\sigma \in (0,1)$ and allow trembles to drop to zero ($\epsilon = 0$) as all histories are represented with positive probability. Financial advisors must be indifferent between cheating and not, and from [**11**] we require

$$w_G = \frac{2b}{\beta_u}.$$

Market clearing gives the equilibrium wage in [**10**]. Substituting in for w_G and solving for the mixed strategy we have:

$$\sigma(b) = a_0 - \frac{xf}{b} a_1 \qquad \text{where} \qquad a_0 = \frac{2}{\beta_u(1-\theta_0)(1-\varphi)}, \; a_1 = \frac{\theta_0}{1-\theta_0}. \tag{18}$$

Observe that $b > \underline{b} \Rightarrow \sigma(b) > 0, \sigma(\underline{b}) = 0$, and $b < \hat{b} \Rightarrow \sigma(b) < 1$ with $\sigma(\hat{b}) = 1$.

The measure of clients who are invested in the fund is

$$V(b) = \varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}(1+\sigma(b)),$$

and so the profit of the fund is

$$\Pi(b) = (xf - b)\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}(1+\sigma(b))\right).$$

The continuity of the mixing function yields the continuity of the profit function. For positive b, we see that $\sigma'(b) > 0$ and $\sigma''(b) < 0$. It follows that $\Pi(b)$ is concave for $0 < b < xf$.[17] We can therefore find the (unconstrained) maximum of the fund's profit function through the first derivative. We have

$$\Pi'(b) = \left(\frac{xf}{b}\right)^2 \frac{1}{2}(1-\theta_0)(1-\varphi)\cdot a_1 - \varphi - \frac{1}{2}(1-\theta_0)(1-\varphi)(1+a_0) \tag{19}$$

$$= \left(\frac{xf}{b}\right)^2 \frac{1}{2}\theta_0(1-\varphi) - \frac{1}{2}(1-\theta_0)(1-\varphi) - \frac{1}{\beta_u} - \varphi \tag{20}$$

And so

$$b^* = xf\left(\frac{\frac{1}{2}\theta_0(1-\varphi)}{\varphi + \frac{1}{\beta_u} + \frac{1}{2}(1-\theta_0)(1-\varphi)}\right)^{\frac{1}{2}}. \tag{21}$$

[17] As $\left[(xf-b)\sigma(b)\right]'' = -2\sigma'(b) + (xf-b)\sigma''(b) < 0$.

The profit function of the fund is increasing in the range $b \in (\underline{b}, \hat{b})$ iff

$$b^* \geq \hat{b} \qquad [22]$$

Establishing [22] completes the proof, and this is done in Lemma 6 in the appendix. □

Proposition 1 establishes that the profit function of the fund is always strictly increasing over the range of mixing solutions. The fund therefore prefers the pure strategy regions we analysed above in §5.1 and §5.2. The fund may maximise her profit by setting bonuses just high enough to corrupt unethical junior advisors completely. In this case $b = \hat{b}$ and unethical juniors will always recommend the targeted fund, as will unethical seniors. The only possible alternative optimal course is for the fund to avoid distorting junior advisor decision making and lowering bonuses to the lowest level at which senior unethical advisors are just incentivised to cheat: $b = 0_+$. In this case the (just above) zero bonus delivers ethical behaviour from all the juniors.

5.4. Targeted fund optimal commission

The fund will prefer all unethical juniors to misinvest ($\sigma = 1$) rather than juniors to be honest ($\sigma = 0$) if it makes more profits. Using the fund profit functions established in Sections 5.1 and 5.2 that is if:

$$(xf - \hat{b})\left(\varphi + (1-\theta_0)(1-\varphi)\right) > xf\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}\right)$$

This simplifies to

$$\hat{b} < \frac{xf}{2}\frac{(1-\theta_0)(1-\varphi)}{\varphi + (1-\theta_0)(1-\varphi)}$$

So substituting in for $\hat{b}$ (given in [17]) we establish that bonuses to corrupt juniors are optimal for the fund when

$$\frac{\beta_u\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)} < \frac{(1-\theta_0)}{\varphi + (1-\theta_0)(1-\varphi)}. \qquad [23]$$

Corollary 1. *The targeted fund prefers bonuses (i.e. commissions) to fully corrupt unethical juniors ($b = \hat{b}$) as compared to no bonuses and honest juniors ($b = 0_+$) if and only if*

(i) the regulator's success probability in calling out unethical behaviour is low enough, $\beta_u \leq \bar{\beta}_u \in (0,1]$;

(ii) the population average level of ethics is low enough $\theta_0 < \bar{\theta}_0$ with $\bar{\theta}_0 \in (0,1)$;

(iii) the probability that clients are best served by the fund is low enough $\varphi \leq \bar{\varphi} \in (0,1]$.

Proof. All omitted proofs are in Appendix A. □

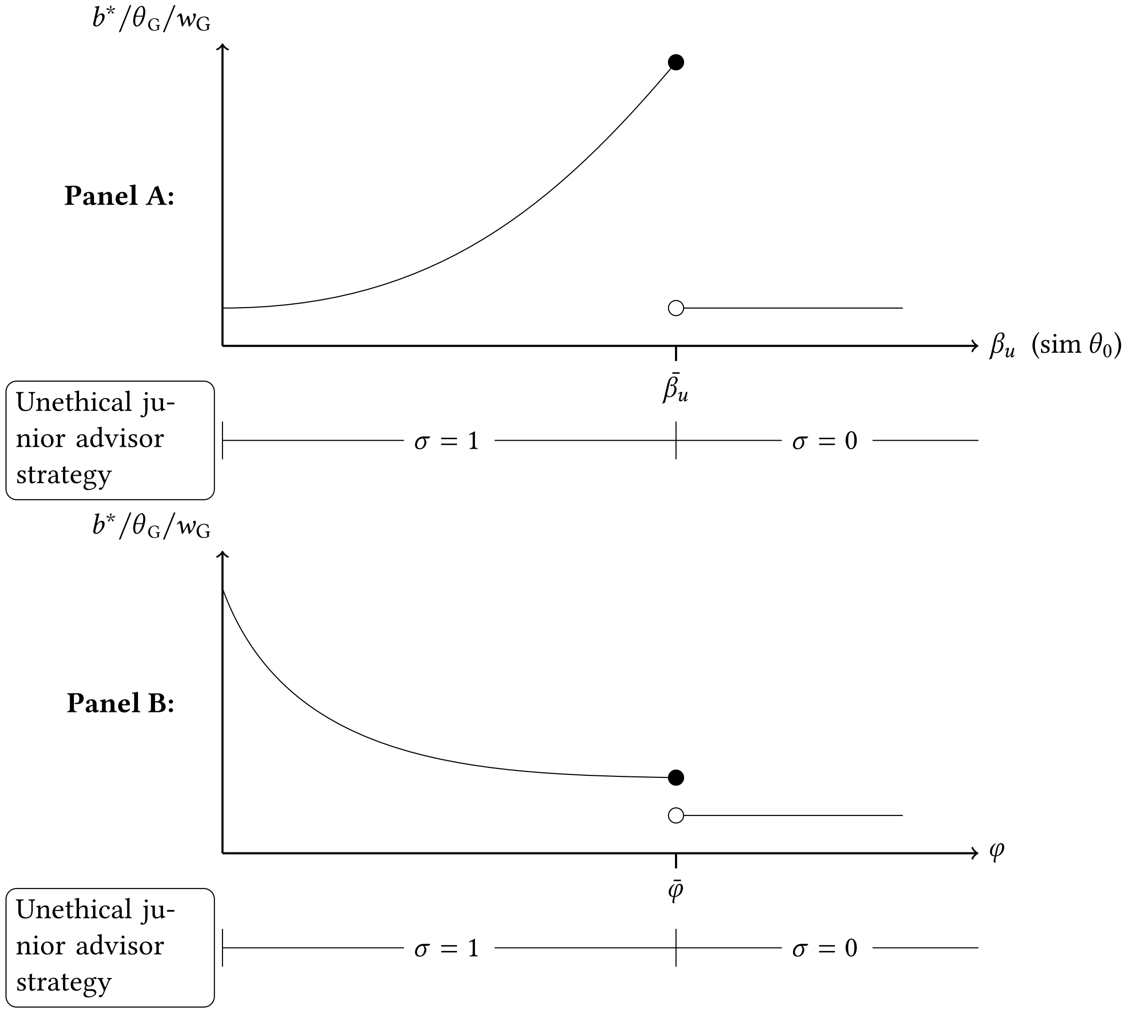

Figure 3: Relationship between optimal fund bonus/commission (b^*), trust in G advisors (θ_G) and pay of senior unblemished advisors (w_G) with respect to:
Panel A: with respect to the regulatory detection technology (β_u), with a similar figure applying when substituting β_u with population ethics θ_0.
Panel B: with respect to the probability the targeted fund is a good match for a client φ.
Results follow from Corollary 2. The misconduct strategy of junior unethical financial advisors (σ) is shown below each graph.

Before discussing the implications of Corollary 1 we complete the analysis by establishing how optimal advisor bonuses/commissions, trust in advisors and pay of advisors depend upon the fundamentals of our modelled industry: the detection technology (β_u), the latent level of ethics (θ_0), and the probability clients are best served by the targeted fund (φ).

Corollary 2. *The relationship between the optimal advisor bonus b^*, or trust in* G *advisors θ_G, or market pay for* G *advisors w_G with respect to: the regulatory detection technology (β_u) or population ethics θ_0, or the probability the targeted fund is a good match for a client φ is depicted generically in*

Figure 3. Formally:

$$\frac{\partial b^*}{\partial \Gamma}, \frac{\partial \theta_G}{\partial \Gamma}, \frac{\partial w_G}{\partial \Gamma} > 0 \textit{ for } \begin{cases} \Gamma = \beta_u \textit{ with } \beta_u \in (0, \bar{\beta_u}) \\ \textit{or } \Gamma = \theta_0 \textit{ with } \theta_0 \in (0, \bar{\theta_0}) \\ \textit{or } \Gamma = 1 - \varphi \textit{ with } \varphi \in (0, \bar{\varphi}) \end{cases} \quad [24]$$

$$\frac{\partial^2 b^*}{\partial \Gamma^2}, \frac{\partial^2 \theta_G}{\partial \Gamma^2}, \frac{\partial^2 w_G}{\partial \Gamma^2} = 0 \textit{ for } \begin{cases} \Gamma = \beta_u \textit{ with } \beta_u > \bar{\beta_u} \\ \textit{or } \Gamma = \theta_0 \textit{ with } \theta_0 > \bar{\theta_0} \\ \textit{or } \Gamma = 1 - \varphi \textit{ with } \varphi > \bar{\varphi} \end{cases}$$

with a point of discontinuity at the critical threshold $\{\bar{\beta_u}, \bar{\theta_0}, \bar{\varphi}\}$ *:*

$$\{b^*, \theta_G, w_G\}\big|_{\beta_u=0} = \{b^*, \theta_G, w_G\}\big|_{\beta_u=\bar{\beta}_{u+}} < \{b^*, \theta_G, w_G\}\big|_{\beta_u=\bar{\beta}_{u-}} \quad [25]$$

$$\textit{and } \{b^*, \theta_G, w_G\}\big|_{\substack{\theta_0=0 \\ \varphi=1}} \leq \{b^*, \theta_G, w_G\}\big|_{\substack{\theta_0=\bar{\theta}_{0+} \\ \varphi=\bar{\varphi}_+}} < \{b^*, \theta_G, w_G\}\big|_{\substack{\theta_0=\bar{\theta}_{0-} \\ \varphi=\bar{\varphi}_-}} \quad [26]$$

Unethical juniors have misconduct strategy:

$$\sigma = \begin{cases} 1 & \beta_u \leq \bar{\beta_u},\ \theta_0 \leq \bar{\theta_0},\ \varphi \leq \bar{\varphi} \\ 0 & \textit{otherwise.} \end{cases}$$

This model reveals and resolves the tension between market forces which favour advisors with a clean record and encourage good financial advisor behaviour, versus the investment fund which can, at a price, use commissions to frustrate the market's inferences and so its effectiveness. To understand Corollary 2, and especially Figure 3, consider first the extreme setting in which the regulator (e.g. FINRA) is entirely ineffective: $\beta_u = 0$. In this case an infinitesimal bonus encourages all unethical juniors to cheat ($\sigma = 1$), and the fund receives the maximum volume of business. Suppose now that the regulator were to improve and β_u rises above zero. In this case junior advisors who cheat might get caught. Therefore having no blemish G in the second period carries some information – clients would place a higher probability on such advisors being ethical. That is θ_G, i.e. trust, would rise. This is of value to clients and therefore of value to firms hiring advisors in the labour market. Firms would therefore bid the wages w_G up. The hope of securing this higher wage later in their careers is the reason unethical juniors would become reluctant to cheat. This is the effect of market forces encouraging good behaviour.

If the fund did not respond then the amount of misconduct would fall and the level of funds invested in the targeted fund would decline. The fund counteracts this effect by raising the bonus/commission she offers financial advisors as this will induce more business from unethical juniors. As the regulator's skill increases this same cycle of logic repeats: the trust clients have in unblemished advisors rises, wages of seniors rise, and the bonus agents receive for recommending the targeted fund rises to counter the career incentive created. The total amount of misconduct remains unchanged (at its maximal value). As the regulator continues to improve it becomes increasingly expensive for the fund to fight the market due to the high (and so expensive) bonuses offered. It is also the case that financial advisors would recommend the targeted fund when it is the right investment anyway, even without a bonus. At some point therefore the cost of bonuses needed to maintain investment in the fund at the maximum level becomes too great and the fund stops fighting the market. At this point the optimal bonus drops and similarly the trust in G advisors and their market wage also fall discontinuously.

It immediately follows from this discussion that if the regulator's objective is to minimise misconduct, then doing so requires detection skill to be at least $\bar{\beta}_u$. If the regulator's ability is below this level then the targeted fund adjusts bonuses to counteract the regulator's deterrence effect.

An identical analysis and intuition holds if one replaces regulatory skill (β_u) with market-wide ethical levels (θ_0). The fund fights the market outcome, that is the career concerns created by wages reflecting the greater trust clients have in G advisors, using bonuses until the cost of doing so becomes prohibitive at which point bonuses, trust and pay all drop. Further improvements in population ethics (θ_0) linearly affect the market wage w_{G} and the trust in senior advisors θ_{G}, however this is a mechanical effect which is independent of the fund's bonus choice.

The intuition for the effect of the probability the targeted fund is a good match for clients is a little different. Suppose that the targeted fund is a very poor choice for clients in that ethical advisors would almost never choose it ($\varphi \approx 0$). In this case the fund will receive no business from any ethical advisors and so profits will be very low if she does not offer bonuses. So bonuses to corrupt unethical junior and senior advisors are optimal. Now suppose that the fund becomes more suited to clients (so that φ increases). In this case unethical junior advisors are caught by the regulator less often as investing in the fund is more likely to have been in the client's interests. It follows that clients trust unblemished (G) advisors a little less – the technology for catching unethical juniors has become less effective. Therefore the wages senior unblemished advisors command declines. This lowers the career incentive and so allows the fund to lower the bonus she offers in turn. This process repeats as the suitability to the clients of the fund's offer improves. When the fund is very suitable for clients then the fund will receive investments from all ethical advisors and all unethical seniors with almost zero bonus. It therefore becomes unprofitable to keep bonuses high solely to keep unethical juniors cheating in the unlikely event that the targeted fund is not a good client match. And so the bonus drops to zero as depicted in Panel B of Figure 3.

5.5. Empirical predictions

Our model solves for the equilibrium outcome of many interrelated features of the market for financial advice: advisor commission levels and career wage profiles, which together yield advisor career incentives; levels of trust clients have in advisors; and the equilibrium level of misconduct successfully caught in the industry. The results of Corollaries 1 and 2, and their depiction in Figure 3 link these equilibrium outcomes to exogenous features of the environment such as the probability that the fee-charging targeted fund is a good match for the client (φ), or the average trustworthiness of people entering into the financial advisory industry (θ_0).

Recent changes in the equity fund investment landscape suggest that these predictions might be particularly relevant if, as has been suggested, high-fee actively managed funds are less likely to dominate a technology-driven low-fee passive fund for a typical client.[18]

Suppose therefore that the probability a randomly chosen client is well-served by a high-fee active fund (φ in our model) declines. Our model predicts that in response the interrelated features of the market would adjust as follows:

(i) The targeted funds will respond by driving up broker commissions and front loads offered to investment advisors to recommend their funds. This follows from the behaviour of b captured in Corollary 2 and depicted in Panel B of Figure 3. This is, in principle, testable using broker commission data from N-SAR filings.[19]

(ii) Compensation for non-blemished advisors with some experience (w_G) increases. This is because the not having a blemish for mis-advising prior clients is more meaningful when bonuses are elevated.[20]

(iii) The trust that clients have in financial advisors with a clean record increases. The clean record is valuable and leads to higher equilibrium wages as clients trust more. Trust data ususally come from surveys as demonstrated, for example, by Sapienza and Zingales (2012).

(iv) The total amount of misconduct is not directly empirically observable, however our model makes a prediction as to its level. The total amount of misconduct in our model follows from [6] and is:

$$\frac{1}{2}(1-\theta_0)(1-\varphi)(1+\sigma) \qquad [27]$$

[18] See Armour and Evens (2023) who argue that passive fund recent dominance has led to a movement of over \$1 trillion from high-client-fee active funds to low-client-fee passive funds since 2017. See also Mutual Fund Fees Drop Again as 'Fee War' Continues, *National Association of Plan Advisors*, May 1, 2019.

[19] See Christoffersen, Evans, and Musto (2013).

[20] Advisor compensation data are in principle available: see Egan, Matvos, and Seru (2019) who used a private industry survey.

This captures that a measure $\frac{1}{2}$ of advisors enter each period, $1-\theta_0$ of them are unethical, they face a temptation to cheat if the high-fee bonus-paying fund is not optimal for their client $(1-\varphi)$, and unethical juniors cheat with probability σ whilst seniors, at the end of their careers, cheat with probability 1. The junior advisor cheating probability σ is an equilibrium outcome and depends on the interaction of bonus temptations versus career incentives. The equilibrium outcome follows from Corollary 1. The empirically relevant part of the proposition is where bonuses are positive as is the case in reality (see footnote 7). Corollary 1 determines that in equilibrium the fund raises the bonuses sufficiently to deliver $\sigma = 1$; unethical advisors always practice misconduct. It follows therefore, using [27], that as the likelihood declines of the active-fund being in the client's best interest ($\varphi \downarrow$) our model predicts that the total amount of misconduct practiced by financial advisors increases. Absent changes in the efficacy of the regulatory regime therefore, our model predicts that the proportion of advisors receiving an adverse finding of misconduct will rise. Misconduct records, as noted in motivation described in the introduction are available from FINRA and the SEC.[21]

6. High Net Worth inequality

In this section we explore the implications of increases in income inequality on the trust that clients have in financiers, on pay, on strategically set commissions, and on the misconduct that financial advisors actually deliver.

The share of national income enjoyed by the wealthiest 10% of Americans has risen steadily from about 35% in 1980 to nearly half in 2018 (Alvaredo et al. (2018)). Further there are respected predictions that wealth inequality is likely to remain on an increasing trajectory in the developed world (Piketty (2020)). This trend towards increased inequality is happening alongside an apparently increasing lack of trust in financial professionals, as noted in the Introduction.[22]

In this section we will show that these observations of increasing client wealth among the very richest and declining trust in financiers should be expected to occur together. They can both be explained by the interaction of investment fund incentive strategies with the labour market for financial advisors. We will show that increasing inequality causes strategic funds to lower their bonuses to encourage disguise amongst unethical juniors, which in turn leads to greater misconduct suffered by the richest at the hands of unblemished, yet increasingly unethical, senior advisors.

We develop our results using the richer version of our model in which we allow a measure μ_H to have substantial wealth $X_H \geq x$. The majority of clients (measure $1-\mu_H$) each have wealth x. If the measure of clients with high net worth (HNW) μ_H is not too large then there will not be enough

[21] See Dimmock, Gerken, and Graham (2018) and Egan, Matvos, and Seru (2019).

[22] See, for example, Sapienza and Zingales (2012), and *Research finds most Brits do not trust financial advisers*, Financial Times, 16 Mar 2021.

of these HNW clients to employ an entire class of desirable financial advisors (all unblemished senior advisors $\hbar = \mathrm{G}$, or all new advisors, $\hbar = \emptyset$). It follows that the marginal employing firms in the labour market for advisors will serve clients with wealth x, and so the equations given in the preliminary results section (§4.2) hold.[23]

We develop the technical machinery when allowing for HNW clients in §6.1. This section proves our main result linking bonuses and inequality: Theorem 1. Section 6.2 discusses the intuition for our results.

6.1. Technical analysis with HNW clients

In this section we demonstrate that increasing X_H (the wealth of the small measure of HNW clients) causes the region of the parameter space in which strictly positive bonuses are optimal to expand. This is done via an inductive argument in §6.1.1. Then in §6.1.2 we develop Theorem 1 which establishes that if the optimal bonus $b^*(X_H)$ is positive, then it is declining in X_H.

6.1.1. *No bonus region shrinks*

We will use an inductive argument to demonstrate that the region of the parameter space in which the fund favours a bonus $b = 0_+$ (which delivers no junior cheating) shrinks as the wealth of HNW clients rises.

Let us denote the profit of the targeted fund which sets a bonus of b when HNW clients have wealth X_H by $\Pi(b; X_H)$. If the targeted fund prefers to incentivise junior advisors to be honest then the optimal bonus to set is $b = 0_+$ (Lemma 3). We denote the fund's profit in this case $\Pi(b, X_H)|_{b=0_+}$. To derive this profit explicitly we must identify which types of financial advisor will serve HNW clients in equilibrium: junior or unblemished seniors. This is achieved by comparing the value clients attach to junior vs unblemished senior advisers. Using [9] we have:

$$\underbrace{v(x, \theta_0, \epsilon)}_{\substack{b=0_+ \Rightarrow \sigma=0 \\ \text{\& tremble } \epsilon}} - v(x, \theta_{\mathrm{G}}, 1) = xf(1-\varphi)\left[(1-\theta_G) - (1-\theta_0)\epsilon\right] > 0 \text{ for small } \epsilon \qquad [28]$$

Equation [28] shows that if $b = 0_+$ then HNW clients prefer junior advisors over G advisors as all clients value them more highly. Firms serving HNW clients will be able to charge higher prices to their client if they employ a junior advisor. And so in equilibrium firms will pay more in wages to such advisors, and HNW clients will be served by junior advisors. This follows as when $b = 0_+$ junior advisors do not cheat whether they are ethical or not due to career concerns, whereas seniors cheat if they are unethical.

[23]We require $\mu_H < \min\left(\frac{1}{2}, \frac{1}{2} \cdot \Pr(\hbar = \mathrm{G})\right)$ which ensures that HNW clients cannot buy up all the desirable advisor types. As $\Pr(\hbar = \mathrm{G}) > 1 - (1-\varphi)(1-\theta_0)\frac{1}{2}\beta_u \geq \frac{1}{2}$ a sufficient condition for our analysis to hold is $\mu_H < \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$.

The profit of the targeted fund in this case is therefore given by:

$$\Pi(0; X_H) = xf\left(\varphi + \frac{1}{2}(1-\theta_0)(1-\varphi)\right) + (X_H - x)f\mu_H\varphi \qquad [29]$$

The first term of the profit function is identical to [14] and captures the fund's profit if all clients had wealth x. The second term is the adjustment for the μ_H clients with higher wealth. These clients are served by junior advisors who, with the zero bonus, do not cheat. Hence the HNW clients only invest in the fund when it is appropriate for them.

We wish to show that if X_H is large (great inequality) then using positive bonuses will be optimal for the fund. Suppose that there exists a bonus $b > 0$ which the targeted fund finds more profitable than a zero bonus. Denote the cheating strategy generated in juniors $\sigma(b)$. As this is more profitable than no bonus it must be that $\sigma(b) > 0$. To formulate our argument we must derive the profit of the targeted fund in this case. We therefore again determine whether HNW clients choose to hire junior advisors or senior unblemished advisors as these two cases yield different fund profit functions. Comparing the value clients attach to junior vs senior unblemished (G) advisors using [9] gives:

$$v(x, \theta_0, \sigma(b)) - v(x, \theta_G, 1) = xf(1-\varphi)\underbrace{\left[(1-\theta_G(b)) - (1-\theta_0)\sigma(b)\right]}_{\mathcal{V}(b)} \qquad [30]$$

To emphasise the dependence of client's trust in G on the actions of the juniors and therefore on b, we write $\theta_G(b)$. If $\mathcal{V}(b) < 0$ then it follows that HNW clients are served by senior unblemished advisors (G). This occurs, for example, if $b \geq \hat{b} \Rightarrow \sigma(b) = 1$.[24] Otherwise, if $\mathcal{V}(b) > 0$ then HNW clients are served by junior advisors. We analyse the first case which is a little more complicated. The second case follows similarly.

Therefore suppose that $\mathcal{V}(b) < 0$ so that HNW clients are served by senior unblemished advisors when the bonus is b. To derive the fund's profit $\Pi(b; X_H)$ we must establish the contribution to fund profits from all three types of financial advisor, $\hbar \in \{\emptyset, B, G\}$:

(i) From $\hbar = \emptyset$: There is a measure $\frac{1}{2}$ of junior financial advisors ($\hbar = \emptyset$). These serve clients with wealth x. A proportion θ_0 of these advisors are unethical and will cheat their client with probability $\sigma(b)$ when possible. The contribution to fund profits is therefore

$$(xf - b)\frac{1}{2}\left(\varphi + (1-\varphi)(1-\theta_0)\sigma(b)\right) \qquad [31]$$

(ii) From $\hbar = B$: The measure of blemished advisors ($\hbar = B$) is $\frac{1}{2}\Pr(\hbar = B)$. These advisors are all unethical ($\theta_B = 0$), and will cheat in the final period of their careers. These blemished advisors

[24]Where $\hat{b}$ is given explicitly in Lemma 4.

all serve clients with wealth x. Their contribution to the fund's profits is therefore

$$(xf - b)\frac{1}{2}\Pr(\hbar = \mathrm{B}) \tag{32}$$

(iii) From $\hbar = \mathrm{G}$: The measure of senior unblemished advisors ($\hbar = \mathrm{G}$) is $\frac{1}{2}\Pr(\hbar = \mathrm{G})$. These advisors are split across clients with wealth x and the HNW clients with wealth X_H:

(a) The measure of G advisors serving clients with wealth x is $\frac{1}{2}\Pr(\hbar = \mathrm{G}) - \mu_H$. These advisors are ethical with probability $\theta_{\mathrm{G}}(b)$, and if unethical will cheat in the final period of their careers. Their contribution to the fund's profits is therefore

$$(xf - b)\left(\frac{1}{2}\Pr(\hbar = \mathrm{G}) - \mu_H\right)\left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}}(b))\right) \tag{33}$$

(b) The remaining measure of G advisors, μ_H, serve HNW clients but otherwise behave as in (iii)(a) above. Their contribution to the fund's profits is therefore

$$(X_H f - b)\mu_H\left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}}(b))\right) \tag{34}$$

To derive the fund's profits we make use of two identities. The first is that

$$\Pr(\hbar = \mathrm{B}) + \Pr(\hbar = \mathrm{G}) = 1$$

as advisors either receive a blemish or they do not. The second identity is the law of iterated expectations:

$$\Pr(\hbar = \mathrm{B})\theta_{\mathrm{B}} + \Pr(\hbar = \mathrm{G})\theta_{\mathrm{G}} = \theta_0 \qquad \Rightarrow \qquad \theta_{\mathrm{G}}\Pr(\hbar = \mathrm{G}) = \theta_0.$$

Using these to sum [31] to [34] we have:

$$\Pi(b; X_H) = (xf - b)\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}(1+\sigma(b))\right) + (X_H - x)f\mu_H\left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}}(b))\right) \tag{35}$$

If $\mathscr{V}(b) > 0$ then similar working yields:

$$\Pi(b; X_H) = (xf - b)\left(\varphi + (1-\theta_0)(1-\varphi)\frac{1}{2}(1+\sigma(b))\right) + (X_H - x)f\mu_H\left(\varphi + (1-\varphi)(1-\theta_0)\sigma(b)\right) \tag{36}$$

which differs only in the final term capturing the probability HNW clients are mis-invested.

We can now prove that increasing the wealth of HNW clients expands the set of model parameters ($\{\theta_0, \varphi, \beta_u\}$) for which positive bonuses are preferred to no bonuses:

Lemma 5. *Consider any bonus b such that $\sigma(b) > 0$:*

$$\Pi(b; X_H) \geq \Pi(0; X_H) \Rightarrow \Pi(b; X_H + \eta) > \Pi(0; X_H + \eta)\ \forall \eta > 0. \tag{37}$$

Furthermore, the optimal fund bonus is non-zero if X_H is large enough (high wealth inequality).

Proof. Using [35], [36] and [29]:

$$\begin{aligned}
\Pi(b; X_H + \eta) =& \Pi(b; X_H) + \begin{cases} \eta f \mu_H \left(\varphi + (1-\varphi)(1-\theta_0)\sigma(b)\right) & \text{if } \mathcal{V}(b) > 0 \\ \eta f \mu_H \left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}}(b)\right) & \text{if } \mathcal{V}(b) \leq 0 \end{cases} \\
\Pi(0; X_H + \eta) =& \Pi(0; X_H) + \eta f \mu_H \varphi \\
\therefore \Pi(b; X_H + \eta) - \Pi(0; X_H + \eta) >& \Pi(b; X_H) - \Pi(0; X_H) \geq 0
\end{aligned}$$

Which proves [37].

For the second part compare the profit $\Pi(\hat{b}; X_H)$ using [35] evaluated at the fund using a bonus which delivers certain junior cheating ($b = \hat{b}$) to the profit available with a zero bonus, [29]:

$$\lim_{X_H \to \infty} \Pi(\hat{b}; X_H) - \Pi(0; X_H) = [\text{constant}] + \lim_{X_H \to \infty} (X_H - x) f \mu_H (1-\varphi)(1-\theta_{\mathrm{G}}) = \infty \qquad \text{as } \theta_{\mathrm{G}} > \theta_0.$$

The optimal bonus must therefore be non-zero as claimed. □

Lemma 5 establishes that the model parameters under which a strategic fund would optimally choose a zero bonus shrink as wealth inequality (X_H) rises. Without wealth inequality ($X_H = x$), then a zero bonus was optimal for parameter values given in Corollary 1. As wealth inequality increases this region of optimal zero bonuses shrinks.

As wealth inequality increases the fund focuses on securing the investment of HNW clients. Bonuses can encourage this, making zero bonuses sub-optimal. This is the intuition underlying Lemma 5. Casual inference might lead one to conclude that the fund's optimal bonus will therefore rise with income inequality. But this is wrong as we now explain.

6.1.2. *Optimal positive bonus for the fund*

Let us consider parameter values such that the optimal bonus offered by the targeted fund is positive. We know from Lemma 5 that this is the most common case. We study the effect of further increases in wealth inequality X_H.

Theorem 1. *Suppose the optimal fund bonus with wealth inequality X_H is positive: $b^*(X_H) > 0$. It follows that*

$$b^*(X_H + \eta) \leq b^*(X_H)\ \forall \eta > 0, \tag{38}$$

with strict inequality if $b^*(X_H) \in (b^\dagger, \hat{b})$ for $b^\dagger > \underline{b}$ defined in [52]. *Further:*

$$\lim_{X_H \to \infty} b^*(X_H) = b^\dagger.$$

Theorem 1 establishes that as inequality in the client population rises (X_H increases), the optimal bonus set by the targeted fund falls. Further, bonuses do not fall down to zero, but decline to a positive lower bound ($b^\dagger$). The bonus lower bound satisfies $\underline{b} < b^\dagger < \hat{b}$. It follows that juniors optimally mix between cheating and not when wealth inequality is high enough. This contrasts with the optimality of pure strategies which the fund chooses to incentivise in advisors without HNW clients (Proposition 1). Secondly, the bonus $b^\dagger$, which bounds the optimal bonus from below, is the unique bonus level at which HNW clients are indifferent between hiring junior advisors and unblemished senior advisors.

Unblemished seniors have a low chance of being unethical, but as they are at the end of their careers if the advisor is unethical then she will cheat. This compares to junior advisors who have a higher chance of being unethical, but even so will moderate their cheating due to career concerns, and so only cheat with some probability. At the bonus $b^\dagger$ the market equilibrium causes clients to be indifferent between these two.

6.2. HNW inequality and misconduct discussion

When all clients have the same wealth, then Proposition 1 reveals that the fund's optimally chosen bonus takes one of two values $\{0, \hat{b}\}$. This means that if optimal commissions are positive they are set so that junior advisors always cheat. We have shown that if wealth inequality should increase (by a small number of HNW clients getting richer), then the fund's optimal bonus is positive and declining in inequality. We now try and explain the implications and the intuition behind this result.

To fix ideas take as a baseline the setting of all in society having the same wealth (x) and the fund issuing positive bonuses set high enough to cause unethical juniors to cheat on their clients. Now consider a small measure of clients becoming HNW and having wealth $X_H > x$. As the wealth of these few increases let us consider the consequences for the fund if she were to lower the bonus she offers advisors. Juniors are more sensitive to the bonus than seniors as juniors face a tradeoff between lost future income versus bonus today; seniors can only gain from the bonus today and so unethical seniors strictly prefer to cheat. A reduction in the bonus therefore reduces misconduct in early career advisors. This causes the overall level of misconduct in society to decline. It also acts to lower fund profits as some of these juniors, who were serving (middle class) clients with wealth x will not now direct their clients to the fund.

However there is a second round effect: as juniors cheat with lower probability, unethical juniors are caught by the regulator less often and so receive a blemish with a lower probability. The second round effect is therefore to increase the proportion of unethicals who survive to the second period without a blemish. That is, a lower bonus causes some advisors to disguise their type. Hence unblemished advisors are less trustworthy; θ_{G} declines. These unblemished advisors, if unethical, will always cheat in the second period and some of them will be serving the HNW individuals. The deterioration of the quality of the pool of unblemished advisors therefore increases the proportion of HNW business which the fund secures. The investment from HNW clients is particularly valuable to the fund as fees which are charged are proportional to the sums invested, that is to wealth. So reducing bonuses as client inequality increases becomes optimal for the fund.

Collecting these insights we have established:

Proposition 2. *As client inequality increases due to the HNW getting richer* ($x < X_H$ *and* $X_H \uparrow$)*:*

(i) The amount of misconduct perpetuated by the population of financial advisors declines.

However

(ii) The amount of misconduct experienced by HNW clients increases.

(iii) Unblemished senior advisors ($\hbar = \mathrm{G}$) *are less trustworthy.*

(iv) The fund lowers the bonus it pays to advisors.

Proof. Theorem 1 $\Rightarrow b^*$ declines (gives (iv)) $\Rightarrow \sigma(b)$ declines (using [18] & gives (i)) $\Rightarrow \theta_{\mathrm{G}}$ declines (using [8] & gives (iii)) $\Rightarrow (1 - \theta_{\mathrm{G}})$ increases and these unblemished seniors serve the HNW clients (gives (ii)). □

Proposition 2 reflects the insight that the fund maximises her profits by ensuring that as many unethical advisors as possible find themselves advising HNW clients. However HNW clients value high quality advisors the most and so will ensure they are served by advisors who have the highest chance of being ethical. That is those with the best records. The fund therefore optimally moderates the temptation to cheat early in advisors' careers so that a larger proportion of unethical advisors can acquire the same history as ethical advisors and so potentially win the right to serve HNW clients – and then cheat on them.

This dynamic therefore implies that the public trust financial advisors less (θ_{G}). This rationally reflects the fact that increasing inequality causes funds to optimally encourage juniors to do more to disguise their true type early on in their careers.

A numerical example depicting Proposition 2 is given in Figure 4. The figure shows that the optimal bonus is at $\hat{b}$ when X_H is small, and the optimal bonus drops to $b^\dagger$ when X_H is large (blue line of circles). The change in bonus is magnified in the juniors' strategy which drops significantly from juniors always cheating ($\sigma(\hat{b}) = 1$) to cheating only with $\approx 88\%$ probability ($\sigma(b^\dagger)$). This is

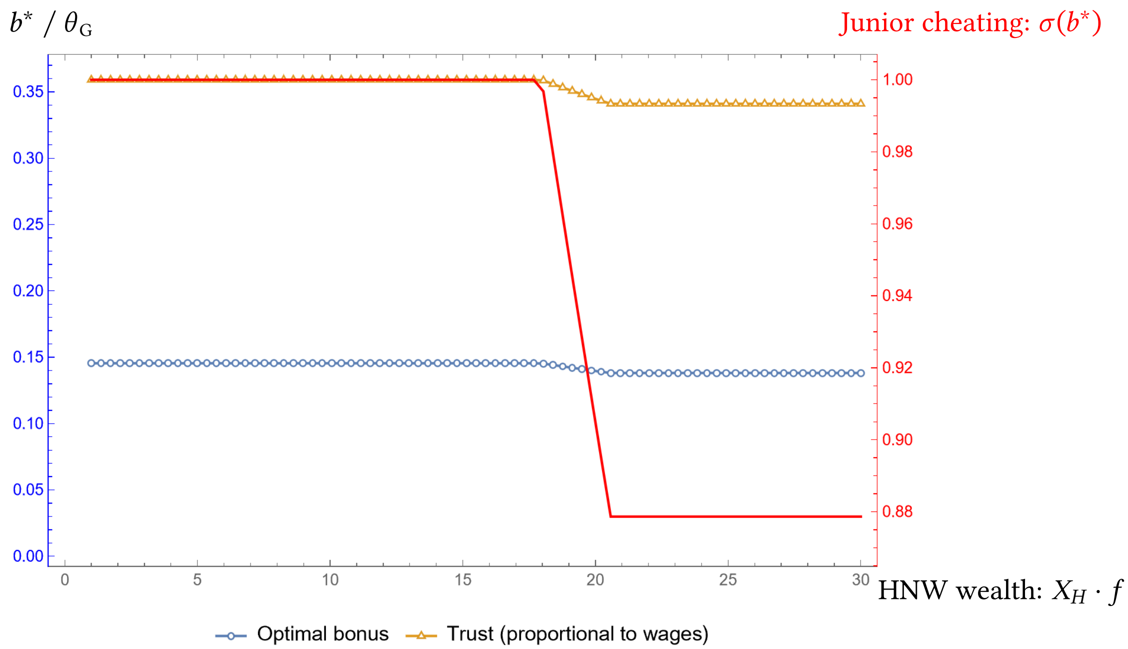

Figure 4: A numerical example depicting Proposition 2

Notes: The optimal bonus b^* is at the high level $\hat{b}$ with X_H low. Once HNW individuals become rich enough the optimal bonus drops to $b^\dagger$; the blue line of circles. This in turn causes a large change in the cheating probability of juniors, $\sigma(b)$; solid red line, right hand axis. The drop in the bonus offered causes juniors to disguise themselves and so trust declines; yellow line of triangles, θ_G. The wage w_G is not plotted, but is proportional to trust. We have set $xf = 1, \beta_u = .9, \varphi = .1, \theta_0 = 0.25, \mu_H = .1$.

reflected in the yellow line of triangles which shows that the trust θ_G, which is the probability a G advisor is ethical, declines.

7. Misconduct Patterns Over a Career

We have established that if an advisor is unethical, they are less likely to cheat clients at the beginning of their career than at the end; career concerns make juniors reluctant to cheat, an effect profit maximising funds sometimes find too expensive to counteract (Proposition 1). Our parsimonious model leaves open the question of whether over a longer career misconduct is monotonic increasing. Or is it possible for misconduct to be non-monotonic with mid-career advisors loathe to spoil a good record if they escape detection after misconduct early in their careers?

To study the time-path of misconduct over advisors' careers, we now extend our model to allow advisors to live for three periods. In each period advisors are employed, advise their clients, and may subsequently receive a blemish or not. The set of histories clients and firms can see is therefore:

$$\hbar \in \{\varnothing, \mathrm{B}, \mathrm{G}, \mathrm{BB}, \mathrm{BG}, \mathrm{GB}, \mathrm{GG}\}$$

Studying our model with advisors living for three periods is the most parsimonious way to allow the level of misconduct to deviate from monotonicity, and identify if this is possible in market equilibrium. We develop some preliminary results in §7.1 and then prove in §7.2 our main result that misconduct is monotonic increasing: unethical early career advisors are the least likely to cheat their clients. Or put another way, integrity after early transgression is not possible.

7.1. Market equilibrium preliminaries

For ease of exposition we consider the benchmark model (solved in §5) in which all clients have the same wealth.[25] To solve our model with advisors living for three periods we begin with some preliminaries. Once an advisor has a blemish then clients understand that the advisor must be unethical. It follows that such an advisor is the least sought-after advisor and so their wages will be given by the lower bound created by the outside option level of 0:

$$w_{\mathrm{B}} = 0 = w_{\mathrm{BB}} = w_{\mathrm{BG}} = w_{\mathrm{GB}}.$$

Blemished advisors will cheat given $b > 0$. Denoting $\sigma_{\hbar}$ as the probability an unethical advisor with history $\hbar$ cheats their client given the opportunity, we have

$$\sigma_{\mathrm{B}} = 1 = \sigma_{\mathrm{BB}} = \sigma_{\mathrm{BG}} = \sigma_{\mathrm{GB}}.$$

In the last period of their careers, an unethical advisor with a clean record will also cheat as there are no repercussions from securing the bonus, and so $\sigma_{\mathrm{GG}} = 1$.

It remains to find $\{\sigma_{\varnothing}, \sigma_{\mathrm{G}}\}$.

We implement Bayes rule and determine the trust that clients have in advisors with different histories. This depends on the strategies $\{\sigma_{\varnothing}, \sigma_{\mathrm{G}}\}$, and so is endogenous to the model. Analogously to [8] we have:

$$\theta_{\mathrm{G}} = \Pr\left(\varepsilon = 1 | \hbar = \mathrm{G}\right) = \frac{\theta_0}{\theta_0 + (1-\theta_0)(1 - \frac{1}{2}\beta_u(1-\varphi)\sigma_{\varnothing})} \qquad [39]$$

$$\text{similarly} \qquad \theta_{\mathrm{GG}} = \frac{\theta_{\mathrm{G}}}{\theta_{\mathrm{G}} + (1-\theta_{\mathrm{G}})(1 - \frac{1}{2}\beta_u(1-\varphi)\sigma_{\mathrm{G}})}. \qquad [40]$$

The value clients assign to advisors with these histories is given by [9]. Indifference of the firms at market equilibrium between hiring a B advisor and others gives the market equilibrium wages

[25] This is not an important assumption. As will become clear the discussion would be similar for the HNW case.

analogously to [10] as:

$$w_{GG} = xf(1-\varphi)\theta_{GG} \quad [41]$$

$$w_G = xf(1-\varphi)[1-(1-\theta_G)\sigma_G] \quad [42]$$

$$w_\emptyset = xf(1-\varphi)[1-(1-\theta_0)\sigma_\emptyset] \quad [43]$$

7.2. Misconduct grows over the course of an advisor's career

We now develop the main result of this section. We show that (unethical) mid-career advisors cheat more than early career advisors, implying that misconduct grows over the course of one's career:

Theorem 2. *We claim that*

$$\sigma_\emptyset > 0 \Rightarrow \sigma_G = 1,$$

or equivalently

$$\sigma_G < 1 \Rightarrow \sigma_\emptyset = 0.$$

Theorem 2 implies that mid-career advisors (i.e. those with history $\hbar = G$) are always weakly more likely to engage in misconduct than early-career advisors (i.e. $\hbar = \emptyset$). If an early career advisor is willing to mix over cheating and not, then mid-career advisors will definitely cheat.

Proof of Theorem 2. Suppose for a contradiction that $\sigma_G < 1$ and yet $\sigma_\emptyset > 0$. $\sigma_G \in [0,1) \Rightarrow \hbar = G$ type weakly prefers not cheating to cheating. If an unethical advisor with history $\hbar = G$ doesn't cheat then her expected payment will be $w_{GG} + b$. While cheating (when it is possible) yields $b + w_{GG}(1 - \frac{1}{2}\beta_u) + b$, reflecting the career concern of receiving a blemish which would cost the following period's high wage. A weak preference for $\hbar = G$ not to cheat therefore implies

$$b \leq \frac{1}{2}\beta_u w_{GG}. \quad [44]$$

Now we note that $\sigma_\emptyset > 0 \Rightarrow \hbar = \emptyset$ type weakly prefers cheating. For a new advisor, the payoff from cheating includes the anticipation that should she secure a G label then she will be (weakly) better off not cheating at that point in her career, given $\sigma_G \in [0,1)$ by assumption. The payoff to a new advisor from cheating is therefore:

$$\begin{aligned} &b + (1 - \frac{1}{2}\beta_u)[w_G + b\varphi + w_{GG} + b] + \frac{1}{2}\beta_u[0 + 2b] \\ =&b[1 + \beta_u + (1 - \frac{1}{2}\beta_u)(1+\varphi)] + (1 - \frac{1}{2}\beta_u)(w_G + w_{GG}) \end{aligned}$$

If instead a new unethical advisor does not cheat, when she secures a G label then she will again be (weakly) better off not cheating at that point in her career, it follows that her payoff is

$$w_{\mathrm{G}} + b\varphi + w_{\mathrm{GG}} + b = b(1+\varphi) + w_{\mathrm{G}} + w_{\mathrm{GG}}.$$

Recall again that a new advisor ($\hbar = \emptyset$) weakly prefers cheating by assumption. The above two equations therefore combine to imply that

$$b \geq \frac{\frac{1}{2}\beta_u(w_{\mathrm{G}} + w_{\mathrm{GG}})}{1 + \frac{1}{2}\beta_u(1-\varphi)}. \qquad [45]$$

The strategy of the proof is now to show that the upper bound on the bonus [44] and the lower bound on the bonus [45] are incompatible. This follows if we can establish that

$$\frac{1}{2}\beta_u w_{\mathrm{GG}}\left(1 + \frac{1}{2}\beta_u(1-\varphi)\right) < \frac{1}{2}\beta_u(w_{\mathrm{G}} + w_{\mathrm{GG}}).$$

Simplifying and then subbing in using [40], [41], and [42] to work in terms of θ_{G} and σ_{G} we wish to show that

$$\frac{\frac{1}{2}\beta_u(1-\varphi)\theta_{\mathrm{G}}}{\theta_{\mathrm{G}} + (1-\theta_{\mathrm{G}})(1 - \frac{1}{2}\beta_u(1-\varphi)\sigma_{\mathrm{G}})} < 1 - (1-\theta_{\mathrm{G}})\sigma_{\mathrm{G}}. \qquad [46]$$

Observe that the left hand side of [46] is increasing in σ_{G} while the right hand side of [46] is decreasing in σ_{G}. It follows that [46] is hardest to satisfy at $\sigma_{\mathrm{G}} = 1$. So the contradiction is established if we can demonstrate [46] with $\sigma_{\mathrm{G}} = 1$, that is if (after simplification)

$$\begin{aligned} &\frac{1}{2}\beta_u(1-\varphi) < 1 - (1-\theta_{\mathrm{G}})\frac{1}{2}\beta_u(1-\varphi) \\ \Leftrightarrow\ &\beta_u(1-\varphi) < 1 + \theta_{\mathrm{G}}\frac{1}{2}\beta_u(1-\varphi). \end{aligned} \qquad [47]$$

But this is true by inspection as the left hand side of [47] is strictly below 1 while the right is strictly above. Hence we have established our contradiction as [44] and [45] are incompatible, and therefore the result follows. □

Intuition:

It can never be the case that an unethical advisor would choose to cheat at the beginning of her career, and yet not cheat later in her career. If an unethical advisor finds it optimal not to cheat later in her career, then it must be the case that the wage differential between having a career-long clean sheet ($\hbar$ = GG) and picking up a blemish is very high. But if this is the case the high terminal wage would also deter a new unethical advisor from cheating at the start of her career. This is because a high terminal wage implies that clients place a high probability on an agent with a clean sheet ($\hbar$ = GG) being ethical, which in turn means that clients value highly mid-career advisors without a blemish as they are unlikely to cheat. It follows that the wage of mid-career advisors without a blemish must also be high. And so early career advisors risk two lots of high wages by cheating. So if an advisor can find it optimal not to cheat later in her career, she will strictly prefer not to cheat at the beginning of her career. It follows that unethical advisors are at their most trustworthy at the start of their careers. Their propensity to cheat their clients rises as their experience grows.

Empirical evidence

There is strong empirical evidence that an agent who committed misconduct in the past is increasingly likely to commit misconduct in the future. Dimmock, Gerken, and Graham (2018), Table III shows that advisor misconduct in a previous period raises the odds ratio for the individual to commit misconduct in the next period by a factor of approximately 4, controlling for coworkers and other confounders.[26] Egan, Matvos, and Seru (2019) show a similarly strong and significant relationship in their Table 5. These authors interpret their results as showing that "*financial advisers with prior misconduct are five times as likely to engage in new misconduct as the average financial adviser*".[27] These results support the pattern of career misconduct our model predicts in Theorem 2.

8. Conclusions

Our study has addressed the facts that pay amongst financiers is high, while trust in them is low, the record of those committing misconduct is public, and yet misconduct is widespread. We have studied this market by constructing an OLG model of financial advisors, who have ethics, are hired in a competitive labour market, interact with a strategic investment fund and are monitored by a regulator.

There are two main forces in our model. The first is that clients have a preference for ethical advisors which creates endogenous high pay for good behaviour via the competitive labour market. This in turn creates endogenous career incentives towards good conduct. The second force is that the strategic fund may find it optimal to fight this market mechanism by using bonuses and commissions to incentivise mis-investment amongst unethical advisors open to such inducements.

We have used our model to study when funds would optimally seek to distort the labour market mechanism and drive unethical investing. We characterise that this occurs when the industry is poorly regulated or advisors are widely unethical (and so open to misconduct if incentivised). Otherwise we show that this high-bonus approach becomes too expensive for the fund which then prefers low bonuses and low misconduct, but with concomitant lower pay for advisors and lower trust as career concerns weaken.

Our model solves for the equilibrium outcome of a number of interrelated features of the market for financial advice: advisor bonus levels and career wage profiles, which together determine

[26] See columns (1) and (5) of Table III, Dimmock, Gerken, and Graham (2018).

[27] See Egan, Matvos, and Seru (2019) p254.

financial advisor career incentives; the levels of trust clients have in their financial advisors; and the overall amount of misconduct due to mis-investing in the industry. Our model therefore offers empirical predictions as to how these endogenous market outcomes would adapt to changes in the financial opportunities available to clients, such as if the probability declines that a targeted fund is better for a randomly chosen client than a standard ETF or index fund. We develop these empirical predictions and note the availability, in principle, of relevant data, though our predictions are yet to be tested.

We have explored how the equilibrium amount of misconduct is changed by increases in inequality created by a small group of high net worth clients becoming richer than the middle class. We have found that such increasing wealth inequality reduces overall misconduct as funds conspire to disguise unethical advisors early in their careers by lowering bonuses. This causes an increase in the amount of misconduct suffered by the HNW clients – to the fund's benefit. We also study the pattern of misconduct over the course of an advisor's career, and we have shown that misconduct is monotonic; the probability of misconduct increases as an unethical advisor moves through her career. Thus unethical advisors are most trustworthy earlier in their careers, and become less so with seniority.

Our analysis models unethical advisors as being driven by pecuniary incentives, and ethical advisors as rules-based (or deontological) and so precluding any misconduct. This is not unusual in the literature on misconduct (e.g. Carlin and Gervais (2009)), however a richer model of the incentives in misconduct would allow for guilt costs which permitted both consequentialist preferences and the possibility of overcoming deontological ones (see Thanassoulis (2023) and the references therein). This opens up the research question of what the relationship is between the distribution of guilt costs amongst financial advisors and equilibrium misconduct. We leave a full analysis of this aspect of the market to future research.

A. Omitted proofs

Lemma 6. *Equation [22] in the proof of Proposition 1 holds.*

Proof. The unconstrained maximum of the fund profit function, b^* is given in [21]. We have

$$b^* \geq \hat{b} \Leftrightarrow \left(\frac{1}{\beta_u} - \frac{1}{2}(1-\varphi)(1-\theta_0)\right)^2 \geq \frac{1}{2}(1-\varphi)\theta_0\left(\varphi + \frac{1}{\beta_u} + \frac{1}{2}(1-\theta_0)(1-\varphi)\right) \qquad [48]$$

To establish that [48] holds for all permitted parameter values we define

$$A(\beta_u, \varphi, \theta_0) := \left(\frac{1}{\beta_u} - \frac{1}{2}(1-\varphi)(1-\theta_0)\right)^2 - \frac{1}{2}(1-\varphi)\theta_0\left(\varphi + \frac{1}{\beta_u} + \frac{1}{2}(1-\theta_0)(1-\varphi)\right)$$

And $b^* \geq \hat{b} \Leftrightarrow A(\beta_u, \varphi, \theta_0) \geq 0$. The first step is to observe that

$$\frac{\partial A}{\partial \beta_u} = -\frac{1}{\beta_u^2}\left(\underbrace{\frac{2}{\beta_u}}_{\geq 2} - \underbrace{(1-\varphi)(1-\theta_0)}_{\leq 1} - \underbrace{\frac{1}{2}(1-\varphi)\theta_0}_{<1}\right) < 0$$

Therefore

$$A(\beta_u, \varphi, \theta_0) > A(1, \varphi, \theta_0)$$

Next observe that

$$\frac{\partial A(1,\varphi,\theta_0)}{\partial \varphi} = \left(1 - \frac{1}{2}(1-\varphi)(1-\theta_0)\right)(1-\theta_0) + \frac{1}{2}\theta_0\left(1 + \varphi + \frac{1}{2}(1-\theta_0)(1-\varphi)\right) - \frac{1}{2}(1-\varphi)\theta_0\left(1 - \frac{1}{2}(1-\theta_0)\right)$$

is linear in φ and $\frac{\partial}{\partial\varphi}A(1,0,\theta_0) > 0$, $\frac{\partial}{\partial\varphi}A(1,1,\theta_0) > 0$. It follows that $\frac{\partial}{\partial\varphi}A(1,\varphi,\theta_0) > 0$ and so

$$A(1,\varphi,\theta_0) > A(1,0,\theta_0)$$

Now note that

$$A(1,0,\theta_0) = \frac{1}{4}\left[(1+\theta_0)^2 - \theta_0(3-\theta_0)\right] = \frac{1}{4}[1 - \theta_0 + 2\theta_0^2] > 0$$

So we have established that $A(\beta_u, \varphi, \theta_0) > 0 \ \forall\{\beta_u, \varphi, \theta_0\}$ and so $b^* > \hat{b} \ \forall\{\beta_u, \varphi, \theta_0\}$.

□

Proof of Corollary 1. For part (i) note that [23] is linear in β_u, is satisfied at $\beta_u = 0$, while at $\beta_u = 1$ [23] is satisfied iff $\varphi\left[\theta_0^2 - \frac{1}{2}(1-\theta_0)^2\right] < \frac{1}{2}(1-\theta_0)^2$ which is equivalent to $\frac{1}{\varphi} > 2\left(\frac{\theta_0}{1-\theta_0}\right)^2 - 1$. If this condition is satisfied then [23] holds for all allowable β_u; if not then there exists an intermediate value $\bar{\beta}_u$ at which [23] is satisfied with equality. Hence

$$\bar{\beta}_u \begin{cases} = 1 & \text{if } \frac{1}{\varphi} > 2\left(\frac{\theta_0}{1-\theta_0}\right)^2 - 1 \\ \in (0,1) & \text{otherwise.} \end{cases} \qquad [49]$$

For part (ii) note that the left hand side of [23] is increasing in θ_0 while the right hand side is declining in θ_0. [23] holds at $\theta_0 = 0$ and fails at $\theta_0 = 1$, so the intermediate critical point exists and is unique.

For part (iii) observe that [23] is linear in φ and is satisfied at $\varphi = 0$. The critical value $\bar{\varphi}$ at which [23] is satisfied with equality is given by

$$\bar{\varphi} = \frac{1}{\beta_u} \frac{(1-\theta_0)\left(1-\frac{1}{2}\beta_u(1+\theta_0)\right)}{\left(\theta_0 - \frac{(1-\theta_0)}{\sqrt{2}}\right)\left(\theta_0 + \frac{(1-\theta_0)}{\sqrt{2}}\right)}$$

If $\theta_0 < \frac{1}{1+\sqrt{2}}$ then the expression above is negative. There is therefore no positive value of φ at which the inequality [23] changes sign, and so [23] is always satisfied. If $\theta_0 > \frac{1}{1+\sqrt{2}}$ there exists a positive critical value $\bar{\varphi}$ at which [23] is satisfied with equality. Setting $\varphi = 1$ in [23] we see that [23] is reversed if and only if $\beta_u\theta_0 > 1-\theta_0 \Leftrightarrow \theta_0 > \frac{1}{1+\beta_u}$.[28] Hence we have

$$\bar{\varphi} \begin{cases} = 1 & \text{if } \theta_0 \leq \frac{1}{1+\beta_u} \\ \in (0,1) & \text{otherwise.} \end{cases}$$

□

Proof of Corollary 2. We use Corollary 1 and Lemmas 3 and 4 to establish the variables of interest as follows:

	$\beta_u < \bar{\beta}_u$ $\theta_0 < \bar{\theta}_0$ $\varphi < \bar{\varphi}$	$\beta_u > \bar{\beta}_u$ $\theta_0 > \bar{\theta}_0$ $\varphi > \bar{\varphi}$
b^*	$\frac{\frac{1}{2}\beta_u x f(1-\varphi)\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)}$	0
θ_G	$\frac{\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)}$	θ_0
w_G	$\frac{x f(1-\varphi)\theta_0}{1-\frac{1}{2}\beta_u(1-\varphi)(1-\theta_0)}$	$x f(1-\varphi)\theta_0$
σ	1	0

The result that the derivatives in [24] hold with respect to all three variables $\{\beta_u, \theta_0, 1-\varphi\}$ follows by differentiation. By comparing the entries in the left column against those in the right column at the critical threshold $\{\bar{\beta}_u, \bar{\theta}_0, \bar{\varphi}\}$ the downwards discontinuity is evident. Finally comparing the entries in the left column evaluated at $\{\beta_u = 0, \theta_0 = 0, 1-\varphi = 0\}$ with the entries in the right column evaluated at the critical threshold $\{\bar{\beta}_u, \bar{\theta}_0, \bar{\varphi}\}$ yields [25] and [26]. □

Proof of Theorem 1. By assumption $b^*(X_H) > 0$, and so junior agents cheat with positive probability. HNW clients will be served by G as opposed to new (∅) advisers iff $\lim_{\epsilon\to 0} \mathscr{V}(b) < 0$ where $\mathscr{V}(b)$ is given in [30].

$$\mathscr{V}(b) \leq 0 \Leftrightarrow \sigma \geq \frac{1}{1-\theta_0}\left(1 - \frac{\theta_0}{1-(1-\theta_0)\frac{1}{2}\beta_u(1-\varphi)\sigma}\right) \qquad [50]$$

[28] Note that $\frac{1}{1+\beta_u} > \frac{1}{1+\sqrt{2}}$ as $\beta_u \leq 1$.

where we have used the results in §4.1 to write that

$$\theta_{\mathrm{G}} = \frac{\theta_0}{1-(1-\theta_0)\frac{1}{2}\beta_u(1-\varphi)\sigma}. \tag{51}$$

By the IVT there is a unique $\sigma^\dagger > 0$ which satisfies [50] with equality.[29] The mixing probability $\sigma^\dagger$ is generated by a bonus $b^\dagger$ which can be expressed as a function of $\sigma^\dagger$ from [18]. Hence

$$b > b^\dagger \Leftrightarrow \sigma > \sigma^\dagger \Leftrightarrow \mathscr{V}(b) < 0 \Leftrightarrow [\hbar = \mathrm{G}] \succ [\hbar = \emptyset]. \tag{52}$$

The profit of the fund in the case of HNW clients being served by G advisors is given in [35] and can be written:

$$\Pi(b; X_H) = \Pi(b; x) + (X_H - x) f \mu_H \left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}})\right) \quad \text{for } b \geq b^\dagger.$$

The function $\Pi(b; x)$ is concave in b and increasing in the range $b \in [\underline{b}, \hat{b}]$ which was established in the proof of Proposition 1. Define the function

$$B(b) := f\mu_H \left(\varphi + (1-\varphi)(1-\theta_{\mathrm{G}}(b))\right)$$

Using the functional form for $\sigma(b)$ given in [18] one can see that $B(b)$ is declining in b over the range $b \in [\underline{b}, \hat{b}]$.[30] By the reasoning of Proposition 1 we have $b^*(X_H) \leq \hat{b}$.

We now establish the theorem in two steps. The first step is to establish that $b^*(X_H) \geq b^\dagger$. Suppose otherwise that $b^*(X_H) < b^\dagger \Rightarrow \sigma(b^*) < \sigma^\dagger$ from [52]. In this case the HNW clients would be served by new advisors, by construction of $b^\dagger$. We would have [36] which we write as:

$$\Pi(b; X_H)|_{b<b^\dagger} = \Pi(b; x) + (X_H - x)C(b) \qquad \text{where} \qquad C(b) = f\mu_H \left(\varphi + (1-\varphi)(1-\theta_0)\sigma(b)\right)$$

Now note that $C(b)$ is increasing in b and recall $\Pi(b; x)$ is increasing in b for $b \in (\underline{b}, \hat{b}) \supset (\underline{b}, b^\dagger)$ so that $\Pi(b, X_H)$ is increasing in b for $b \in (\underline{b}, b^\dagger)$. Together with the reasoning above this establishes that $b^*(X_H) \in [b^\dagger, \hat{b}]$.

The second stage is to derive the appropriate comparative static. Suppose that $b^\dagger \leq b^*(X_H) < \hat{b}$ for some X_H. Then $\sigma(b^*) \in (0, 1)$. It follows that $\Pi(b^*; X_H)$ is interior and therefore standard first and second order conditions apply, that is

$$\frac{\partial \Pi(b^*; X_H)}{\partial b} = 0, \tag{53}$$

[29] Compare both sides of [50] evaluated at $\sigma = 0$ and $\sigma = 1$, and note that both sides of [50] are monotonic in σ.

[30] $\frac{\partial \sigma}{\partial b} > 0$ from [18], $\frac{\partial \theta_{\mathrm{G}}}{\partial \sigma} > 0$ from [51] $\Rightarrow B' < 0$.

and is concave at that point: $\frac{\partial^2 \Pi(b^*;X_H)}{\partial b^2} < 0$. So taking differentials of [53] with respect to b and X_H we have

$$\underbrace{\frac{\partial^2 \Pi(b^*; X_H)}{\partial b^2}}_{<0} db + \frac{\partial}{\partial X_H}\frac{\partial \Pi(b^*; X_H)}{\partial b} dX_H = 0 \Rightarrow \frac{db}{dX_H} =_{\text{sign}} \frac{\partial}{\partial X_H}\frac{\partial \Pi(b^*; X_H)}{\partial b} = B'(b^*) < 0$$

Condition [38] follows.

We complete the proof by observing that $\lim_{X_H \to \infty} \frac{\partial \Pi(b;X_H)}{\partial b}\Big|_{b>b^\dagger} =_{\text{sign}} B'(b) < 0$. Given that we have established that the optimal bonus cannot fall strictly below $b^\dagger$, the final result follows completing the proof. □

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