

# The Remuneration of Advisors in Markets for Complex Products\*

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## Abstract

I develop a search-theoretic model to explain the entry of advisors in retail financial markets. When advisors are remunerated through kickbacks, more advisors enter when firms have a larger incentive to obfuscate (increase search costs). Thus, the intuitive link that advisors are more prevalent in more “complex” markets arises endogenously. Even though advisors facilitate consumer search, the effect of advisor entry on consumer welfare is ambiguous. However, as in the long-run free entry equilibrium there will generally be fewer advisors when kickbacks are banned than when they are not, banning such kickbacks may ultimately harm consumers. I show that the effectiveness of kickbacks in steering advisors’ recommendations and the value of additional services advisors offer are key parameters to understand whether banning kickbacks is beneficial to consumers.

*JEL Classification:* D43, D83, L13, L15, M52.

## 1 Introduction

It is common in many markets, such as insurance, mortgages and health care, for consumers to purchase products through intermediaries that provide product recommendations. However, even within retail finance, the prevalence of advice differs between products. For example, in the UK, 56% of consumers report receiving independent advice for a mortgage, while only 6% report doing so for simple insurance products (Table 1). Table 1 also shows that consumers are more likely to receive advice when they find it more difficult to find the right product information themselves. Moreover, this combination of market complexity and a large market share of advisors occurs especially for big-ticket items such as mortgage and complex insurance products such as life insurance.

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[Table 1 about here.]

In this paper, I develop a theory of advisor entry in complex markets to explain these patterns. While doing so, I compare two settings. The first is when these advisors are remunerated through kickbacks by upstream firms. Especially in retail finance, this practice is controversial as there are concerns that kickbacks lead advisors to recommend unsuitable products to receive larger kickbacks. The second setting is when these kickbacks are banned, so that consumers have to pay to receive advice. When the amount consumers are willing to pay for advice is smaller than the kickbacks advisors receive, banning kickbacks hurts advisor profitability. As a result, advisors may leave the market, so that consumers may ultimately be worse off.

I show that these questions, why advisors enter a market and whether they should be remunerated through kickbacks or not, are intricately linked. To do so, I develop a search-theoretic model with endogenous entry of advisors. Consumers can search for the best product themselves or consult an independent advisor that recommends the best product. Search costs are endogenous because firms can obfuscate, that is, increase search costs to relax competition, for example by using technical language to describe their products. I show that when advisors are remunerated through kickbacks more advisors enter in the long-run free entry equilibrium if firms have a larger incentive to obfuscate, i.e. when search costs are endogenously large. When kickbacks are banned, the number of advisors in the long-run equilibrium will tend to be lower than when they are not. However, as the presence of kickbacks puts upward pressure on prices, the effects of banning kickbacks on consumer welfare are ambiguous. I show that two key parameters, the effectiveness of kickbacks in steering advisors' recommendations and the value of any additional benefits advisors may offer in addition to recommending the best product, are crucial to understanding this trade-off.

Although advice is present in many markets, my model's assumptions are informed by market settings as typically observed in retail finance, because advice is especially important in these kinds of markets. For example, in 2013, 37.5% of consumers in the United States reported using the services of a financial planner or broker.<sup>1</sup> Also, kickbacks have been a focus of financial regulators. For example, in The Netherlands, the United Kingdom and Australia, kickbacks have been completely or partially banned in recent years and the regulation of kickbacks is part of recent European Union guidelines.<sup>2</sup>

In the baseline model, consumers randomly search over multiple firms selling a horizontally differentiated product (Wolinsky, 1986). Firms can obfuscate their products. Obfuscation means that firms make their products difficult to find, understand or otherwise evaluate to relax competition or confuse

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<sup>1</sup>Survey of Consumer Finances, 2013. Accessed from <https://www.federalreserve.gov/econresdata/scf/scfindex.htm> on December 5, 2016.

<sup>2</sup>For example, EU guideline 2014/65/EU require disclosure of kickbacks in the context of investment products and sets a framework for further regulation by member states. EU guideline 2016/97 regulates kickbacks for insurance advisors. (EUR-Lex, <http://eur-lex.europa.eu/>)

consumers. One way they can do so is by purposefully making their product descriptions difficult to understand. For example, Celerier and Vallee (2016) show using a textual analysis of structured investment products that financial firms use complex language to entice yield-seeking retail investors to purchase their products while hiding their risks.<sup>3</sup> I model obfuscation as in Ellison and Wolitzky (2012): firms can impose an additional search cost to consumers visiting their firm. Because consumers' disutility from search is convex in search effort, obfuscation is individually rational for firms, as it raises the cost of visiting additional firms. Therefore, search costs are endogenously large in equilibrium which creates scope for advisors to enter. I show that firms have both an incentive to increase their kickbacks as well as to obfuscate more when the value of the product they sell increases. My model thus generates the correlation in Table 1 between market complexity and advice prevalence, as well as the observation that complexity and advice co-occur for big-ticket items. When kickbacks are banned, this correlation disappears. I argue that without kickbacks, the number of advisors in the long-run free entry equilibrium is likely to be smaller than with kickbacks: because consumers expect the same recommendation at every advisor, price competition between advisors is fierce so that they make smaller profits than when they receive kickbacks.

The consumer welfare effects of advisor entry are ambiguous and depend on the way advisors are remunerated. When advisors are remunerated through kickbacks, advisor entry increases consumer welfare only if kickbacks are not too effective in steering advisors' recommendations. The reason is that, even though advisors provide consumers with better matches, the presence of kickbacks dampens price competition: firms can increase kickbacks rather than lower their prices to attract consumers. As a result, advisor entry increases prices when advisors are remunerated through kickbacks. This price effect can be larger or smaller than the effect of better matching facilitated by advisors, so that the overall effect is ambiguous. When kickbacks are banned, this price effect disappears so that advisor entry always benefits consumers compared to a market without advisors. This does not mean that banning kickbacks is necessarily beneficial for consumers. Indeed, when kickbacks are relatively ineffective in steering advice and when advisors offer large additional benefits in addition to recommending a product, such as tax planning, consumers are better off if advice is subsidized by upstream firms. This result holds when the number of advisors is held fixed, and is exaggerated in the long-run when fewer advisors choose to stay active after banning kickbacks.

This paper combines ideas from the literatures on financial advice and obfuscation and is thus related to both. My work is perhaps most closely related to Inderst and Ottaviani (2012a), who study competition between two firms through a single advisor. In their work, consumers' willingness to pay

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<sup>3</sup>Other evidence on obfuscation is given by Muir, Seim and Vitorino (2013), who show that driving schools obfuscate their prices.

is such that they want to purchase only through an advisor. In real-world markets, many products can however be purchased both through independent advisors and directly from firms, as for example Table 1 shows. In my model, both channels are active. Compared to Inderst and Ottaviani (2012a), this allows me to explain why advisors enter, to study the welfare effects of advisor entry and to study the effect advisors and the way they are remunerated have on the market as a whole. In particular, my model allows me to study the effect of advice on consumers' welfare, while in Inderst and Ottaviani (2012a) firms always set their prices such that in equilibrium consumer surplus is zero. Other papers in the literature include Gravelle (1994), Bolton, Freixas and Shapiro (2007), Inderst and Ottaviani (2012b), all of which also consider only a single channel.

Stoughton, Wu and Zechner (2011) present a model of investment management in which consumers use the services of an advisor because a fixed search cost is required to learn investments' returns. Their model is tailored to the mutual fund industry, while I consider a more general setting to explain why advice exists. Moreover, in their model kickbacks serve to confuse consumers in their value of the product. I consider how different firms use kickbacks to "bias" advisors' recommendations, which is the motivation of regulators to ban these kickbacks.

To the best of my knowledge, Murooka (2015) is the only other paper concerned with both obfuscation and advice. He studies whether advisors have an incentive to unshroud hidden fees when firms can shroud fees as in Gabaix and Laibson (2006). He shows that in many cases they do not. This is consistent with my model, because in my model it is precisely the existence of obfuscation that allows advisors to profitably enter. Like other papers, consumers can only purchase through an advisor in Murooka (2015), while in my model the market structure is endogenous.

Other recent papers on advice relate to other aspects of the market. Bardey et al. (2016) study the incentives advisors have to collect information, while de Cornière and Taylor (2016) consider the incentives of upstream firms to invest in quality in the presence of an intermediary. Shen and Wright (2016) explain the observation that in many markets with advisor firms do not price discriminate (i.e. there is price coherence) between consumers who purchase through an advisor and those who purchase directly at a firm.

My paper also relates to the literature on obfuscation and adds to it in two ways.<sup>4</sup> So far, this literature has concerned itself with homogenous products. I embed Ellison and Wolitzky's (2012) model of obfuscation in Wolinsky's (1986) model of sequential search, thereby extending the analysis to differentiated products. Moreover, I show that obfuscation can endogenously lead to different market structures and analyze the effect of market structure on the incentive to obfuscate.

The remainder of this paper is organized as follows. Section 2 discusses the model's environment.

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<sup>4</sup>This literature includes Carlin (2009), Wilson (2010) and Ellison and Wolitzky (2012).

In Section 3 I derive the equilibria considered: without advisors, with advisors remunerated through kickbacks and with advisors remunerated by consumers. Section 4 discusses the entry of advisors and consumer welfare in the special but analytically convenient case where the advisors' market share is exogenous. Section 5 corroborates the findings from Section 4 with numerical examples from a richer model. Section 6 concludes.

## 2 Environment

$F \geq 2$  firms sell a single horizontally differentiated product to a unit mass of consumers. The marginal cost of production is zero. Product valuations are idiosyncratic amongst consumers and firms: consumer  $k$  obtains match value  $\varepsilon_{ki}$  at firm  $i$ , where  $\varepsilon_{ki}$  is independently and identically distributed with distribution  $\varepsilon_i \sim \text{Unif}(0, \bar{\varepsilon})$ . Consumer  $k$  receives utility  $\varepsilon_{ki} - p_i$  if he purchases product  $i$  and 0 if he purchases no product. Continuing, I will drop the consumer subscript  $k$  on  $\varepsilon_i$  for ease of exposition.

Consumers can either search for the best product themselves, i.e. through the search channel, or consult an advisor for a product recommendation, i.e. through the advice channel (Figure 1). I explain those two channels in the following two subsections.

[Figure 1 about here.]

### 2.1 The search channel

Without the help of an advisor, consumers must engage in costly search to learn match values and prices. Search is costly due to exogenous transportation costs and firms' obfuscation. Transportation costs comprise the necessary time to evaluate a product, which includes the actual time to visit a firm as well as the time to understand and evaluate its product's properties. This transportation cost is heterogeneous across consumers: a fraction  $1 - \mu$  of consumers has high expertise and transportation cost  $\sigma$ , while a fraction  $\mu$  has low expertise and faces a higher transportation cost  $\sigma + \chi$ , with  $\chi > 0$ . This captures the fact that consumers differ in their financial literacy (e.g. Van Rooij, Lusardi and Alessie, 2011), so that it is easier for some consumers to find their best match than for others.

Obfuscation comprises those strategies firms employ to further increase search costs. For example, in the case of insurance, transportation costs include visiting a website to learn about coverage. This will always be necessary, but firms can obfuscate by, for example, using unnecessary technical language in the insurance contract. I follow Ellison and Wolitzky (2012) to model obfuscation. To be specific, firm  $i$  chooses the additional time it takes to evaluate its product, or amount of obfuscation,  $t_i \geq 0$ . Consumers do not observe obfuscation before visiting a firm, but in equilibrium they do form correct expectations

about it. Since consumers cannot observe obfuscation before searching, firms cannot commit to any particular amount. Initially, I will assume obfuscation is completely costless. As this leads to multiple equilibria, I will later assume obfuscation has some small cost  $c(t)$ , with  $c'(t) > 0$ , which will select a unique equilibrium.

Consumers experience convex disutility from time spent searching, i.e the sum of transportation costs and obfuscation. Denote by  $g(t)$  consumers' disutility from search. Then, in an equilibrium where all firms set obfuscation  $t^*$ , a consumer with transportation cost  $s \in \{\sigma, \sigma + \chi\}$  experiences disutility from search after visiting  $n$  firms equal to

$$g(n(s + t^*)).$$

I assume that  $g(0) = 0$  and that  $g(t)$  is strictly increasing and strictly convex in  $t$  for all  $t \geq 0$ .  $g(t)$  will be convex when consumers' utilities are concave in both consumption and leisure (Ellison and Wolitzky, 2012).

I consider only symmetric equilibria in pure strategies, in which firms choose price  $p^*$  and obfuscation  $t^*$ .<sup>5</sup> Given that a consumer expects these quantities, what should he do? As in many search models, his optimal behavior is given by a reservation value rule. Assume a consumer with transportation cost  $s$  visits some firm  $i$ , has so far incurred total search costs (transportation costs and obfuscation)  $\tau \geq 0$  and expects obfuscation  $t^*$  at all subsequent firms. Then the reservation value  $r(t_i; s, \tau)$  is the solution to

$$\int_{r(t_i; s, \tau)}^{\bar{\varepsilon}} \frac{\varepsilon - r(t_i; s, \tau)}{\bar{\varepsilon}} d\varepsilon = \frac{(\bar{\varepsilon} - r(t_i; s, \tau))^2}{2\bar{\varepsilon}} = g(\tau + 2s + t_i + t^*) - g(\tau + s + t_i). \quad (1)$$

The left-hand side is the expected increase in utility from searching if all firms charge the same price, the right-hand side the expected increase in the consumer's disutility from search. Therefore, a consumer's reservation value is that match value for which he is indifferent between purchasing immediately and visiting one more firm. The left-hand side is strictly decreasing in  $r(\cdot)$  so that the solution to (1), if it exists, is unique.

The reservation value rule states that a consumer continues to search only if his best match so far is lower than his reservation value. Standard derivations of this fact, such as Kohn and Shavell (1974) or Weitzman (1979), are however not applicable here since the cost of visiting a certain firm depends on the number of firms a consumer has visited. The following proposition establishes the reservation value property in this particular model.

**Proposition 1.** *A consumer with transportation costs  $s \in \{\sigma, \sigma + \chi\}$  has visited  $0 \leq n \leq F - 2$  firms  $\mathcal{F}$  before*

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<sup>5</sup>I discuss timing and equilibrium selection in more detail in Section 3.

visiting firm  $i$ . His best match so far is  $x = \max_{i \in \mathcal{F}} \varepsilon_i$  (with  $x = 0$  when  $n = 0$ ). Firm  $i$  sets price  $p_i$  and obfuscation  $t_i$ . Then the consumer visits the next firm if and only if  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} < r(t_i; s, \tau)$ . If the consumer stops searching, he purchases the product giving the highest utility if this is greater than zero.

*Proof.* See the appendix. □

## 2.2 The advice channel

Because obfuscation makes search costly, some consumers prefer to use an advisor. There are  $A$  advisors, who recommend one product to any consumer visiting them. An advisor does not reveal any more information, such as the match value of the recommended product.<sup>6</sup> An advisor does so after observing both the consumer's match values and the products' prices. The consumer, however, observes only the prices. After receiving the advisor's recommendation, the consumer has the option to purchase any or no product. The transportation cost to any advisor is  $\alpha > 0$ , so that a consumer experiences disutility  $g(\alpha)$  from visiting one.<sup>7</sup> In addition to recommending a consumer a product, consumers receive an advisor benefit  $b_i$  when they purchase a product through advisor  $i$  (as in Edelman and Wright, 2015b). This reflects the fact that in many markets, advisors do more than recommend the most suitable product. For example, advisors may give advice on tax planning as well. Advisors are horizontally differentiated:  $b_i \sim \text{Unif}(0, \bar{b})$ , which, for simplicity, consumers observe without searching.

Advisors can provide consumers with their best match because they have superior expertise. Since this expertise is costly to acquire, an advisor will only enter in markets in which it expects to make sufficient profits. There is a fixed cost of entry  $E$  for every advisor, which corresponds to learning about product characteristics or complying with regulations. In the long-run free entry equilibrium, advisors will enter until the profit per advisor net of entry costs  $E$  equals zero.

I consider two modes of advisor remuneration. In the first case, advisors are remunerated through kickbacks by the firms. In this case, advice is free for consumers and an advisor receives a kickback  $k_i$  if he sells product  $i$ . Kickbacks are set by the firms. In the second case, I discuss the case where these kickbacks are regulated so that consumers must pay for advice themselves. Every advisor  $j$  then sets an advice fee  $a_j$  which consumers must pay if they receive advice. I discuss the specific workings of the advisor in more detail for each case in Section 3.

Advisors cannot charge an advice fee when they receive kickbacks. This assumption reflects that financial advice, when remunerated through kickbacks, tends to be free. In some cases, this reflects the institutional setting. For example, in The Netherlands, before 2009 it was illegal for financial advisors

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<sup>6</sup>This is by assumption, but as will become clear when deriving the advisor's optimal recommendation in Section 3.2.1, no advisor would like to deviate by disclosing more information in the resulting equilibrium.

<sup>7</sup>In equilibrium, no consumer wants to visit more than one advisor.

to charge consumers anything. In other cases, this assumption can be endogenized as a self-confirming equilibrium. To see this, assume firms do not wish to sell through an advisor charging consumers, expecting that no consumer wants to purchase there. Then, it is indeed rational for consumers not to visit such an advisor, making the firms' original inference rational. As a result, a fee-charging advisor makes no profits so that it is an equilibrium that advisors do not charge consumers when they receive kickbacks.

### 3 Equilibria

I now derive the resulting equilibria in three cases. First I consider a baseline model without advisors, of which I call the resulting equilibrium the *search equilibrium*. Then I consider the same model with advisors remunerated through kickbacks, which results in the *kickback equilibrium*. Finally, I assume that kickbacks are banned and consumers have to pay for advice, resulting in the *regulated equilibrium*. All equilibria follow from some restriction on the full model as presented in Figure 1: these restrictions, as well as the remaining strategic variables are detailed in Table 2.

[Table 2 about here.]

In all cases, the timing is as follows:

1. Firms choose prices, obfuscation and (if applicable) kickbacks. If applicable, advisors simultaneously set advice fees.
2. Consumers observe the advisor benefits and (if applicable), advice fees. They choose whether to search themselves or whether to visit an advisor.
3. Consumers who search, proceed as explained in the previous section. Consumers who go to an advisor, receive a recommendation and choose which product to purchase.

Firms cannot price discriminate between the search and the advisor channel. I take it as an empirical given that they do not.<sup>8</sup> One explanation of this phenomenon is given by Shen and Wright (2016). They show that if consumers can purchase directly from a firm after receiving advice ("showrooming"), firms find it optimal not to discount direct purchases because this lowers the effectiveness of kickbacks. A similar mechanism would apply to this model.

I focus on Bayes-Nash equilibria that are symmetric and in pure strategies. Moreover, in this model, contrary to most of the search literature, the first search is not free. Therefore it is possible that in equilibrium some or all consumers do not search at all. For that reason, I also restrict my attention to

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<sup>8</sup>For empirical evidence that prices are the same in the search and the advice channel, see Edelman and Wright (2015a).

equilibria in which all consumers search at least once, which, following Ellison and Wolitzky (2012), I call non-trivial equilibria.<sup>9</sup>

Finally, I focus on parameters such that in the resulting equilibrium high expertise consumers search themselves and low expertise consumers visit an advisor, so that the market share of the advisors is fixed. I call such equilibria *segmented equilibria*. The following three assumptions on the model parameters are sufficient for the resulting equilibrium to be segmented.

**Assumption 1.** Assume  $\alpha \geq \underline{\alpha}$ ,  $\chi \geq \underline{\chi}$  and  $\mu \geq \underline{\mu}$ .

Firstly, the difference in transportation costs between low expertise and high expertise consumers  $\chi$  needs to be sufficiently large, i.e. the difference between the two types must be a real difference. Moreover, the share of low expertise consumers  $\mu$  must be sufficiently large so that advisors find it worthwhile to advice only them, as they do in a segmented equilibrium. Finally, the search cost  $\alpha$  to advisors must be large enough so that high expertise consumers do not want to visit an advisor.

In Appendix A, I prove that these assumptions are sufficient for the resulting equilibrium to be segmented. I do so by deriving the three equilibria in general, i.e. allowing for (some) high expertise consumers to visit an advisor and (some) low expertise consumers to search themselves. I then show that there exists values of  $\underline{\alpha}$ ,  $\underline{\chi}$  and  $\underline{\mu}$  so that under Assumption 1, consumers endogenously choose to segment themselves. I formalize this argument in the following proposition.

**Proposition 2.** *There exist values of  $\underline{\alpha}$ ,  $\underline{\chi}$  and  $\underline{\mu}$  such that Assumption 1 is a sufficient condition for the kickback and regulated equilibria to be segmented. In other words, a sufficient condition for the kickback and regulated equilibria to be fully segmented is that  $\alpha$ ,  $\chi$  and  $\mu$  are sufficiently large.*

*Proof.* See the appendix. □

During the remainder of the paper, I will assume Assumption 1 holds, as it allows me to derive to derive all results analytically. In Section 5, I show numerically that the results also hold in non-separating equilibria.

### 3.1 Search equilibrium

To establish a baseline, I start by discussing the model without advisors. Because all consumers must search to find their best match, I call the resulting equilibrium the search equilibrium and subscript equilibrium quantities with  $S$ . As in Ellison and Wolitzky (2012), equilibrium requires that firms obfuscate so much that in equilibrium no consumer searches twice:

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<sup>9</sup>For a more in-depth discussion of the extensive margin of search, see Janssen, Moraga-González and Wildenbeest (2005) and Moraga-González, Sándor and Wildenbeest (2016).

**Lemma 1.** *In any symmetric non-trivial search equilibrium, no consumer searches twice:  $r(t_S^*; \sigma, 0) \leq p_S^*$ .*

*Proof.* See the Appendix. □

The intuition for this result is the same as in Ellison and Wolitzky (2012): whenever some consumer searches twice, a firm profits if it obfuscates more. The strict convexity of the disutility of search  $g(t)$  causes this increase to raise the incremental disutility of the second search and therefore the probability that a consumer purchases at the first firm. Even when firms can only increase the cost of the second search by a small amount  $\epsilon > 0$ , any situation in which some consumers search more than once unravels in this way until, in equilibrium, no consumer searches twice. When  $r(t_S^*; \sigma, 0) \leq p_S^*$ , low-expertise consumers never search twice. Because high-expertise consumers have higher transportation costs but face the same obfuscation, this inequality implies that they never search twice as well.<sup>10</sup>

Because no consumer searches twice, firms have monopoly power and can charge the monopoly price. However, many obfuscation levels are possible in equilibrium. There needs to be enough obfuscation so that no consumer searches twice, but not so much that some consumer doesn't search at all. Many obfuscation levels are compatible with these requirements, as the following proposition shows.

**Proposition 3.** *Any symmetric non-trivial search equilibrium has the following properties:*

- *the equilibrium price is the monopoly price:  $p_S^* = \arg \max_p p(1 - \frac{p}{\bar{\epsilon}}) = \frac{\bar{\epsilon}}{2}$ ;*
- *obfuscation  $t_S^*$  is such that*

$$g(\sigma + \chi + t_S^*) \leq \frac{(\bar{\epsilon} - p_S^*)^2}{2\bar{\epsilon}} \leq g(2\sigma + 2t_S^*) - g(\sigma + t_S^*).$$

*Proof.* By Proposition 1 and Lemma 1, in equilibrium, a consumer visiting firm  $i$  purchases if and only if  $\epsilon_i \geq p_i$ . The first statement follows immediately.

Given the equilibrium price and the fact that no consumer ever searches twice, the expected surplus of a consumer's first search is

$$\int_{p_S^*}^{\bar{\epsilon}} \frac{\epsilon - p_S^*}{\bar{\epsilon}} d\epsilon = \frac{(\bar{\epsilon} - p_S^*)^2}{2\bar{\epsilon}}.$$

For a non-trivial equilibrium to exist, this should be greater than the cost of the first search. When the first inequality holds, this is the case for the low-expertise consumers, who have the greatest transportation costs, so that all consumers search at least once.

The second inequality formalizes the notion that obfuscation should be such that no consumer ever searches twice. Since the right-hand side of (1) is strictly increasing in  $t_i$  by the convexity of  $g(\cdot)$ ,

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<sup>10</sup>Although I have taken obfuscation to mean an increase in search costs, my model is consistent with a behavioral model in the vein of Carlin (2009), in which consumers purchase from a random firm if firms obfuscate, because consumers visit a single random firm in equilibrium.

$\frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} \leq g(2\sigma + 2t_S^*) - g(\sigma + t_S^*)$  is necessary and sufficient to satisfy Lemma 1.  $\square$

## 3.2 Kickback equilibrium

I now extend the model from the previous section to include advisors who are remunerated through kickbacks. This results in the the kickback equilibrium and I denote the equilibrium price with  $p_K^*$ , equilibrium obfuscation with  $t_K^*$  and equilibrium kickbacks with  $k_K^*$ .

### 3.2.1 Advisor problem

An advisor receives  $k_i$  if he sells a product from firm  $i$ . Consumers do not observe the kickbacks. The interaction between the advisors and consumers is based on Inderst and Ottaviani's (2012a) model of biased advice, the main difference being that here match values are drawn independently from a continuous distribution, while in their paper one product always has a high match value and the other a low one. Moreover, since the current model is symmetric, in equilibrium advisors will be unbiased, i.e. always recommend the product with the highest match value. However, the possibility of biasing advisors via kickbacks *off the equilibrium path* is sufficient to get to the main results, while the symmetry gives the model a simpler structure.<sup>11</sup>

An advisor and a consumer play a cheap talk game. When making its recommendation, advisors do not only care about the product's kickback, but also about the utility it gives the consumer. Reasons for doing so are because an advisor cares directly about the consumer's payoff, he is liable for bad advice and at risk of receiving a fine or because of reputational concerns (Inderst and Ottaviani, 2012a). This concern for suitability is captured by the following advisors' payoff:

$$u_{Ai} = k_i + \gamma(\varepsilon_i - p_i),$$

if the consumer purchases product  $i$ , where  $\gamma \in (0, 1)$  captures the advisors' concern for suitability.<sup>12</sup> Thus, an advisor prefers the consumer to purchase product  $i$  if and only if

$$k_i + \gamma(\varepsilon_i - p_i) \geq \max_{j \neq i} (k_j + \gamma(\varepsilon_j - p_j)).$$

It is easy to see that the unique<sup>13</sup> non-babbling cheap talk equilibrium of this game is that the advisor

<sup>11</sup>If there was some asymmetry between the firms, for example in marginal costs, advisors would be biased, i.e. recommend with positive probability the inferior product. This bias would be an additional deadweight loss. See Inderst and Ottaviani (2012a) for a more in-depth discussion of this issue.

<sup>12</sup>For  $\gamma > 1$ , it is always more efficient for a firm to lower its price than to increase its kickback. As a result, equilibrium kickbacks are 0 and advisors make no profits. An advisor with  $\gamma > 1$  will thus never enter the market if he needs to pay a fixed cost to do so.

<sup>13</sup>Ignoring the outcome-equivalent equilibrium in which the firms' labels are reversed.

recommends the product which gives the advisor the highest payoff. Since  $\gamma > 0$ , this signal is informative and the consumer follows the advice. In fact, since the advisor is unbiased in equilibrium it is trivially optimal for the consumer to follow the advisor's recommendation. I assume that beliefs are passive in the sense that consumers also hold the equilibrium belief that the advisor is unbiased off the equilibrium path.<sup>14</sup> As a result, consumers also follow the advisor's recommendation out of equilibrium.<sup>15</sup>

There is however one situation in which the consumer does not follow the advisor's recommendation: when the expected match value of the recommended product is smaller than its price. Denote by  $\hat{\varepsilon} = E[\varepsilon_i | \text{advisor recommends } i]$  this expected match value. I assume that beliefs are passive in the sense that consumers do not update  $\hat{\varepsilon}$  when they observe off-equilibrium prices. When  $\hat{\varepsilon} < p_i$ , following the advisor's recommendation to purchase product  $i$  leads to a negative expected payoff for the consumer. It follows that he either always purchases some other product  $j \neq i$  or no product at all. However, as will become clear below, this cannot happen in equilibrium. For this reason it is also optimal for the advisor to not disclose more information on match values than the best match: every consumer who visits an advisor ends up making a purchase. Since firms set kickbacks before advisors make their recommendations, advisors cannot increase their profits by deviating in any way, such as by disclosing the match value of the recommended product.<sup>16</sup>

While the advisor provides a better match on average, consumers run the risk of purchasing a product which ex-post gives them negative utility. When they visit a firm, they have the option value of not purchasing, but will on average receive a worse match. The fact that one option does not clearly dominate the other leads to both advisors and the individual firms having a positive market share in equilibrium.

### 3.2.2 Firm problem

Having discussed the interaction between consumers and advisors, I now turn to the optimal strategy of the firms, given consumer behavior. Similar to the search equilibrium, obfuscation must be such that consumers only visit one firm:

**Lemma 2.** *In any non-trivial symmetric kickback equilibrium, no consumer searches twice:  $r(t_K^*, \sigma, 0) \leq p_K^*$ .*

*Proof.* Analogous to Lemma 1. □

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<sup>14</sup>One assumption often made in the literature on financial advice is that consumers are naive, i.e. they always believe that both firms pay the same kickback and the advisor is unbiased. Since in this model this belief is correct in equilibrium, there is no difference between naive consumers and consumers forming rational expectations about kickbacks.

<sup>15</sup>An alternative is that consumers have "wary" beliefs, in which they update their beliefs on the information contained in the advisor's recommendation when they observe off-equilibrium prices. With such beliefs, an equilibrium need not exist.

<sup>16</sup>In fact, advisors' preference for not disclosing any further information on match values will in general be strict since any informative signal will necessarily lead some consumers to not purchase anything.

Firms thus face demand from two sources: from direct searchers and from advised consumers. To derive the symmetric equilibrium, assume that firm  $i$  is a potential deviant. First, by Lemma 2, a direct searcher demands firm  $i$ 's product if  $\varepsilon_i \geq p_i$ . Total demand from direct searchers is then  $\frac{1-\mu}{F}$ . Second, consumers purchasing through the advisor demand product  $i$  if  $k_i + \gamma(\varepsilon_i - p_i) \geq k_K^* + \gamma(\max_{1 \leq j \leq F, j \neq i} \varepsilon_j - p_K^*)$ . The probability of this event equals

$$P\left(k_i + \gamma(\varepsilon_i - p_i) \geq k_K^* + \gamma\left(\max_{1 \leq j \leq F, j \neq i} \varepsilon_j - p_K^*\right)\right) = \frac{1}{\bar{\varepsilon}^F} \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-1} d\varepsilon.$$

However, when  $p_i > \hat{\varepsilon} = E[\varepsilon_i | \varepsilon_i = \max_{0 \leq j \leq F} \varepsilon_j]$ , no advised consumer will purchase product  $i$  because its price is larger than what a consumer believes its expected match value to be, so that firm  $i$  only faces demand from direct searchers. Thus, firm  $i$ 's profits are

$$\pi_i(p_i, k_i) = \begin{cases} \frac{1-\mu}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) + \mu(p_i - k_i) \frac{1}{\bar{\varepsilon}^F} \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-1} d\varepsilon & \text{if } p_i \leq \hat{\varepsilon}, \\ \frac{1-\mu}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) & \text{if } p_i > \hat{\varepsilon}. \end{cases} \quad (2)$$

Taking the first order conditions and applying symmetry gives the kickback equilibrium, which can be characterized as follows.

**Proposition 4.** *Assume that*

- *Assumption 1 holds;*
- $\gamma \geq \frac{1-F+2\mu F}{\mu+\mu F}.$

*Then there exists a symmetric, non-trivial, fully segmented kickback equilibrium with the following properties:*

- *the equilibrium price equals  $p_K^* = \frac{\bar{\varepsilon}}{2} \left(1 + (1-\gamma)\frac{\mu}{1-\mu}\right)$  and equilibrium kickbacks equal  $k_K^* = p_K^* - \frac{\gamma\bar{\varepsilon}}{F}.$*
- *equilibrium obfuscation  $t_K^*$  must satisfy*

$$g(\sigma + \chi + t_K^*) \leq \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} \leq g(2\sigma + 2t_K^*) - g(\sigma + t_K^*).$$

*Proof.* See the appendix. □

The first assumption leads to the resulting equilibrium to be separating, as discussed above. The second assumption, on advisors' concern for suitability  $\gamma$ , ensures that  $p_K^* \leq \hat{\varepsilon}$ , i.e. the equilibrium price is smaller than the expected value of a recommended product, so that advised consumers actually purchase the recommended product.

### 3.3 Regulated equilibrium

Because kickbacks have led to concerns of biased advice, some regulators have banned kickbacks or are considering doing so. When kickbacks are regulated, consumers have to pay a fee to receive advice. To study the effect of this policy, I now assume that kickbacks are not allowed and that every advisor charges an advice fee  $a_i \geq 0$ . Now not only the firms, but also the advisors have to decide on an optimal price. I consider these problems in order.

#### 3.3.1 Firm problem

First, similarly to the search and kickback equilibrium, obfuscation must be such that no consumer searches twice:

**Lemma 3.** *In any non-trivial symmetric regulated equilibrium, no consumer searches twice:  $r(t_R^*; \sigma, 0) \leq p_R^*$ .*

*Proof.* Analogous to Lemma 1. □

To derive the equilibrium price  $p_R^*$ , consider the strategy of a deviant firm  $i$ . Its profits again stem from sales to direct searchers and advised consumers. Remember that I focus on situations in which the  $\mu$  low expertise consumers choose to visit an advisor, while the high expertise consumers search themselves. Since the  $\frac{1-\mu}{F}$  direct searchers never search twice in equilibrium, they purchase when  $\varepsilon_i \geq p_i$ . Advisors are unbiased in the absence of kickbacks and therefore recommend product  $i$  when  $\varepsilon_i - p_i \geq \max_{j \neq i} \varepsilon_j - p_R^*$ . However, consumers will only follow this recommendation if the price is lower than the expected match value, i.e. when  $p_i \leq \hat{\varepsilon} = E[\varepsilon_i | \varepsilon_i \geq \max_{j \neq i} \varepsilon_j]$ . Thus, firm  $i$ 's profits are

$$\pi_i = \begin{cases} \frac{1-\mu}{F} p_i \left(1 - \frac{p_i}{\hat{\varepsilon}}\right) + \frac{\mu}{\hat{\varepsilon} F} p_i \int_{-p_R^* + p_i}^{\hat{\varepsilon}} (\varepsilon - p_i + p_R^*)^{F-1} d\varepsilon & \text{when } p_i \leq \hat{\varepsilon} \\ \frac{1-\mu}{F} p_i \left(1 - \frac{p_i}{\hat{\varepsilon}}\right) & \text{when } p_i > \hat{\varepsilon}. \end{cases} \quad (3)$$

In Appendix A I prove that the solution to the firm maximization problem is given by

$$p_R^* = \frac{\left(1 + \frac{\mu}{1-\mu}\right) \hat{\varepsilon}}{2 + F \frac{\mu}{1-\mu}}.$$

#### 3.3.2 Advisor problem

Since advisors are no longer remunerated through kickbacks, they will have to set an advice fee  $a_i \geq 0$  which every consumer must pay to receive a recommendation. Contrary to the product price  $p$ , consumers need not search to observe the advice fees. Thus, there is random search across firms and directed search across advisors.

What fee does an advisor charge? If a deviant advisor  $i$  increases its fee, it can lose consumers in two ways. First, some consumers will switch to a cheaper advisor. Second, some consumers will start to search themselves. However, in a segmented equilibrium the second effect does not appear as for a sufficiently small change in advisor fees it will still be the case that all low expertise consumers visit an advisor. Thus, in a segmented equilibrium the advisor fee of a deviant advisor  $i$  must maximize

$$\begin{aligned}\pi_i^A &= a_i \mu P \left( b_i - a_i \geq \max_{j \neq i} b_j - a_R^* \right) \\ &= \frac{a_i}{\bar{b}^A} \mu \int_{a_R^* - a_i}^{\bar{b}} (b - a_i + a_R^*)^{A-1} db.\end{aligned}$$

Taking the first order conditions and applying symmetry gives that

$$a_R^* = \frac{\bar{b}}{A}.$$

Summing up, regulated equilibria are characterized as follows.

**Proposition 5.** *Assume Assumption 1 holds. Then there exists a non-trivial, symmetric, fully segmented regulated equilibrium with the following properties:*

- The equilibrium price is  $p_R^* = \frac{(1 + \frac{\mu}{1-\mu})\bar{\varepsilon}}{2 + F \frac{\mu}{1-\mu}}$ ;
- Equilibrium obfuscation satisfies

$$g(\sigma + t_R^*) \leq \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} \leq g(2\sigma + 2t_R^*) - g(\sigma + t_R^*);$$

- The advisor fee is  $a_R^* = \frac{\bar{b}}{A}$ .

*Proof.* The first and third statement follow from the preceding discussion. The second statement is required so that no consumer searches twice and all consumers search at least once and is derived in the same way as in the kickback equilibrium.  $\square$

## 4 Results

### 4.1 Comparison of equilibria

What effect do advisors have on the market? To begin answering this question, I compare equilibrium prices and obfuscation between the three equilibria derived above. This is complicated by the fact that there are multiple search, kickback and regulated equilibria, making it unclear which equilibrium is to

be compared with which. To make this comparison easier, I will assume for the remainder of this paper that obfuscation is associated with some small cost. When obfuscation is costly, firms never obfuscate more than is strictly necessary to deter consumers from visiting the other firm. However, when the cost of obfuscation is too high, firms might obfuscate less and not deter all consumers from searching twice. I assume that the cost of obfuscation is low enough that this doesn't happen: to obfuscate  $t$ , a firm must pay the cost  $c(t) = \eta t$ , where  $\eta > 0$  is bounded from above so that in equilibrium no consumer searches twice.<sup>17</sup> As a result, the equilibria will be unique. Obfuscation is equal to the lower bound on obfuscation (which equals the upper bound on search costs), that is,  $t_S^*$ ,  $t_K^*$  and  $t_R^*$  are the solutions to

$$g(2\sigma + 2t_S^*) - g(\sigma + t_S^*) = \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}}, \quad (4)$$

$$g(2\sigma + 2t_K^*) - g(\sigma + t_K^*) = \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}}, \quad (5)$$

$$g(2\sigma + 2t_R^*) - g(\sigma + t_R^*) = \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}}. \quad (6)$$

The comparison between equilibrium quantities is now straightforward:<sup>18</sup>

**Proposition 6.** *Compared to the baseline model without advisors, prices are higher and there is less obfuscation when there are advisors remunerated through kickbacks. On the other hand, prices are lower and there is more obfuscation when kickbacks are banned:  $p_R^* \leq p_S^* < p_K^*$  and  $t_R^* \geq t_S^* > t_K^*$ .*

*Proof.* See the appendix. □

Prices are higher in the kickback equilibrium than the search equilibrium because advisors steer consumers to the firm with the highest match value. Therefore, advised consumers essentially draw their match values from the distribution  $\varepsilon_i | \varepsilon_i > \max_{j \neq i} \varepsilon_j$ , i.e. from the first order statistic. Because advised consumers have higher valuations than direct searchers, firms have an incentive to raise their prices. Moreover, kickbacks reduce price competition at advisors. If a firm increases its price by  $\Delta p$  and its kickback by  $\gamma \Delta p$ , an advisor receives the same utility from recommending the firm's product and demand from advised consumers remains constant. Thus, a firm can always increase its price without losing demand from advised consumers and, because  $\gamma < 1$ , this double deviation increases a firm's profits on advised consumers.<sup>19</sup> It is this combination of selecting consumers with high match values and the ability to escape price competition through kickbacks that leads to higher equilibrium

<sup>17</sup>That such a cost function exists follows from the fact that the marginal benefit of obfuscation is strictly greater than 0 in all three models as long as some consumer has a strictly positive probability of searching twice. Thus, if  $\eta$  is small enough, the marginal benefit of obfuscation is always larger than the marginal cost, so that firms find it optimal to obfuscate until no consumer searches twice, but no more.

<sup>18</sup>To be consistent with the rest of the paper, I focus on segmented equilibria in this subsection. However, all results extend to the non-segmented equilibria derived in the appendix by replacing  $\mu$  with the equilibrium market share of the advice channel.

<sup>19</sup>Of course, a price increase will reduce the demand from direct searchers, which is why the equilibrium price is interior.

prices when advisors are remunerated through kickbacks. But in the regulated equilibrium, kickbacks no longer soften price competition at the advisor. As a result, firms Bertrand compete for advised consumers and the price is lower in the regulated equilibrium than in the search equilibrium.

The effect of advisor entry on obfuscation is opposite from the effect on prices. The reason is that the equilibrium price determines how much obfuscation is required to deter all direct searchers from searching twice. The requirement that no consumer searches twice is equivalent to the requirement that all consumers whose match value is larger than the price at the first firm they visit purchase immediately. Thus, when the equilibrium price is higher, as is the case in kickback equilibrium, only consumers with relatively high match values need to be deterred from searching twice. But consumers who have already drawn a relatively high match value expect to gain less from visiting subsequent firms so that less obfuscation is necessary to prevent them from doing so. Conversely, when the equilibrium price is lower, as is the case in the regulated equilibrium, consumers who have relatively low match values and therefore expect to gain more from visiting subsequent firms need to be deterred from searching twice. Therefore there is more obfuscation.

## 4.2 Consumer surplus

The presence of advisors has four effects. Two are direct effects: advised consumers receive a better match and potentially save on transportation costs. The other two are the equilibrium effect on obfuscation and prices. Since one of the latter two is negative, higher prices when the advisor is remunerated through kickbacks and more obfuscation when kickbacks are banned, it is not directly obvious that the entry of advisors is beneficial for consumer welfare. Indeed, in kickback equilibria the effect is ambiguous:

**Proposition 7.** *Consumers with high expertise are worse off in the kickback equilibrium than in the search equilibrium. Consumers with low expertise are better off in the kickback than in the search equilibrium when advisors have a sufficiently large concern for suitability. However, when the advisors' concern for suitability is small, consumers with low expertise can be worse off in the kickback equilibrium.*

*Proof.* See the appendix. □

Consumers with low expertise gain from the presence of advisors because they receive their best match and potentially have lower search costs. However, kickbacks cause prices to increase. When the advisors have a large concern for suitability, i.e.  $\gamma$  is close to 1, this price increase is relatively small as the double deviation of increasing the price by  $\Delta p$  and the kickbacks by  $\gamma\Delta p$  does not lead to a large increase in profits. Therefore, consumers with low expertise are better off. However, when advisors

have a small concern for suitability, firms have a large incentive to simultaneously increase their prices and kickbacks. The price increase then dominates the effect of a better match. Consumers with high expertise gain from less obfuscation and suffer from a higher price. It turns out that the second effect is always larger, therefore consumers with high expertise are worse off in the kickback than in the search equilibrium.

In the regulated equilibrium, firms Bertrand compete for advised consumers in the absence of kickbacks so that in equilibrium the price is lower than in the search equilibrium. As a result, all consumers are better off:

**Proposition 8.** *Every consumer is better off in the regulated equilibrium than in the kickback equilibrium.*

*Proof.* See the appendix. □

For consumers with high expertise there is a clear welfare ranking: they are best off in the regulated equilibrium, then in the search equilibrium and they are the worst off in the kickback equilibrium. For consumers with low expertise such a ranking does not exist. Every consumer with low expertise is better off in the regulated than in the search equilibrium, but otherwise any ranking is possible. Proposition 7 establishes that consumers with low expertise are better off in the kickback than in the search equilibrium as long as advisors have a sufficiently large concern for suitability  $\gamma$ . But they may also be better off than in the regulated equilibrium. Table 3 shows an example of such a situation. Since in either equilibrium every consumer receives his best match and visits the advisor with the largest advisor benefits, the difference in consumer surplus between the kickback and regulated equilibrium for consumers with low expertise is simply

$$a_R^* + p_R^* - p_K^*.$$

$p_R^* < p_K^*$  so that consumers with low expertise are better off in the kickback equilibrium than in the regulated equilibrium if the advice fee  $a_R^*$  is smaller than the price difference  $p_K^* - p_R^*$ . Since in a fully segmented equilibrium,  $a_R^* = \frac{\bar{b}}{A}$ ,  $a_R^*$  will be large when the value of the ancillary benefits  $\bar{b}$  is large and/or the number of advisors  $A$  is small. And since  $p_K^*$  is decreasing in advisors' concern for suitability  $\gamma$ , so is the price difference  $p_K^* - p_R^*$ . Thus, consumers with low expertise are better off in the kickback than in the regulated equilibrium when i) the advice benefits are relatively large, ii) the number of advisors is small, and/or iii) advisors' have large concern for suitability so that kickbacks are not very effective in steering advisors' recommendations. The reason is that in the kickback equilibrium, the advisors' recommendation and additional benefits are subsidized by the firms. When consumers have to pay for advice, advisors will charge for these ancillary services. When these services are thus

relatively valuable and advisors can charge a high price because of a lack of competition, consumers can be worse off. On the other hand, when the advisor benefits are relatively less valuable, the loss of the subsidization is small and consumers with low expertise are better off in the regulated equilibrium because the product price is lower. Thus, the effects of banning kickbacks on consumer welfare depend on two key parameters: the value of any additional benefits advisors bring and the effectiveness of kickbacks in steering advice.

[Table 3 about here.]

### 4.3 Free entry of advisors

Advisors can provide consumers with their best match because of their superior expertise. This expertise—learning the products’ attributes, complying with regulatory requirements, etcetera—is costly to acquire. Therefore, advisors enter only in markets where their expected profits exceed these costs. One common reason given for the presence of advisors in a certain market is that search costs are too high for (some) consumers to make a purchase themselves, so that the advisor can make profits by aggregating information. This explanation, while intuitive, is not entirely satisfactory for two reasons. First, search costs are endogenous because firms can obfuscate. Second, the presence of advisors changes the incentives to obfuscate and search costs are therefore itself influenced by advisors. However, as I will now show, when consumers have a larger incentive to search, firms have a larger incentive to obfuscate and advisors have a larger incentive to enter the market as long as they are remunerated through kickbacks. Thus, the intuitive relation that advice should be more prevalent in more “complex” markets arises endogenously.

To study the entry of advisors I will endogenize the number of advisors  $A$  and consider the long-run free entry equilibrium. Recall that every advisor needs to pay an entry cost  $E$ . In a kickback equilibrium, every advisor makes profits  $\frac{\mu k_K^*}{A}$ , so that in the long-run free entry kickback equilibrium the number of advisors  $A_K^*$  solves<sup>20</sup>

$$\frac{\mu k_K^*}{A_K^*} = E.$$

Therefore, in a fully segmented kickback equilibrium

$$A_K^* = \frac{\mu \bar{E}}{2E} \left( 1 + (1 - \gamma) \frac{\mu}{1 - \mu} - \frac{2\gamma}{F} \right). \quad (7)$$

Inspection of equations (7) and (5) gives the following result.

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<sup>20</sup>Ignoring the integer constraint on the number of firms.

**Proposition 9.** *In the long-run free entry kickback equilibrium, both obfuscation and the number of advisors are increasing in the value of search  $\bar{\varepsilon}$ .*

An increase of  $\bar{\varepsilon}$  increases the mean of the match value distribution, while holding its coefficient of variation constant.<sup>21</sup> In other words, compared to a product with a smaller  $\bar{\varepsilon}$ , a product with a larger  $\bar{\varepsilon}$  is on average more valuable but has the same dispersion, when the dispersion is corrected for the fact that the distributions are on different scales. Thus, the proposition states that when products become more valuable, obfuscation and the number of advisors increase, holding the amount of relative dispersion constant.

This corresponds to the observation made in the Introduction, that advice and complexity are more common in markets for more valuable goods. The reason is that when  $\bar{\varepsilon}$  is large, consumers benefit more from searching. As a result, firms need more obfuscation to prevent consumers from searching twice. At the same time, when this value of search is large, advisors become more profitable. This is a supply side effect. An increase in  $\bar{\varepsilon}$  increases the willingness of advised consumers to pay for the recommended product. As a result, competition for advised consumers increases, leading to larger kickbacks and a greater number of advisors. Indeed, in a segmented equilibrium the market share of the advisor channel is insensitive to search costs, so that the result is driven completely by a greater profitability for advisors per consumer and not by an increased demand for advice. In Section 5 I consider non-segmented equilibria, and show that in those cases, the demand for advice increases with  $\bar{\varepsilon}$  as well.

The model predicts that high search costs  $\sigma + t_K^*$  and a large number of advisors co-occur. This raises the question whether an increase in the exogenous component of search costs  $\sigma$  (or, for that matter,  $\chi$ ), would generate the same results as an endogenous increase in obfuscation. The answer is no, because obfuscation moves in the opposite direction of transportation costs: when transportation costs decrease, firms need to increase obfuscation with the same amount to prevent all second searches and vice versa. Thus, when firms can obfuscate, the level of exogenous transportation costs is independent from the number of advisors.

The link between obfuscation and the number of advisors disappears when commissions are banned. In a regulated equilibrium every advisor makes profits  $\frac{\mu a_R^*}{A}$ , so that the number of advisors in the long-run free-entry equals

$$A_R^* = \sqrt{\frac{\mu \bar{b}}{E}}.$$

The number of advisors in the long-run regulated equilibrium does not depend on the value of search  $\bar{\varepsilon}$ .

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<sup>21</sup>The coefficient of variation is defined as  $\frac{\sqrt{\text{Var}(\varepsilon_i)}}{E[\varepsilon_i]}$  and is a scale-independent measure of dispersion. When  $\varepsilon_i \sim \text{Unif}(0, \bar{\varepsilon})$ , the coefficient of variation equals  $\frac{1}{\sqrt{3}}$  for all  $\bar{\varepsilon}$ .

The reason is that the supply-side channel where an increase in  $\bar{\epsilon}$  leads to higher kickbacks is no longer present. Instead, since consumers receive the same recommendation from every advisor, advisors can only charge for the additional benefits they provide. Therefore, the number of advisors in the regulated equilibrium depends only on the value of these benefits  $\bar{b}$  and not on the characteristics of the product.

When are there more advisors in the long-run kickback than in the long-run regulated equilibrium? The previous discussion suggests this is the case when the value of the product  $\bar{\epsilon}$  is relatively high, and the value of the ancillary services provided by the advisors  $\bar{b}$  is relatively low. The following Proposition confirms that this is indeed true.

**Proposition 10.** *The number of advisors in the long-run free entry kickback equilibrium  $A_K^*$  is larger than the number of advisors in the long-run free entry regulated equilibrium  $A_R^*$  if and only if*

$$\frac{\bar{\epsilon}^2}{\bar{b}}$$

*is sufficiently large.*

*Proof.* See the appendix. □

This result implies that banning kickbacks may have the unintended consequence that advisors leave the market. This may be the case, for example, if  $E$  is understood to be a yearly cost of keeping up with the latest market developments or complying with regulations. When the value of the product sold is relatively much higher than the ancillary services of the advisors, advisors may leave the market. That this is the case, seems likely. For example, the ancillary service of proper tax planning necessarily is of lower value than the profits a mutual fund generates, since the amount of taxes is capped by the profits on the mutual fund.

When advisors leave the market after banning kickbacks, long-run consumer surplus is smaller than in the short run. I prove this formally in the following proposition.

**Proposition 11.** *Denote by  $\Delta CS_s$  the short-run difference in expected consumer surplus for a low expertise consumer between the kickback and regulated equilibrium, when  $A = A_K^*$ . Denote by  $\Delta CS_l$  the difference in expected consumer surplus for a low expertise consumer in the long run. Then,*

$$\Delta CS_s < \Delta CS_l$$

*if and only if*

$$A_K^* > A_R^*.$$

*Proof.* See the appendix. □

The proposition states that, starting from a long-run kickback equilibrium, banning kickbacks will lead to smaller (larger) consumer surplus if and only if the number of advisors under free entry is larger (smaller) in the kickback than in the regulated equilibrium. In other words, when, as I have argued above, the long-run number of advisors is smaller without than with kickbacks, a social planner will overestimate the consumer surplus gains from banning kickbacks: any increase in the short-run will be partially undone by advisor exit in the long run. Of course, if banning kickbacks is already harming consumer surplus in the short run, consumers will only be worse off in the long run. The reason for this is twofold. Firstly, when advisors leave the market, the remaining advisors will charge higher fees because of reduced competition. Moreover, since advisor benefits are horizontally differentiated, and consumers visit the advisor with the highest benefit in equilibrium, advisor exit lowers the average advisor benefit that consumers obtain.<sup>22</sup>

## 5 Non-segmented equilibria

In the previous section, I have restricted the analysis to parameters for which consumers with low and high expertise fully separate, in the sense that low expertise consumers visit an advisor and high expertise consumers search themselves. In the resulting equilibria, the market share of the advisors is fixed, which allows for simple analytical derivations of the main results. A downside of considering segmented equilibria is that the market share of the advice channel is fixed, shutting down any effects on the demand for advice. In this section I show numerically that the results from the previous sections extend to the non-segmented equilibria and I show additional results on the demand for advice. I derive the non-segmented equilibria in Appendix B. For brevity, I focus only on equilibria in which no consumers with high expertise visit an advisor and some (but not all) with low expertise do so. However, similar results can be presented for the other types of equilibrium.

Table 4 replicates the result that in the long-run kickback equilibrium obfuscation and advisor entry both increase in the value of search  $\bar{\epsilon}$ . However, an increase in the value of search now also leads to more consumers using an advisor's services. This is because when there are more advisors, the maximum advisor benefit is larger and because searching becomes more costly due to increased obfuscation. Both factors make visiting an advisor more attractive relative to searching. Thus, when the assumption of a fixed market share for the advisors is relaxed, the relationship from Table 1 that more consumers seek advice when they have more difficulty finding information themselves arises endogenously.

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<sup>22</sup>It is possible that the entry fee  $E$  is not exogenous, but itself influenced by obfuscation, because advisors may find it more difficult to gain expertise when search costs are large. If this is the case, i.e.  $E = E(t^*)$ , with  $E'(\cdot) > 0$ , the effect of banning kickbacks on consumer surplus becomes even more negative. The reason is that there is more obfuscation in the regulated than in the kickback equilibrium, so that entry costs will then be greater when kickbacks are banned when they are not, further strengthening the result that banning kickbacks will lead to advisors leaving the market.

[Table 4 about here.]

Table 5 compares profits and consumer welfare for a given number of advisors in the kickback and regulated equilibrium. When the number of advisors is small (in this case  $A = 2$ ), total consumer surplus can be smaller in the regulated equilibrium when the advisors have a sufficiently large concern for suitability  $\gamma$ . The reason is that when  $\gamma$  decreases, firms increase their prices. However, for  $A \geq 3$ , consumers are better off in the regulated than in the kickback equilibrium. From this it does not follow, however, that banning kickbacks increases consumer welfare. The number of firms in the long-run free entry equilibrium is lower in the regulated equilibrium, so that consumers are better off with kickbacks when the advisors have a sufficient concern for suitability.

[Table 5 about here.]

## 6 Conclusion

In this paper, I have developed a search-theoretic explanation for the presence of advisors in markets such as mortgages and insurance. Search costs are endogenous because firms can obfuscate, that is increase their own search cost. As in Ellison and Wolitzky (2012), a convexity in the disutility of search makes this individually rational, because firms can increase the cost of further searches by obfuscating their own products.

When advisors are remunerated through kickbacks, both the incentive to obfuscate and the incentive to pay kickbacks are increasing in the value of the product sold. As a result, more advisors enter the market when there is more obfuscation. The entry of advisors can (but need not) have adverse consequences for consumers, even though in equilibrium the advisors are unbiased. The reason is that firms have an incentive to raise prices and this can offset the benefits the advisor brings.

When kickbacks are banned, this supply-side channel disappears. Consumers are necessarily better off compared to the situation without advisors because competition for advised consumers lowers prices. However, consumers may be better off when advisors are remunerated through kickbacks than when kickbacks are banned. The reason is that under kickbacks upstream firms subsidize advice, as well as any additional services advisors offer. Since banning kickbacks can lead to advisors exiting the market, they can charge high prices for these extra services leaving consumers worse off.

My results have implications for the regulation of (financial) advisors. In particular, I have shown that the desirability of a ban on kickbacks depends on two key parameters: the ease with which kickbacks steer advice, and the value of any additional benefits advisors, such as tax planning, offer. I have shown that when kickbacks are relatively ineffective in steering advice and/or advisors offer significant

additional benefits, consumers are better off with kickbacks than without.

While developing the results I have mainly focused on equilibria in which the demand for advice is fixed. Numerically, I have shown that when the demand for advice is not fixed the same conclusions as above are reached.

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## A Derivation of non-segmented equilibria

In this appendix, I derive the kickback and regulated equilibria without the restriction of complete segmentation. In a fully segmented equilibrium, all low-expertise consumers visit an advisor and all high expertise consumers search themselves. Therefore, the fraction of consumers using the advice channel is equal to the fraction of low-expertise consumers  $\mu$ . When consumers are not fully segmented, the fraction of consumers who use an advisor is no longer fixed at  $\mu$ . Denote this fraction by  $\lambda$ . I now first derive the kickback and regulated equilibrium without the restriction of separation. Then, I provide conditions under which it is optimal for consumers to completely segment, so that  $\lambda = \mu$ .

### A.1 Kickback equilibrium

Consider a deviant firm  $i$ . Its profit function is the same in a segmented equilibrium except that  $\mu$  is replaced by the equilibrium advice channel market share  $\lambda_K^*$ . Thus, replacing  $\mu$  by  $\lambda_K^*$  in (2) gives

$$\pi_i(p_i, k_i) = \begin{cases} \frac{1-\lambda_K^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) + \lambda_K^* (p_i - k_i) \frac{1}{\bar{\varepsilon}^F} \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-1} d\varepsilon & \text{if } p_i \leq \hat{\varepsilon}, \\ \frac{1-\lambda_K^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) & \text{if } p_i > \hat{\varepsilon}. \end{cases} \quad (8)$$

I will derive the equilibrium under the assumption that the equilibrium price satisfies  $p_K^* < \bar{\varepsilon}$ . Below I give a sufficient condition under which this is true.<sup>23</sup> The first order condition with respect to  $k_i$  is

$$\begin{aligned} & - \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-1} d\varepsilon \\ & + (F-1) \frac{p_i - k_i}{\gamma} \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-2} d\varepsilon = 0. \end{aligned}$$

Applying symmetry  $p_i = p_K^*$ ,  $k_i = k_K^*$ , gives

$$p_K^* - k_K^* = \frac{\gamma \bar{\varepsilon}}{F}. \quad (9)$$

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<sup>23</sup>When  $\gamma$  is too close to 0, the solution to the firm problem will be to set  $p_i = \bar{\varepsilon}$ , i.e. to extract all surplus from advised consumers. However this cannot be an equilibrium since no consumer would visit an advisor expecting this price since they have to pay a positive search cost to do so. No symmetric equilibrium in pure strategies exists in such a case.

The first order condition with respect to  $p_i$  is

$$\frac{1 - \lambda_K^*}{F} \left[ 1 - 2 \frac{p_i}{\bar{\varepsilon}} \right] + \frac{\lambda_K^*}{\bar{\varepsilon}^F} \left( \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left( \varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma} \right)^{F-1} d\varepsilon \right. \\ \left. - (F-1)(p_i - k_i) \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left( \varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma} \right)^{F-2} d\varepsilon \right) = 0.$$

Applying symmetry and substituting (9) gives

$$p_K^* = \frac{\bar{\varepsilon}}{2} \left( 1 + (1 - \gamma) \frac{\lambda_K^*}{1 - \lambda_K^*} \right).$$

To close the model, it is necessary to compute the probability of a consumer visiting the advisor  $\lambda$ . To do this, it is convenient to denote by  $\Delta_K(s)$  the difference in consumer surplus between searching and visiting an advisor for a consumer with transportation cost  $s$ , excluding the advisor benefit. That is,

$$\Delta_K(s) = \underbrace{\frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}}}_{\text{surplus of direct search}} - g(s + t_K^*) - \underbrace{\left( \frac{F}{F+1} \bar{\varepsilon} - p_K^* - g(\alpha) \right)}_{\text{surplus of visiting an advisor}}. \quad (10)$$

Since obfuscation prevents any consumer from visiting more than one firm, a consumer's surplus of searching himself equals the expected benefit of one search minus his disutility from that search. A consumer that visits an advisor will always purchase in equilibrium. Because advisors are unbiased in equilibrium, the consumer's expected surplus from visiting an advisor (excluding the advisor benefit) is  $\max_{1 \leq i \leq A} \varepsilon_i - p_K^* - g(\alpha)$ , which equals the second part of the expression. In a symmetric equilibrium, the probability that a consumer will visit an advisor then equals

$$\lambda_K^* = \begin{cases} 1 & \text{if } \Delta_K(\sigma) < 0, \\ \mu + (1 - \mu) \left( 1 - \left( \frac{\Delta_K(\sigma)}{\bar{b}} \right)^A \right) & \text{if } \Delta_K(\sigma + \chi) < 0 \leq \Delta_K(\sigma) < \bar{b}, \\ \mu & \text{if } \Delta_K(\sigma + \chi) < 0 \text{ and } \Delta_K(\sigma) \geq \bar{b}, \\ \mu \left( 1 - \left( \frac{\Delta_K(\sigma + \chi)}{\bar{b}} \right)^A \right) + (1 - \mu) \left( 1 - \left( \frac{\Delta_K(\sigma)}{\bar{b}} \right)^A \right) & \text{if } 0 \leq \Delta_K(\sigma + \chi) < \Delta_K(\sigma) < \bar{b}, \\ \mu \left( 1 - \left( \frac{\Delta_K(\sigma + \chi)}{\bar{b}} \right)^A \right) & \text{if } 0 \leq \Delta_K(\sigma + \chi) < \bar{b} \leq \Delta_K(\sigma), \\ 0 & \text{if } \Delta_K(\sigma + \chi) > \bar{b}. \end{cases} \quad (11)$$

Finally, obfuscation must be such that no consumer searches twice. This is the case when

$$g(\sigma + \chi + t_K^*) \leq \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} \leq g(2\sigma + 2t_K^*) - g(\sigma + t_K^*).$$

Similar to the search equilibrium, the second statement formalizes the idea that obfuscation should be small enough that every consumer searches at least once and large enough that no consumer twice. The first inequality formalizes the first notion:  $g(\sigma + \chi + t_K^*)$  is the expected disutility of visiting one firm for a consumer with low expertise, while  $\frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}}$  is the expected benefit of searching once. If consumers with low expertise search at least once, so do consumers with high expertise. The second inequality is required to satisfy Lemma 2, that is the requirement that no consumer searches twice.

The following lemma gives a condition under which the necessary conditions derived above are indeed sufficient. Finally, the following lemma proves that if advisors have a sufficiently large concern for suitability, this is indeed an equilibrium.

**Lemma 4.** *A sufficient condition for the equilibrium derived above to exist is that it satisfies  $\gamma \geq \frac{1-F+2\lambda_K^*F}{\lambda_R^*+\lambda_K^*F}$ .*

*Proof.* Consider a deviant firm  $i$  in the equilibrium described above. It cannot be optimal for firm  $i$  to set a price  $p_i > \hat{\varepsilon}$ . This is the case since  $\hat{\varepsilon} = \frac{F}{F+1}\bar{\varepsilon}$ , which is larger than the monopoly price  $\frac{\bar{\varepsilon}}{2}$ . Thus,  $\pi_i$  is decreasing in  $p_i$  for  $p_i > \hat{\varepsilon}$  by the logconcavity of the function  $p(1 - \frac{p_i}{\bar{\varepsilon}})$ . Thus, there are two candidate solutions to the profit maximization problem of the deviant firm: an interior solution  $0 < p_i < \hat{\varepsilon}_i$  and the boundary solution  $p_i = \hat{\varepsilon}$ . To see when the interior solution is optimal, consider the related problem

$$\max_{p_i, k_i} \Theta(p_i, k_i) = \frac{1 - \lambda_K^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) + \lambda_K^* (p_i - k_i) \frac{1}{\bar{\varepsilon}^F} \int_{-p_K^* + p_i + \frac{k_K^* - k_i}{\gamma}}^{\bar{\varepsilon}} \left(\varepsilon - p_i + p_K^* - \frac{k_K^* - k_i}{\gamma}\right)^{F-1} d\varepsilon,$$

which is the deviant's firm problem in the hypothetical case  $\hat{\varepsilon} = \bar{\varepsilon}$ . Without loss of generality, this problem can be constrained to  $(p_i, k_i) \in [0, \bar{\varepsilon}] \times [0, p_i]$ . Since this is a compact set and  $\Theta(p_i, k_i)$  is bounded from above by  $\bar{\varepsilon}$ , there exists a maximum by the extreme value theorem. First note that  $k_i = p_i$  cannot be a maximum: firm  $i$  then makes no profits on advised consumers so that any drop in kickbacks will lead to a strict increase in profits. Moreover,  $k_i = 0$  cannot be a maximum. To see this, note that the price that maximizes profits when there are only advised consumers (i.e. when  $\lambda_K^* = 1$ ) conditional on  $k_i = 0$  can shown to be

$$p_i = \frac{\gamma(\bar{\varepsilon} - p_K^*) - k_K^*}{\gamma(F+1)}.$$

Substitution and some simple algebra shows that this is smaller than the monopoly price  $\frac{\bar{\varepsilon}}{2}$ . Since the price that maximizes the profits on direct consumers is the monopoly price, it follows that the price that maximizes  $\Theta(p_i, 0)$  is smaller than  $\frac{\bar{\varepsilon}}{2}$ . However, this cannot maximize  $\Theta_i(p_i, k_i)$  since firm  $i$  has the following deviation. It can raise its price by some  $\epsilon > 0$  and its kickbacks by  $\gamma\epsilon$ . This increases firm  $i$ 's profits made on direct searchers, as the new price is closer to the monopoly price. Moreover, this deviation leaves demand from advised consumer constant, but increases the margin on advised consumers since  $\gamma < 1$ . Thus,  $k_i = 0$  cannot be a solution to this problem. Since  $p_i = 0$  and  $p_i = \bar{\varepsilon}$

are trivially not optimal, it follows that the solution to the maximization of  $\Theta(p_i, k_i)$  is given by the first order conditions, which are exactly  $p_K^*$  and  $t_K^*$ .

Finally, note that  $\pi_i(p_i, k_i) \leq \Theta(p_i, k_i)$  for all  $p_i$  and  $k_i$ . Thus, if  $\pi_i(p_K^*, k_K^*) = \Theta(p_K^*, k_K^*)$ ,  $p_K^*$  and  $k_K^*$  maximize  $\pi_i(\cdot)$  as well. A sufficient condition for this is that  $p_K^* \leq \hat{\varepsilon}$ , which some simple algebra shows to be the case when

$$\gamma \geq \frac{1 - F + 2\lambda_K^* F}{\lambda_K^* + \lambda_K^* F}.$$

□

## A.2 Regulated equilibrium

Just as in the kickback equilibrium, the profits of a deviant firm  $i$  can be written by replacing  $\mu$  by the endogenous equilibrium market share of the advisor channel  $\lambda_R^*$  in the profit function (3):

$$\pi_i = \begin{cases} \frac{1-\lambda_R^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) + \frac{\lambda_R^*}{\bar{\varepsilon}^F} p_i \int_{-p_R^*+p_i}^{\bar{\varepsilon}} (\varepsilon - p_i + p_R^*)^{F-1} d\varepsilon & \text{when } p_i \leq \hat{\varepsilon} \\ \frac{1-\lambda_R^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) & \text{when } p_i > \hat{\varepsilon}. \end{cases}$$

I assume that  $p_R^* < \hat{\varepsilon}$ . Below I prove that this is indeed an equilibrium. The first order condition is

$$\frac{1-\lambda_R^*}{F} \left(1 - 2\frac{p_R^*}{\bar{\varepsilon}}\right) + \frac{\lambda_R^*}{\bar{\varepsilon}^F} \left( \int_{-p_R^*+p_i}^{\bar{\varepsilon}} (\varepsilon - p_i + p_R^*)^{F-1} d\varepsilon - (F-1)p_i \int_{-p_R^*+p_i}^{\bar{\varepsilon}} (\varepsilon - p_i + p_R^*)^{F-2} d\varepsilon \right) = 0.$$

Applying symmetry  $p_i = p_R^*$  gives

$$p_R^* = \frac{\left(1 + \frac{\lambda_R^*}{1-\lambda_R^*}\right) \bar{\varepsilon}}{2 + F \frac{\lambda_R^*}{1-\lambda_R^*}}.$$

To prove the sufficiency of the first order conditions, consider the related problem

$$\max_{p_i} \Theta(p_i) = \frac{1-\lambda_R^*}{F} p_i \left(1 - \frac{p_i}{\bar{\varepsilon}}\right) + \frac{\lambda_R^*}{\bar{\varepsilon}^F} p_i \int_{-p_R^*+p_i}^{\bar{\varepsilon}} (\varepsilon - p_i + p_R^*)^{F-1} d\varepsilon,$$

subject to  $p_i \in [0, \bar{\varepsilon}]$ , which is the deviant advisor's profit in the hypothetical case  $\hat{\varepsilon} = \bar{\varepsilon}$ . Since the constraint set is compact and  $\Theta(p_i)$  is continuous and bounded from above by  $\bar{\varepsilon}$ , a maximum exists by the extreme value theorem. Since  $p_i = 0$  or  $p_i = \bar{\varepsilon}$  are trivially no maxima, the maximum is interior and given by the first order condition. The solution to the first order condition is simply  $p_i = p_R^*$ . Since

$$p_R^* \leq p_S^* = \frac{\bar{\varepsilon}}{2} < \hat{\varepsilon} = \frac{F}{F+1} \bar{\varepsilon},$$

$\pi_i(p_R^*) = \Theta(p_R^*)$ . Since  $\pi_i(p_i) \leq \Theta(p_i)$  for all  $p_i$ , it follows that  $p_R^*$  also maximizes  $\pi_i$ .

To derive the advisor fee  $a_R^*$ , define by  $\Delta_R(s)$  the difference in expected consumer surplus between searching and visiting an advisor, excluding the advisor benefit and the advice fee, for a consumer with transportation cost  $s$ :

$$\Delta_R(s) = \underbrace{\frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(s + t_R^*)}_{\text{surplus of direct search}} - \underbrace{\left( \frac{F}{F+1} \bar{\varepsilon} - p_R^* - g(\alpha) \right)}_{\text{surplus of visiting an advisor}}. \quad (12)$$

Then a consumer visits advisor  $i$  if it is more attractive than other advisors, i.e. if  $b_i - a_i \geq \max_{j \neq i} b_j - a_R^*$  and if it is more attractive than a direct search, i.e. if  $b_i - a_i \geq \Delta_R$ . Thus the profits of a deviant advisor  $i$  are

$$\begin{aligned} \pi_i^A &= a_i \left( \mu P \left( b_i - a_i \geq \max_{j \neq i} \{b_j\} - a_R^*, b_i - a_i \geq \Delta_R(\sigma + \chi) \right) \right. \\ &\quad \left. + (1 - \mu) P \left( b_i - a_i \geq \max_{j \neq i} \{b_j\} - a_R^*, b_i - a_i \geq \Delta_R(\sigma) \right) \right) \\ &= \frac{a_i}{\bar{b}^A} \left( \mu \int_{\omega_i(\sigma + \chi)}^{\bar{b}} (b - a_i + a_R^*)^{A-1} db + (1 - \mu) \int_{\omega_i(\sigma)}^{\bar{b}} (b - a_i + a_R^*)^{A-1} db \right) \\ &= \frac{a_i}{A \bar{b}^A} \left( (\bar{b} - a_i + a_R^*)^A - \mu (\omega_i(\sigma + \chi) - a_i + a_R^*)^A - (1 - \mu) (\omega_i(\sigma) - a_i + a_R^*)^A \right), \end{aligned}$$

where  $\omega_i(s) = \min\{\max\{\Delta(s) + a_i, 0\}, \bar{b}\}$ . In equilibrium, it is possible that some or all consumers of either type visit an advisor. The equilibrium advisor fee depends on the type of sorting of consumers between the two sales channels.

**Lemma 5.** *There are four possible types of equilibria in which a strictly positive fraction of consumers visit an advisor and a strictly positive fraction of consumers search themselves.*

- *Fully segmented equilibrium: all consumers with low expertise visit an advisor and no consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^* = \frac{\bar{b}}{A}$ .*
- *All consumers with low expertise visit an advisor and some (but not all) consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - (1 - \mu)(\Delta_R(\sigma) + a_R^*)^A}{A \bar{b}^{A-1}}$ .*
- *Some (but not all) consumers with low expertise visit an advisor and some (but not all) consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - \mu(\Delta_R(\sigma + \chi) + a_R^*)^A - (1 - \mu)(\Delta_R(\sigma) + a_R^*)^A}{A \bar{b}^{A-1}}$ .*
- *Some (but not all) consumers with low expertise visit an advisor and no consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - (\Delta_R(\sigma + \chi) + a_R^*)^A}{A \bar{b}^{A-1}}$ .*

*Proof.* I derive the equilibrium advisor fees for the four cases in order.

- Fully segmented equilibrium: all consumers with low expertise visit an advisor and no consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^* = \frac{\bar{b}}{A}$ .

In such an equilibrium,  $\omega_i(\sigma + \chi) = 0$  and  $\omega_i(\sigma) = \bar{b}$  around  $a_i = a_R^*$ . Thus, the first order condition is

$$(\bar{b} - a_i + a_R^*)^A - (a_R^* - a_i)^A - Aa_i \left( (\bar{b} - a_i + a_R^*)^{A-1} - (a_R^* - a_i)^{A-1} \right) = 0.$$

Applying symmetry ( $a_i = a_R^*$ ) gives  $a_R^* = \frac{\bar{b}}{A}$ .

- All consumers with low expertise visit an advisor and some consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - (1-\mu)(\Delta_R(\sigma) + a_R^*)^A}{Ab^{A-1}}$ .

In such an equilibrium,  $\omega_i(\sigma + \chi) = 0$  and  $\omega_i(\sigma) = \Delta_R(\sigma) + a_i$ . Thus, the first order condition is

$$(\bar{b} - a_i + a_R^*)^A - \mu(a_R^* - a_i)^A - (1-\mu)(\Delta_R(\sigma) + a_R^*)^A - Aa_i \left( (\bar{b} - a_i + a_R^*)^{A-1} - \mu(a_R^* - a_i)^{A-1} \right) = 0.$$

Applying symmetry ( $a_i = a_R^*$ ) gives the desired result.

- Some (but not all) consumers with low expertise visit an advisor and some (but not all) consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - \mu(\Delta_R(\sigma + \chi) + a_R^*)^A - (1-\mu)(\Delta_R(\sigma) + a_R^*)^A}{Ab^{A-1}}$ .

In such an equilibrium,  $\omega_i(\sigma + \chi) = \Delta_R(\sigma + \chi) + a_i$  and  $\omega_i(\sigma) = \Delta_R(\sigma) + a_i$ . Thus, the first order condition is

$$(\bar{b} - a_i + a_R^*)^A - \mu(\Delta_R(\sigma + \chi) + a_R^*)^A - (1-\mu)(\Delta_R(\sigma) + a_R^*)^A - Aa_i(\bar{b} - a_i + a_R^*)^{A-1} = 0.$$

Applying symmetry ( $a_i = a_R^*$ ) gives the desired result.

- Some (but not all) consumers with low expertise visit an advisor and no consumers with high expertise visit an advisor. In such an equilibrium,  $a_R^*$  solves  $a_R^* = \frac{\bar{b}^A - (\Delta_R(\sigma + \chi) + a_R^*)^A}{Ab^{A-1}}$ .

In such an equilibrium,  $\omega_i(\sigma + \chi) = \Delta_R(\sigma + \chi) + a_i$  and  $\omega_i(\sigma) = \bar{b}$ . Thus, the first order condition is

$$(\bar{b} - a_i + a_R^*)^A - (\Delta_R(\sigma + \chi) + a_R^*)^A - Aa_i(\bar{b} - a_i + a_R^*)^{A-1} = 0.$$

Applying symmetry ( $a_i = a_R^*$ ) gives the desired result.

□

Note that this lemma only establishes the fee level in every type of equilibrium, not which type of equilibrium will exist. In Proposition 2, I give sufficient conditions for the equilibrium to be fully

segmented (the first case), as this is the case I focus on during in the main body of the paper. Concluding, regulated equilibria can be characterized as follows.

**Proposition 12.** *Any non-trivial symmetric regulated equilibrium has the following properties:*

- The equilibrium price is  $p_R^* = \frac{\left(1 + \frac{\lambda_R^*}{1 - \lambda_R^*}\right)\bar{\varepsilon}}{2 + F \frac{\lambda_R^*}{1 - \lambda_R^*}};$
- Equilibrium obfuscation satisfies

$$g(\sigma + t_R^*) \leq \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} \leq g(2\sigma + 2t_R^*) - g(\sigma + t_R^*);$$

- The advisor fee is given by Lemma 5.
- The fraction of consumers who visit an advisor is  $\lambda_R^* = 1 - \mu \left(\frac{\omega^*(\sigma + \chi)}{b}\right)^A - (1 - \mu) \left(\frac{\omega^*(\sigma)}{b}\right)^A$ , where  $\omega^*(\sigma + \chi) = \min\{\max\{\Delta_R(\sigma + \chi) + a_R^*, 0\}, \bar{b}\}.$

*Proof.* The first and third statement follow from the preceding discussion. The first inequality in the second statement says that obfuscation must be small enough that all consumers search at least once, while the second inequality is required to satisfy Lemma 3, i.e. that no consumer searches twice. The final statement follows since the probability that a consumer with low expertise visits an advisor is  $P(\max_i b_i - a_R^* \geq \Delta_R(\sigma + \chi))$ , which equals  $1 - \left(\frac{\omega^*(\sigma + \chi)}{b}\right)$ . Similarly, the probability that any of the  $1 - \mu$  consumers with high expertise visit an advisor is  $1 - \left(\frac{\omega^*(\sigma)}{b}\right)$ . The weighted sum of these two expressions give  $\lambda_R^*$ .  $\square$

## B Omitted proofs

### B.1 Proof of Lemma 1

The proof is by contradiction. Assume that  $r(t_i; \sigma, 0) > p_S^*$  for some firm  $i$ . By Proposition 1, some consumers will visit subsequent firms as well, of which some fraction will not purchase at firm  $i$ . From Equation (1),  $r(t_i^*; \sigma, 0)$  is strictly increasing in  $t_i$  by the strict convexity of  $g(t)$ . Therefore, when  $r(t_S^*; \sigma, 0) > p_S^*$ , a firm can strictly decrease the probability a consumer searches twice by increasing its amount of obfuscation  $t_i$ . Since the probability that a consumer who visits two firms purchases at firm  $i$  is  $P(\varepsilon_i - p_i > \max\{0, \varepsilon_j - p_S^*\}) < P(\varepsilon_i - p_i > 0)$ , this decrease in the probability of a second search strictly increases the probability of a purchase at firm  $i$ . Thus, this deviation strictly increases firm  $i$ 's profits. By contradiction, it then follows that equilibrium requires that  $r(t_S^*; \sigma, 0) \leq p_S^*$ . When this is the case, consumers with low expertise also never search twice, i.e.  $r(t_S^*; \sigma + \chi, 0) < p_S^*$ , because  $r(t; s, \tau)$  is strictly decreasing in  $s$  for any  $t$  and  $\tau$ .

## B.2 Proof of Proposition 1

The proof is by induction. First consider the case  $n = F - 2$ , so that there is only one more firm to visit after firm  $i$ . It then follows immediately from the definition of  $r(\cdot)$  that the consumer prefers searching over purchasing his best option if and only if  $r(t_i; s, \tau) > \max\{x, \varepsilon_i + p^* - p_i\}$ . However, when  $r(t_i; s, \tau) < p^*$  the consumer never searches again. The reason is that in this case the consumer is indifferent between searching and purchasing a product with match value smaller than  $p^*$  at price  $p^*$ . Since the last option gives the consumer negative utility, he prefers his outside option over searching irrespective of  $x$  and  $\varepsilon_i$ .

Now consider the case  $n = F - 3$ , so that there are two more firms to potentially visit after firm  $i$ . When  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} < r(t_i; s, \tau)$  visiting one more firm is always profitable even if the consumer will never visit the last firm. When  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} \geq r(t_i; s, \tau)$  the consumer expects to lose from visiting *only* the next firm. Since  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} \geq r(t_i; s, \tau)$  implies  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} \geq r(t^*; s, \tau + s + t_i)$ , he already knows at firm  $i$  that he will not visit the last firm. Since the expected cost of visiting the next firm exceeds the expected benefit, the consumer stops searching when  $\max\{x, \varepsilon_i + p^* - p_i, p^*\} \geq r(t_i; s, \tau)$ . Continuing this logic to the case where there are more than two subsequent firms to visit concludes the proof.

## B.3 Proof of Proposition 2

I derive sufficient conditions for the segmentation of the kickback and regulated equilibria by deriving restrictions on the analysis from appendix A. An equilibrium is fully segmented if no consumer with high expertise wants to deviate by visiting an advisor and no consumer with low expertise wants to deviate by searching himself.

In a kickback equilibrium, no consumer with high expertise wants to visit an advisor when searching is preferable even if some advisor gives the maximum advisor benefit  $\bar{b}$ , that is when  $\Delta_K(\sigma) > \bar{b}$ , or when

$$\frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} - g(\sigma + t_K^*) \geq \frac{F}{F+1}\bar{\varepsilon} - p_K^* - g(\alpha) + \bar{b}.$$

Since  $p_K^*$  and  $t_K^*$  are independent from  $\alpha$  in any fully segmented equilibrium and  $g(\cdot)$  is strictly increasing, it follows that a sufficient condition for this inequality to hold is that  $\alpha$  is sufficiently large. No consumer with low expertise wants to search himself when going to an advisor is preferable even if all advisors give the minimum advisor benefit 0, that is when  $\Delta_K(\sigma + \chi) \leq 0$ , or

$$\frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_K^*) \leq \frac{F}{F+1}\bar{\varepsilon} - p_K^* - g(\alpha).$$

Since  $p_K^*$  and  $t_K^*$  are also independent of  $\chi$ , a sufficient condition for this inequality to hold is that  $\chi$  is sufficiently large.

In a regulated equilibrium, no consumer with high expertise wants to visit an advisor if the difference in consumer surplus between searching and visiting an advisor is no larger than  $\bar{b} - a_R^*$ , that is when  $\Delta_R(\sigma) \geq \bar{b} - a_R^*$ . This is the case when,

$$\frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(\sigma + t_R^*) \geq \frac{F}{F+1}\bar{\varepsilon} - a_R^* - p_R^* - g(\alpha) + \bar{b}.$$

By a similar reasoning as before, a sufficient condition for this inequality to hold is that  $\alpha$  is sufficiently large. No consumer with low expertise wants to search himself when  $\Delta_R(\sigma + \chi) \leq -a_R^*$ , or

$$\frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_R^*) \leq \frac{F}{F+1}\bar{\varepsilon} - a_R^* - p_R^* - g(\alpha),$$

for which it is again sufficient that  $\chi$  is sufficiently large.

Finally, equilibrium also requires that no advisor wants to deviate from setting the equilibrium advice fee  $a_R^* = \frac{\bar{b}}{A}$ . This is the case if the fraction of consumers with low expertise  $\mu$  is sufficiently large. To see this, first consider the limit case  $\mu = 1$ . A deviant advisor  $i$ 's profit function then equals

$$\pi_i^A(a_i) = a_i \int_{\min\{\Delta_R(\sigma + \chi) + a_i, 0\}}^{\bar{b}} F(b - a_i + a_R^*)^{A-1} f(b) db,$$

where  $F(x)$  and  $f(x)$  are the distribution function and density of the Uniform distribution over  $[0, \bar{b}]$ , respectively. Since the uniform density is log concave, so is the function  $\Gamma(a_i) = a_i \int_0^{\bar{b}} F(b - a_i + a_R^*)^{A-1} f(b) db$ . Therefore, it has a unique maximum. It is easy to verify via the first order conditions that this maximum is given by  $a_i = a_R^* = \frac{\bar{b}}{A}$ . In a fully segmented equilibrium,  $a_R^* + \Delta_R(\sigma + \chi) \leq 0$ , so that  $\pi_i^A(a_R^*) = \Gamma(a_R^*)$ . Since  $\pi_i^A(a_i) \leq \Gamma(a_i)$  for all  $a_i$ , it follows that  $a_i = a_R^* = \frac{\bar{b}}{A}$  also maximizes  $\pi_i^A$  when  $\mu = 1$ . Thus, when  $\mu = 1$ , no advisor wants to deviate from this equilibrium.

When  $\mu < 1$ , it follows from the first order conditions that the unique maximum of the advisor's problem under the constraint  $\bar{b} - \Delta_R(\sigma) < a_i < -\Delta(\sigma + \chi)$  is also  $a_i = a_R^* = \frac{\bar{b}}{A}$ . However, it is possible that there exists a higher local maximum outside this range. In other words, it might be optimal for a deviant advisor to set a fee which attracts some consumers with high expertise. However, since the solution to the advisor's problem is unique when  $\mu = 1$  and the profit function is continuous, it follows that there exists a  $\underline{\mu}$  such that no advisor wants to deviate from the fully segmented equilibrium as long as  $\mu \in (\underline{\mu}, 1]$ .

## B.4 Proof of Proposition 4

The statements follow from the discussion in Appendix A.1, noting that in a segmented equilibrium  $\lambda_K^* = \mu$ .

## B.5 Proof of Proposition 6

The ordering of the equilibrium prices follows immediately by inspection of their expressions, noting that  $0 < \mu < 1$ . In all three equilibria, obfuscation solves the equation

$$g(2\sigma + 2t) - g(\sigma + t) = \frac{(\bar{\varepsilon} - p)^2}{2\bar{\varepsilon}}.$$

The implicit function theorem gives that

$$\frac{\partial t}{\partial p} = -\frac{(\bar{\varepsilon} - p)}{\bar{\varepsilon}(2g'(\sigma + 2t) - g'(\sigma + t))},$$

which is strictly negative since  $g(\cdot)$  is strictly convex. Thus, obfuscation is higher when prices are lower.

## B.6 Proof of Proposition 7

Denote by  $CS_S(s)$  and  $CS_K(s)$  the consumer surplus of a consumer with transportation cost  $s$  in the search and kickback equilibrium, respectively. Consumers with high expertise are worse off in the kickback equilibrium since for them difference in consumer surplus equals

$$\begin{aligned} CS_S(\sigma) - CS_K(\sigma) &= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} - g(\sigma + t_K^*) \right) \\ &= g(2\sigma + 2t_S^*) - 2g(\sigma + t_S^*) - (g(2\sigma + 2t_K^*) - 2g(\sigma + t_K^*)), \end{aligned}$$

where (4) and (5) are substituted in the final line. This expression is positive since  $t_S^* > t_K^*$  and  $g(\cdot)$  is strictly convex.

For consumers with low expertise, this difference is

$$\begin{aligned}
CS_S(\sigma + \chi) - CS_K(\sigma + \chi) &= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{F}{F+1} \bar{\varepsilon} - p_K^* - g(a) + \max_i b_i \right) \\
&= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_K^*) \right) \\
&\quad + \left( \frac{(\bar{\varepsilon} - p_K^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_K^*) \right) - \left( \frac{F}{F+1} \bar{\varepsilon} - p_K^* - g(a) + \max_i b_i \right) \\
&= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_K^*)^K}{2\bar{\varepsilon}} - g(\sigma + \chi + t_K^*) \right) \\
&\quad + \Delta_K(\sigma + \chi) - \max_i b_i.
\end{aligned}$$

As  $\gamma \uparrow 1$ ,  $p_K^* \rightarrow p_S^*$  and  $t_K^* \rightarrow t_S^*$ . Therefore, when  $\gamma \uparrow 1$ , the difference in consumer surplus goes to  $\Delta_K(\sigma + \chi) - \max_i b_i$ , which is negative by Proposition 2. Moreover,  $CS_S(\sigma + \chi) - CS_K(\sigma + \chi)$  is decreasing in  $\gamma$ , as

$$\frac{\partial(CS_S(\sigma + \chi) - CS_K(\sigma + \chi))}{\partial \gamma} = \frac{\partial p_K^*}{\partial \gamma} = -\frac{\bar{\varepsilon}}{2} \cdot \frac{\mu}{1 - \mu} < 0.$$

It thus follows, that for  $\gamma$  sufficiently close to 1, i.e. when advisors have a sufficiently large concern for suitability, all consumers with low expertise are better off in the kickback than in the search equilibrium.

To show that consumers with low expertise can also be worse off in the kickback than in the search equilibrium, I present a numerical example. Take  $\bar{\varepsilon} = 1$ ,  $\gamma = \frac{1}{2}$ ,  $\mu = \frac{1}{3}$ ,  $F = 2$ ,  $g(t) = t^2$ ,  $\sigma = \frac{1}{30}$ ,  $\chi = \frac{1}{30}$  and  $\alpha = \frac{1}{30}$ .<sup>24</sup> It is straightforward to calculate that  $p_S^* = \frac{1}{2}$ ,  $t_S^* \approx .17$  and the consumer surplus of a consumer with low expertise in the search equilibrium is approximately .063. In the kickback equilibrium,  $p_K^* = \frac{5}{8}$ ,  $t_K^* \approx .118$  and the consumer surplus of a consumer for whom the maximum advisor benefit  $\max_i b_i$  equals 0, is approximately .041. Thus, at least some consumers with low expertise will be worse off in the kickback than in the search equilibrium.

## B.7 Proof of Proposition 8

First consider consumers with high expertise. For them, the difference in consumer surplus is

$$\begin{aligned}
CS_S(\sigma) - CS_R(\sigma) &= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_R^*)^K}{2\bar{\varepsilon}} - g(\sigma + t_R^*) \right) \\
&= g(2\sigma + 2t_S^*) - 2g(\sigma + t_S^*) - (g(2\sigma + 2t_R^*) - 2g(\sigma + t_R^*)),
\end{aligned}$$

where the final line substitutes (4) and (6). Since  $t_R^* \geq t_S^*$  and  $g(\cdot)$  is strictly convex, this expression is (weakly) negative.

<sup>24</sup>This is a fully segmented equilibrium as long as  $\bar{b} \leq 0.006$ .

For consumers with low expertise, we have that

$$\begin{aligned}
CS_S(\sigma + \chi) - CS_R(\sigma + \chi) &= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{F}{F+1} \bar{\varepsilon} - a_R^* - p_R^* - g(a) + \max_i b_i \right) \\
&= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_R^*) \right) \\
&\quad + \left( \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_R^*) \right) - \left( \frac{F}{F+1} \bar{\varepsilon} - a_R^* - p_R^* - g(a) + \max_i b_i \right) \\
&= \frac{(\bar{\varepsilon} - p_S^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_S^*) - \left( \frac{(\bar{\varepsilon} - p_R^*)^2}{2\bar{\varepsilon}} - g(\sigma + \chi + t_R^*) \right) \\
&\quad + \Delta_R(\sigma + \chi) + a_R^* - \max_i b_i.
\end{aligned}$$

When  $F = 2$ , inspection reveals that  $p_R^* = p_S^*$ . As a result,  $t_R^* = t_S^*$  when  $F = 2$ . Thus, when  $F = 2$

$$CS_S(\sigma + \chi) - CS_R(\sigma + \chi) = \Delta_R(\sigma + \chi) + a_R^* - \max_i b_i \leq 0,$$

since  $\Delta_R(\sigma + \chi) + a_R^* \leq 0$  in any fully segmented equilibrium by Proposition 2. Thus, when  $F = 2$ , every consumer with low expertise is better off in the regulated equilibrium. Moreover,

$$\begin{aligned}
\frac{\partial(CS_S(\sigma + \chi) - CS_R(\sigma + \chi))}{\partial F} &= - \left( \frac{1}{(1+F)^2} \bar{\varepsilon} - \frac{\partial p_R^*}{\partial F} \right) \\
&= - \left( \frac{1}{(1+F)^2} \bar{\varepsilon} + \frac{\mu \bar{\varepsilon}}{(2(1-\mu) + \mu F)^2} \right) < 0.
\end{aligned}$$

Thus, the difference in consumer surplus is decreasing in  $F$ . Therefore, all consumers with low expertise are better off in the regulated equilibrium than in the search equilibrium for any  $F \geq 2$ .

## B.8 Proof of Proposition 10

Using their respective definitions, the inequality  $A_K^* \geq A_R^*$  is equivalent to

$$\frac{\mu \bar{\varepsilon}}{2E} \left( 1 + (1-\gamma) \frac{\mu}{1-\mu} - \frac{2\gamma}{F} \right) \geq \sqrt{\frac{\mu \bar{b}}{E}}.$$

Rearranging terms gives that this is equivalent to  $\frac{\bar{\varepsilon}^2}{\bar{b}} \geq \zeta$ , where

$$\zeta = \frac{4E}{\mu \sqrt{1 + (1-\gamma) \frac{\mu}{1-\mu} - \frac{2\gamma}{F}}}.$$

## B.9 Proof of Proposition 11

For a low expertise consumer, the difference in expected consumer surplus between the long-run kickback and regulated equilibrium can be written as

$$\begin{aligned}\Delta CS_l &= \underbrace{\left( \frac{F}{F+1} \bar{\varepsilon} - p_K^* - g(\alpha) + \frac{A_K^*}{A_K^* + 1} \bar{b} \right)}_{\text{Expected CS in long-run kickback equilibrium}} - \underbrace{\left( \frac{F}{F+1} \bar{\varepsilon} - p_R^* - g(\alpha) + \frac{A_R^*}{A_R^* + 1} \bar{b} - a_R^* \right)}_{\text{Expected CS in long-run regulated equilibrium}} \\ &= p_R^* - p_K^* + \left( \frac{A_K^*}{A_K^* + 1} + \frac{1}{A_R^*} - \frac{A_R^*}{A_R^* + 1} \right) \bar{b}.\end{aligned}$$

In the short run, i.e. for a fixed number of advisors  $A$ , this difference is given by equation (4.2). Using that in a segmented equilibrium  $a_R^* = \frac{\bar{b}}{A}$ , it follows that

$$\Delta CS_s - \Delta CS_l = \left( \frac{1}{A} - \frac{A_K^*}{A_K^* + 1} - \left( \frac{1}{A_R^*} - \frac{A_R^*}{A_R^* + 1} \right) \right) \bar{b}.$$

When  $A = A_K^*$ ,  $\Delta CS_s - \Delta CS_l < 0$  if and only if  $A_K^* > A_R^*$  since the function

$$\frac{1}{x} - \frac{x}{x+1}$$

is decreasing in  $x$ .

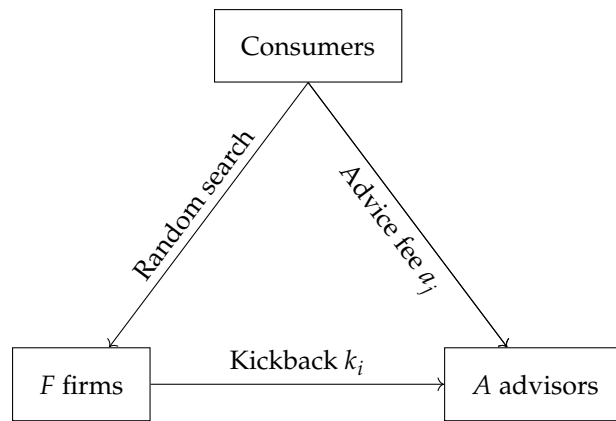


Figure 1: Model overview.

	Mortgage	Pension	Investment	Simple insurance	Complex insurance
Consumer can find the right information	73%	73%	79%	86%	70%
Consumer received independent advice	56%	42%	31%	6%	44%
Correlation	-.915				

Table 1: Correlation between ease of getting information and the fraction of consumers who receive independent financial advice, based on Finney and Kempson (2008). The first line is the fraction of consumers who answered yes to the statement that they find it easy to get hold of the right information (Table 2.25). The second line is the fraction of consumers who received advice from an independent financial advisor or a mortgage broker (Table 2.15).

	Restriction	Firms choose	Advisors choose
Search equilibrium	$A = 0$	$p, t$	n/a
Kickback equilibrium	$a = 0$	$p, t, k$	–
Regulated equilibrium	$k = 0$	$p, t$	$a$

Table 2: The three market configurations compared in this article. The restriction is compared to the full model in Figure 1.

	$p$	$t$	$a$	$CS(\sigma + \chi)$
$\bar{b} = 0.035$				
Kickback equilibrium	.5167	.1973	-	.0389
Regulated equilibrium	.5000	.2041	.0175	.0381
$\bar{b} = 0.02$				
Kickback equilibrium	.5167	.1973	-	.0389
Regulated equilibrium	.5000	.2041	.0100	.0456

Table 3: Examples where consumers with low expertise are better (top) and worse (bottom) off in the kickback than in the regulated equilibrium.  $CS(\sigma + \chi)$  is the consumer surplus of a consumer with low expertise whose highest advisor benefit equals 0. Parameters:  $\bar{\varepsilon} = 1$ ,  $\gamma = \frac{9}{10}$ ,  $\mu = \frac{1}{4}$ ,  $F = 2$ ,  $g(t) = t^2$ ,  $\sigma = 0$ ,  $\chi = \frac{1}{4}$ ,  $\alpha = \frac{1}{3}$ ,  $A = 2$ .

$\bar{\varepsilon}$	$t_K^*$	$A_K^*$	$\lambda_K^*$
$\frac{3}{4}$	.1188	2	.0826
1	.1312	6	.1834
$\frac{3}{2}$	.1158	14	.2610
2	.1793	21	.2916
3	.2214	35	.3172

Table 4: Obfuscation ( $t_K^*$ ), long-run free entry number of advisors ( $A_K^*$ ) and total advisor market share ( $\lambda_K^*$ ) in the kickback equilibrium for values of the value of search  $\bar{\varepsilon}$ . Parameters:  $\bar{b} = \frac{1}{10}$ ,  $\sigma = \frac{1}{20}$ ,  $\chi = \frac{1}{5}$ ,  $\alpha = \frac{1}{2}$ ,  $g(t) = t^2$ ,  $\gamma = \frac{9}{10}$ ,  $F = 2$ ,  $\mu = \frac{1}{5}$ ,  $E = \frac{1}{10}$ .

	Kickback equilibrium							Regulated equilibrium		
	$A$	$\gamma = \frac{1}{2}$			$\gamma = \frac{9}{10}$					
		$\pi^A$	$\lambda$	CS	$\pi^A$	$\lambda$	CS	$\pi^A$	$\lambda$	CS
	2	.0145	.1038	.0682	.0044	.1457	.0837	.0013	.1011	.0831
	3	.0114	.1200	.0691	.0034	.1694	.0878	.0010	.1374	.0896
	4	.0094	.1308	.0697	.0028	.1826	.0902	.0008	.1633	.0940
	5	.0080	.1386	.0700	.0023	.1901	.0916	.0006	.1801	.0968
Free entry		.0010	.1903	.0707	.0010	.1998	.0945	.0010	.1374	.0896
Free entry number of advisors		58			12			3		

Table 5: Profits per advisor ( $\pi^A$ ), market share of all advisors ( $\lambda$ ) and total consumer surplus (CS) in the kickback and regulated equilibria for different number of advisors ( $A$ ). Parameters:  $\bar{\varepsilon} = 1$ ,  $\bar{b} = \frac{1}{10}$ ,  $\sigma = \frac{1}{20}$ ,  $\chi = \frac{1}{5}$ ,  $\alpha = \frac{1}{2}$ ,  $g(t) = t^2$ ,  $F = 2$ ,  $\mu = \frac{1}{5}$ ,  $E = \frac{1}{1000}$ .