# Deception under Competitive Intermediation*

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**Abstract**

This paper investigates the incentive of intermediaries — such as financial advisors, mortgage brokers, or insurance salespeople — to educate consumers who misperceive the value of products. Two types of firms sell products through competing common-agent intermediaries and pay commissions for sales. One sells a transparent product, while the other sells a deceptive product that has a hidden fee, quality, or risk. Each intermediary chooses which product to offer and whether or not to educate consumers about the hidden attribute. I show that a non-educating equilibrium exists if and only if the degree of misperception is large. In the equilibrium, intermediaries earn high commissions despite competition. Furthermore, because consumers ultimately bear the cost of such commissions, consumer welfare is lower when intermediaries can educate consumers than when they cannot. I also provide a condition to detect such welfare distortion from market data, and discuss the effects of various regulations.

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# 1 Introduction

In the mutual fund, mortgage, and insurance industries, products are often sold through independent intermediaries.[1] A primary role of the intermediaries is to help consumers make better purchase decisions by informing them about product attributes. This educational role of intermediaries is particularly important for uninformed or confused consumers who may be inattentive to "hidden" fees, qualities, or risks.[2] Nevertheless, recent empirical studies report that intermediaries often give advice that is detrimental to consumers but benefits product providers.[3] Some of these studies find that intermediaries receive higher commissions from product providers for selling products which are worse for consumers.[4] Yet, how intermediaries can profitably sell worse products *and* get higher commissions in a competitive environment remains largely unexplored.

Building on Gabaix and Laibson (2006) and complementing the literature on intermediation under consumer naivete (Stoughton, Wu and Zechner 2011; Bolton, Freixas and Shapiro 2012; Inderst and Ottaviani 2012c), this paper theoretically investigates the incentives of competing intermediaries to educate consumers who misperceive the value of products. I show that when intermediaries are motivated by commissions, deception (i.e., not educating consumers about their misperception) occurs if and only if the degree of misperception is large. In the deceptive equilibrium, each intermediary faces a trade-off between expanding market share by educating consumers and earning a higher commission per sale by exploiting consumers. Based on this trade-off, intermediaries engage in deception if deceptive firms can pay sufficiently high commissions — financed by deception —

[1] In the US, the Investment Company Institute reports that among all households who hold mutual funds including pension plans, 53 percent of them own funds purchased through investment professionals, and 82 percent of households do so after excluding pension plans (Profile of Mutual Fund Shareholders, 2012). The Mortgage Bankers Association (MBA) reports that 50 percent of all mortgage loans and 71 percent of subprime loans are originated through mortgage brokers (Residential Mortgage Origination Channels, MBA Research Data Notes, 2006).

[2] Anagol and Kim (2012) find that investors are less sensitive to mutual-fund fees when the fees are amortized and hidden. Gurun, Matvos and Seru (2016) report that consumers are less sensitive to post-introductory interest rates than to initial interest rates of adjustable-rate mortgages because of "deceptive advertisements" by mortgage lenders. See also the Federal Trade Commission's article on deceptive mortgage advertisements: `http://www.consumer.ftc.gov/articles/0087-deceptive-mortgage-ads` (accessed November 1, 2014).

[3] In the US mutual-fund industry, Mullainathan, Nöth and Schoar (2012) conduct an audit study and find that most financial advisors cater to their customers' biases, such as return chasing, and promote high-fee mutual funds. Li (2014) examines US mutual-fund flow data and reports that financial advisors reinforce clients' return chasing to sell high-commission funds.

[4] Chalmers and Reuter (2015) report that customers who consulted brokers for retirement plans allocate their money more to funds with higher broker fees, although on average these broker-recommended funds underperform a default investment option. Christoffersen, Evans and Musto (2013) find that in the US mutual-fund industry, a higher commission increases a fund flow while it also predicts future poorer fund performance. In the Indian life-insurance industry, Anagol, Cole and Sarkar (2017) report that a vast majority of salespeople recommend unsuitable, strictly-dominated insurance plans that are associated with high commissions.

with which transparent firms cannot compete. If deception occurs, then intermediaries receive high commissions even when they are competing for consumers. Such deception severely harms social and consumer welfare. Consistent with the evidence described in the previous paragraph, intermediaries can profitably sell products with lower, or even negative, social surplus. Intermediaries are less likely to educate consumers when their educational role is more important. Furthermore, consumer welfare is lower when intermediaries can — but do not — educate consumers than when they cannot educate consumers. Analogous to recent policies in the US mortgage industry as well as in the Australian and UK mutual-fund industries, regulating commissions can lead intermediaries to educate consumers and hence can increase consumer and social welfare.[5] I also show that net product value is negatively correlated with its commission under deception, which may be helpful to detect such deception from market data.

Section 2 sets up the model and discuss its key assumptions. In the basic model, two firms sell their products to a unit mass of homogenous consumers. One firm produces a deceptive product that has a hidden product attribute such as an additional fee, a harmful quality, or a future risk, whereas the other firm produces a transparent product that has no hidden attribute. Firms can sell their products only through profit-maximizing common-agent intermediaries, to whom they pay sales commissions. Each intermediary decides which product to promote and whether or not to educate consumers about the hidden attribute of the deceptive product. Each consumer visits a fixed number of intermediaries and buys at most one item. Following Gabaix and Laibson (2006) and Heidhues, Kőszegi and Murooka (2017), I assume that consumers are naive both in the sense that they are initially unaware of the hidden attribute and that they do not infer its existence from the level of prices or commissions. Consumers take into account hidden attributes when making their purchase decisions if and only if they are educated by some intermediary. I investigate subgame-perfect Nash equilibria played by firms and intermediaries. In particular, I focus on identifying conditions for equilibria in which intermediaries employ deception.

Section 3 analyzes the model and discusses welfare implications. After illustrating three benchmark cases, I investigate the main model in which consumers are naive and firms sell their products through intermediaries. Holding the other parameters constant, I show that deception occurs if and

[5] In the US mortgage industry, "to protect mortgage borrowers from unfair, abusive, or deceptive lending practices," the Federal Reserve Board has prohibited compensation to a mortgage broker based on terms or conditions of a mortgage transaction since 2011 (Banking and Consumer Regulatory Policy Press Release, August 16, 2011). Also, in the Australian and UK mutual-fund industries, commissions to financial advisors have been banned since 2013.

only if the amount of the hidden attribute is large. Specifically, the condition for deception hinges on an intermediary's trade-off between expanding market share and earning a higher commission per consumer. On the one hand, an intermediary can increase its market share by educating consumers and attracting them from other intermediaries. On the other hand, an intermediary can earn higher commissions by not educating consumers and selling the deceptive product. As a result, deception occurs if the deceptive firm can give sufficiently high commissions — financed by the hidden attribute — with which the transparent firm cannot compete. Because the deceptive firm needs to give a sufficiently high commission to each intermediary in order to maintain the deception, competition among intermediaries does not lower the level of commissions when deception occurs.

When deception occurs, the educational role of intermediaries exhibits perverse welfare effects. Deception distorts consumer and social welfare; because consumers misperceive the value of products, intermediaries can profitably sell products with lower social surplus or even ones with negative social surplus. Intermediaries are less likely to educate consumers as their educational role becomes more important (i.e., as the hidden attribute is larger). The presence of reputation loss by not educating consumers can further distort market outcomes if it is not sufficient to eliminate deception. Moreover, I show that consumer welfare is lower when intermediaries have an ability to educate consumers about the hidden attribute than when they don't have the ability. This is because commissions for persuading intermediaries not to educate consumers increase the total prices of the products, and consumers ultimately bear the cost of such commissions. This result indicates that if deception is an issue, having expert intermediaries in a market can hurt naive consumers more. I also show that conditional on deception, the ex-post utility of consumers is the same under a monopoly intermediary and multiple intermediaries. Although introducing competition among intermediaries makes deception harder to sustain, it does not increase consumer or social welfare if deception is sustained.

Section 4 discusses the possibilities and limits of policies for preventing deception. Once the difference in commissions is limited, each intermediary has an incentive to attract consumers from competitors by educating the consumers. Therefore, caps on commissions or prohibiting large discrepancies in commissions can eliminate deception, and thereby increase welfare. This is akin to recent regulations introduced in the US mortgage industry as well as in the Australian and UK mutual-fund industries. Unlike policies that attempt to restrict hidden attributes directly, these commission regulations do not require a policymaker to identify which attribute is used to exploit consumers. I also discuss the effects of regulating the maximum additional fees, letting consumers reach more intermediaries, and disclosure of commission structures.

Section 5 analyzes how competition among deceptive firms affects consumer and social welfare. When there are multiple firms in each type of product, all firms earn zero profits. In this case, whether or not intermediaries earn positive profits from deception depends on the relative social surplus of the products. On the one hand, when the deceptive product is socially superior to the transparent one, deceptive firms compete down their product prices and commissions. As a result, both consumer and social welfare are maximized. On the other hand, when the deceptive product is socially inferior to the transparent product—which seems more likely in practice—intermediaries can earn positive profits by employing deception. The same trade-off and condition as in the model with one deceptive firm determine whether deception through high commissions can be sustained. Consumers' ex-post utility under deception is higher than in the case with one deceptive firm, but is still negative. Furthermore, under deception with multiple deceptive firms, net product value is negatively correlated with its commission. This relation is potentially helpful to detect such deception from market data.

Section 6 examines how the presence of sophisticated consumers affects the welfare of naive consumers in various settings. Section 7 discusses further extensions and modifications of the model which incorporates (i) effort costs intermediaries need to pay when educating consumers, (ii) heterogeneity in consumers' search intensity, (iii) heterogenous bargaining power between firms and intermediaries, (iv) the possibility of vertical integration, or (v) the possibility that intermediaries directly charge advising fees or give direct rebates to consumers. Section 8 summarizes related theoretical literatures. Section 9 concludes. All proofs are provided in the Appendix.

# 2 Model

This section introduces the model. Section 2.1 sets up the model. Section 2.2 discusses three key assumptions throughout this paper.

## 2.1 Setup

Consider a market with two product providers: a deceptive firm (firm $D$) and a transparent firm (firm $T$). Firm $D$ has a hidden attribute $\overline{a} \geq 0$, whereas firm $T$ does not have such an attribute. Firm $x \in \{D, T\}$ sells product $x$ with value $v_x > 0$ and marginal cost $c_x > 0$. Assume $v_D - c_D + \overline{a} > 0$ and $v_T - c_T > 0$.[6] There is a unit mass of homogenous consumers and each of them buys at most one item. Consumers are *naive* but *educable* as in Gabaix and Laibson (2006) and Heidhues et al. (2017): when consumers make purchase decisions, they are ignorant of $\overline{a}$ if and only if they are not educated about $\overline{a}$. While $\overline{a}$ represents the degree of consumer misperception in general, I assume in the model that $\overline{a}$ is an exogenous hidden fee charged by firm $D$ and that consumers cannot avoid $\overline{a}$ after their purchase.[7] If instead $\overline{a}$ is an overestimate of quality or underestimate of risk, then a deceptive firm can charge a higher product price instead of charging a hidden fee, and all results in this paper remain the same.[8] Note that firm $D$ has monopoly power for potentially exploiting consumers by $\overline{a}$; Section 5 analyzes a model with multiple deceptive firms in which no firm has such monopoly power.

A key feature of the model is that firms must delegate their sales to common-agent intermediaries motivated by commissions.[9] Let $J \geq 2$ denote the total number of intermediaries in the market. Each consumer visits a fixed number $N (\leq J)$ of intermediaries simultaneously and randomly.[10] I assume $N \geq 2$ to analyze a competitive environment for intermediaries; $N$ limits each intermediary's ability to take market share away from competitors.[11] Each intermediary chooses one product to promote, and whether or not to educate consumers about $\overline{a}$. Each intermediary can educate all

[6] Otherwise, some product is never profitably sold and the market becomes a monopoly. Note that product $D$ can be socially wasteful ($v_D$ can be smaller than $c_D$) and that I do not impose a specific relation between the social surplus of these two products ($v_D - c_D$ versus $v_T - c_T$).

[7] If the hidden fee is avoidable and endogenously chosen by firm $D$, then the firm sets the hidden fee equal to a monopoly price after consumers are locked-in.

[8] Specifically, consider an alternative case where uneducated consumers perceive the value of product $D$ to be $v_D + \overline{a}$, whereas its actual value is $v_D$. Then, all results in this paper, including its welfare implications, remain the same once the product price of the deceptive firm is modified from $p_{Di}$ to $p_{Di} + \overline{a}$.

[9] In this paper, commissions are identical to kickbacks from firms to intermediaries. For consistency, I call them commissions throughout the paper.

[10] In Section 7, I examine a model with incorporating heterogeneity in consumers' search intensity. To analyze the effects of competition among intermediaries in a tractable way, I assume throughout this paper that the number of intermediaries each consumer visits is exogenous. Incorporating endogenous consumer search into the model is beyond the scope of this paper, though it is briefly discussed in Section 7 and 9.

[11] According to a survey reported by Lacko and Pappalardo (2007), in the US mortgage industry, consumers on average contact 2.8 mortgage lenders and brokers. Also, Woodward and Hall (2012) estimate that most consumers are likely to visit only 2 mortgage brokers for their loan originations.

consumers who visit at no cost. If no intermediary educates, then a consumer is ignorant of $\overline{a}$ in her purchase decision; but if at least one intermediary educates, then she takes $\overline{a}$ into account. I assume that consumers do not make an inference about the hidden attribute from the level of product prices or commissions.[12] All parties are risk neutral. I employ a tie-breaking rule where intermediaries split the demand equally if consumers are indifferent between buying from them.

The timing of the game is as follows:

1. Each firm $x \in \{D, T\}$ simultaneously proposes a product price $p_{xi}$ and a commission per sale $f_{xi} \geq 0$ to each intermediary $i \in \{1, \cdots, J\}$.[13]

2. After observing all of the contracts, each intermediary simultaneously chooses one product to promote and whether or not to educate consumers about $\overline{a}$.[14]

3. Each consumer reaches $N$ intermediaries simultaneously and randomly, observes products which are promoted by these intermediaries, and makes her purchase decision.[15]

4. All transactions are implemented.

The profits of firm $D$ and $T$ per sale are respectively $p_{Di} - c_D - f_{Di} + \overline{a}$ and $p_{Ti} - c_T - f_{Ti}$. The ex-post utility of each consumer if she buys product $D$ and product $T$ from intermediary $i$ is respectively $v_D - p_{Di} - \overline{a}$ and $v_T - p_{Ti}$. The total profits of each intermediary are its market share times commissions.

I investigate pure-strategy subgame-perfect Nash equilibria played by firms and intermediaries with the following two equilibrium refinements. First, no firm sets its total price below its total cost; any such strategy is weakly dominated. Second, if ordinal preferences of all intermediaries in a second-stage subgame are retained in another second-stage subgame, then each of the intermediaries makes the same educational decision between these subgames.[16] This refinement ensures

[12] Incorporating commission-disclosure decisions into the model does not change the analysis. For ease of exposition, I consider a case in which consumers can observe the level of commissions but do not make an inference from it. See Section 4.4 for a detailed discussion.

[13] For ease of exposition, I restrict the attention to piece-rate contracts. Given the demand structure, this restriction is without loss of generality in the model.

[14] Since consumers are homogenous and there is no capacity constraint of the products, we can restrict the attention to single-product promotion. Section 6 analyzes multi-product promotion under consumer heterogeneity in naivete.

[15] In Section 3.2 (footnote 29), I discuss how results are robust when consumers can also observe an unpromoted product and can ask an intermediary to deliver it.

[16] Formally, let $G$ denote a subgame which consists of a tuple of contracts offered from firms to intermediaries. Let $\pi^i(a \mid G)$ denote the payoff of intermediary $i$ given contracts $G$ and intermediaries' action profile $a$. Let $G'$

that intermediaries' educational decisions are consistent across subgames with the same ordinal preferences, and is used to derive the uniqueness of equilibrium in which intermediaries do not educate consumers.

For ease of exposition, I divide the set of equilibria into two types: *non-educating equilibria* in which all consumers remain uneducated, and *educating equilibria* in which some or all consumers are educated. In the analysis, I focus on identifying conditions for and properties of non-educating equilibria. Since educating consumers is trivially a best response if all other intermediaries educate, a (fully) educating equilibrium always exists. Whenever a non-educating equilibrium exists, however, it is more plausible to be played among intermediaries than the educating equilibrium because of the following reasons. First, intermediaries earn higher profits in a non-educating equilibrium. Second, intermediaries play a weakly-dominated strategy in an educating equilibrium. Finally, if a non-educating equilibrium exists in the model, then it becomes the *unique* equilibrium in an extended model in which intermediaries incur a positive education cost, no matter how small the cost is. I discuss such an extended model in Section 7.

## 2.2 Discussion of Key Assumptions

The model has three key assumptions: (i) consumers have misperceptions about a product attribute, (ii) intermediaries can educate consumers about the attribute, and (iii) without the help of intermediaries, firms cannot educate consumers about the attribute of other firms' products. In this subsection, I discuss these assumptions in turn.

(i) In the model, $\overline{a}$ represents the amount by which a consumer misperceives the attributes of the product that can be hidden fees, harmful qualities, or future risks. As examples of hidden fees, Gurun et al. (2016) report that post-introductory interest rates of adjustable-rate mortgages are not salient due to "deceptive advertisements," and the advertisements lead consumers to choose worse mortgages. Woodward and Hall (2012) find that some consumers originating mortgage loans pay high broker fees because of a confusing payment scheme.[18] By examining a natural experiment,

denote another tuple of contracts. The definition of the second refinement is: if $\pi^i(a \mid G) > \pi^i(a' \mid G)$ implies $\pi^i(a \mid G') > \pi^i(a' \mid G')$ for all $i$ and all $a, a'$, then each intermediary makes the same educational decision between subgame $G$ and subgame $G'$. In the Appendix, I explain how this refinement is used to derive the equilibrium uniqueness. [17]

[18] Specifically, Woodward and Hall (2012) report that consumers who compensate a mortgage broker with both a direct cash payment and a commission from a mortgage lender pay twice as much as similar consumers who pay either with cash alone or with a commission alone.

Anagol and Kim (2012) show that consumers tend to pay higher fees to mutual funds when the fees are amortized and hidden. As examples of misperceived qualities and risks, individual investors may overestimate future returns or underestimate risks of actively-managed mutual funds relative to index funds.[19] Consumers may have incorrect beliefs about the likelihood of accidents covered by insurance plans. Patients may think the efficacy of a brand-name drug is better than that of generic one with the same ingredients (Bronnenberg, Dubé, Gentzkow and Shapiro 2015).

Along with most studies incorporating consumer naivete, I assume that consumers do not make an inference about the hidden attribute from price or commission levels. Of course, if consumers can rationally infer, then they will notice the existence of hidden attributes when observing overly high commissions. Empirical evidence, however, suggests that consumers are often inattentive to the incentives of intermediaries.[20] I return to discuss this assumption and policies on mandatory disclosure of commission structures in Section 4.4.

(ii) Helping consumers choose products is thought to be a central role of intermediaries. Doctors can teach patients which treatment is better for them, real-estate agents can tell deficiencies of a house, and financial advisors and mortgage brokers can educate consumers about the hidden costs of products.[21] Experts in these industries are often indispensable because most consumers find it hard to choose an appropriate product without the help of intermediaries. In addition, these intermediaries can provide certified information or clear analysis to modify consumers' misperceptions, whereas providing such information is either costly or often impossible for non-experts.

To investigate the educational incentives of intermediaries in a clear manner, I assume that each intermediary can educate its customers at no cost. Note that such "perfect education" is an extreme assumption which makes a deceptive equilibrium harder to exist. In Section 7, I examine how results are robust to incorporating costly education.

(iii) This paper focuses on markets in which expert intermediaries are indispensable for some consumers. Section 3.1 demonstrates that if firms can directly educate most consumers about

[19] Studies by Malkiel (1995), Gruber (1996), and French (2008) report that actively-managed mutual funds underperform index funds after fees are taken into account. Furthermore, Gil-Bazo and Ruiz-Verdú (2009) report that mutual funds charging higher fees tend to have worse before-fee risk-adjusted performance.

[20] Malmendier and Shanthikumar (2007) report that small investors literally follow the stock recommendations of security analysts, though the recommendations of the analysts have an upward bias. Christoffersen et al. (2013) report that in the US mutual-fund industry, a 1% point increase in commissions leads to a 0.4464% increase in annual fund flows, while the increase in commissions predicts a 0.34% *decrease* in future performance net of fees.

[21] For market evidence, see footnote 3. Also, Foá, Gambacorta, Guiso and Mistrulli (2015) examine Italian mortgage data and report that the presence of financial advice affects consumers' mortgage choices.

other firms' product attributes, then a non-deceptive firm would always educate. For the industries illustrated above, however, some consumers are unwilling to buy products without consulting experts because stakes are large and product attributes are complicated. For example, mortgages have hundreds of thousands of dollars at stake, and their contracts are hundreds of pages long—far beyond the limits of comprehension for many consumers. To educate consumers in these markets, a non-deceptive firm needs either to hire or train in-house intermediaries. In either case, the total cost seems the same as, or higher than, that of using existent intermediaries. In Section 7, I discuss how results are robust to incorporating such possibilities of vertical integration.[22]

# 3 Analysis

This section analyzes the model and derives its welfare implications. Section 3.1 presents three benchmark cases. Section 3.2 characterizes the equilibria of the model, identifies a condition under which a deceptive equilibrium exists, and discusses its implications. Section 3.3 analyzes welfare effects on intermediaries' educational role and on the presence of competition among intermediaries. Section 3.4 discusses a case where intermediaries also face reputational concerns.

## 3.1 Benchmark Cases

Before the main analysis, I briefly describe three benchmark cases: a case where firms can directly educate consumers, a case where consumers do not have misperceptions, and a case where intermediaries do not have an ability to educate consumers.

**Equilibrium under Direct Marketing**

First, suppose that consumers are naive but firms directly market to the consumers, which is a variant of an extended model in Heidhues et al. (2017). Assume that firm $x \in \{D, T\}$ simultaneously chooses its price $p_x$ and whether or not to educate consumers about the hidden attribute of firm $D$.[23] In this case, there always exists a Nash equilibrium played by firms in which firm

[22] Beyond the model, it is possible that non-deceptive firms can use mass advertisements to educate consumers. In that case, however, deceptive firms and intermediaries can also use "counter-advertisements." Further, if profitable deception can occur, then deceptive firms and intermediaries have more resources to make naive consumers confused. Hence, education can be difficult without a direct consultation with an expert.

[23] In the Supplementary Material, I show that how the result of Result 1 is robust to the different specifications of timing between pricing and educating decisions.

$T$ educates consumers about $\overline{a}$ and a firm with a lower social surplus chooses marginal-cost pricing.[24] Intuitively, the game is reduced to standard Bertrand-type price competition in a vertically-differentiated market once consumers are educated. Also, in order to increase own advantage, firm $T$ educates consumers in any equilibrium:

**Result 1** (Equilibrium under Direct Marketing)**.** Suppose that firms directly market to consumers and make pricing and educating decisions at the same time. Then, all consumers are educated in any equilibrium.

**Equilibrium without Naivete**

Second, suppose that firms sell their products through intermediaries but all consumers are *informed* about the hidden attribute. These informed consumers observe which product has $\overline{a}$.[25] In this case, a standard Bertrand-type competition argument applies:[26]

**Result 2** (Equilibrium without Naivete)**.** Suppose that all consumers are informed. Then, in any equilibrium, only the product with higher social surplus is sold All intermediaries earn zero profits.

**Equilibrium under No Ability to Educate Consumers**

Third, as the most important benchmark case, suppose that consumers are naive but intermediaries *cannot* educate consumers about the hidden attribute. Since there is competition among intermediaries and their role is only to deliver products from firms to consumers, commissions are competed down to zero in any equilibrium:

**Result 3** (Equilibrium under No Ability to Educate Consumers)**.** Suppose that intermediaries do not have an ability to educate consumers about $\overline{a}$. Then, in any equilibrium, all intermediaries earn zero profits.

[24] Precisely, there exists a non-deceptive equilibrium such that $p_D^* + \overline{a} = c_D, p_T^* = \min\{v_T, v_T - (v_D - c_D)\}$ and all consumers buy firm $T$'s product if $v_D - c_D \leq v_T - c_T$, whereas $p_D^* + \overline{a} = v_D - (v_T - c_T), p_T^* = c_T$ and all consumers buy firm $D$'s product if $v_D - c_D > v_T - c_T$.

[25] In the Supplementary Material, I show that the result remains the same if instead consumers anticipate the existence of a hidden attribute but do not know which product has the hidden attribute.

[26] Note that Result 2 is stated in terms of utility and profits rather than what intermediaries actually do. There is a non-essential multiplicity of equilibria due to the fact that intermediaries make zero profits. This multiplicity affects none of the equilibrium outcomes.

The deceptive product is sold in an equilibrium if and only if $v_D - c_D + \overline{a} \geq v_T - c_T$. In this case, the equilibrium becomes $p^*_{Ti} = c_T$, $p^*_{Di} = v_D - (v_T - c_T)$, $f^*_{Di} = f^*_{Ti} = 0$ for all $i$. Consumers are indifferent between product $D$ and $T$, and their ex-post utility is the social surplus of product $T$ minus the hidden cost: $(v_T - c_T) - \overline{a}$. Note that firm $T$ cannot profitably deviate by increasing both its commission and its product price, because then consumers (wrongly) think that the deceptive product is better even when some intermediary promotes the transparent product. Importantly, this does not hold in the model where intermediaries can educate consumers as analyzed in the next subsection.

## 3.2 Equilibrium in the Model

Now I analyze the model presented in Section 2.1: consumers are naive and each intermediary can educate them. I first investigate a fully deceptive equilibrium in which no intermediary educates consumers. I prove in the Appendix that if a fully deceptive equilibrium exists, then intermediaries receive positive commissions in the equilibrium. To see the intuition, consider the tuple of strategies described in the last paragraph: $p_{Ti} = c_T$, $p_{Di} = v_D - (v_T - c_T)$, $f_{Di} = f_{Ti} = 0$ for all $i$. Note that each intermediary has the new outside option of educating consumers, promoting the transparent product, and attracting consumers from other deceiving intermediaries. Since consumers strictly prefer the transparent product once they are educated, this tuple of strategies no longer becomes an equilibrium. Specifically, firm $T$ can induce intermediary $i$ to promote product $T$ by increasing its commission by $\epsilon$ and its product price by $2\epsilon$ for small $\epsilon > 0$, and hence can profitably deviate.

The outside option of educating consumers generates competition for raising commissions. Consequently, firm $T$ sets its commission as high as possible, which is the total surplus of its product. In order to prevent intermediaries from educating consumers, the deceptive firm needs to give $N$ times higher commissions than the transparent firm can give. Further, by doing so firm $D$ can charge its monopoly price to consumers.[27] As a result, the fully deceptive equilibrium is characterized by $p^*_{Ti} = v_T$, $f^*_{Ti} = v_T - c_T$, $p^*_{Di} = v_D$, $f^*_{Di} = N(v_T - c_T)$ for all $i$.[28] Notice that neither firm $T$

[27] This is because firm $D$ does not face competition with firm $T$ once firm $D$ offers such high commissions to intermediaries. Note that this comes from the fact that firm $D$ has monopoly power for exploiting consumers; Section 5 analyzes a model in which no firm has such monopoly power.

[28] Precisely, firm $T$'s offer in the equilibrium is $p^*_{Ti} = v_T - \epsilon$, $f^*_{Ti} = v_T - c_T - \epsilon$ with $\epsilon \to 0$ because of consumers' tie-breaking rule. As a formal argument, suppose that the amount of prices and commissions are discretized. Take the limit of the intervals of the discretized spaces to zero. Then, the sequence of the offers converges to the equilibrium one with continuous action spaces.

nor intermediaries have incentives to deviate from this candidate equilibrium. Firm $D$ follows the above strategy if (i) firm $D$ earns non-negative profits ($p^*_{Di} + \overline{a} - c_D - f^*_{Di} \geq 0$) and (ii) the profits from deception is not smaller than the difference of commissions ($\overline{a} \geq f^*_{Di}$). By combining these two inequalities, I obtain the following "Condition for Deception":

$$\min\{v_D - c_D, 0\} + \overline{a} \geq N(v_T - c_T). \tag{CD}$$

In this equilibrium, naive consumers' ex-post utility is $-\overline{a} < 0$, firm $D$ earns positive profits if Condition (CD) holds with strict inequality, firm $T$ has zero market share, and each intermediary has $1/J$ of the market share and earns $N(v_T - c_T)$ of commissions per sale.

In the Appendix, I also show that if a deceptive equilibrium exists, then it is unique among deceptive equilibria. Also, if consumers are educated, then commissions are competed away as in Result 2. These considerations lead to the complete characterization of the equilibria:

**Proposition 1** (Equilibria in the Model)**.** Suppose the model described in Section 2.1.

(i) A deceptive equilibrium exists if and only if Condition (CD) holds. If the deceptive equilibrium exists, then it is unique among deceptive equilibria: $p^*_{Ti} = v_T$, $f^*_{Ti} = v_T - c_T$, $p^*_{Di} = v_D$, $f^*_{Di} = N(v_T - c_T)$ for all $i$. In the equilibrium, all consumers receive ex-post negative utility. Each intermediary promotes the deceptive product without educating consumers and earns positive profits. The deceptive firm earns positive profits if Condition (CD) holds with strict inequality. The non-deceptive firm has zero market share. Social welfare is not maximized when $v_D - c_D < v_T - c_T$.

(ii) A non-deceptive equilibrium always exists and its outcome is unique among non-deceptive equilibria. In the equilibrium, all consumers are educated, intermediaries earn zero profits, and social welfare is maximized.

In the deceptive equilibrium, each intermediary faces a key trade-off between market share and the level of commissions. On the one hand, an intermediary can increase its market share by educating consumers and attracting them from other intermediaries. On the other hand, an intermediary can earn a higher commission per customer by not educating consumers and selling the deceptive product. As a result, deception occurs if the profits from the hidden attribute allow the deceptive firm to give each intermediary a sufficiently high commission with which the transparent firm cannot compete.[29]

[29] One may think that the occurrence of such deceptive equilibrium is coming from the assumption that naive

If deception occurs, then having competition among intermediaries *does not lower* the level of commissions. This is because the deceptive firm needs to give each intermediary a high commission to maintain deception.[30] This result brings a new insight to the relation between commissions and the role of intermediaries: although high commissions in classical models often imply that intermediaries provide valuable or high-cost services to their customers, disproportionately high commissions may indicate that intermediaries promote products in a socially-inefficient way. This result can help explain why actively-managed mutual funds and option adjustable-rate mortgages are able to profitably charge higher total prices than alternative products, such as index funds and fixed-rate mortgages.

Deception may severely harm consumer and social welfare. If Condition (CD) holds, then the deceptive firm can profitably sell an inferior product (i.e., $v_D - c_D < v_T - c_T$), leading to suboptimal social and consumer welfare. Moreover, the deceptive firm can profitably sell its product even when the product is socially wasteful (i.e., $v_D - c_D < 0$); deception enables the survival of products that should not exist in the market.

Deception becomes less likely to occur as consumers' search intensity, $N$, increases. Conditional on deception, however, increasing the search intensity further raises the level of commissions. As $N$ increases, educating consumers becomes more attractive to each intermediary. To maintain deception, therefore, the deceptive firm must give a higher commission at the expense of own profits. Once the commission becomes so high that the deceptive firm cannot profitably maintain deception, deception is eliminated and commissions are competed down. As a result, $N$ has a non-monotonic effect on the level of commissions.[31] Similarly, so long as Condition (CD) holds, the level of commissions is increasing in the social surplus of the transparent product ($v_T - c_T$); as

consumers can observe only promoted products. Indeed in this two-firm model, if consumers can observe a non-promoted product and can ask an intermediary to deliver it, then firm $T$ can profitably deviate by slightly decreasing both its product price and its commission. However, this effect is an artifact of two-firm price competition and does not occur when there is also competition among deceptive firms. See Section 5 (footnote 43).

[30] The intuition of why high commissions can be sustained under competition among intermediaries is close to Besley and Prat (2006) and Asker and Bar-Isaac (2014). Besley and Prat (2006) show that a government has an incentive to give medias sufficiently high bribes in order to prevent these medias from broadcasting bad news. Asker and Bar-Isaac (2014) show that in a repeated-game framework, a monopolistic up-stream firm may give retailers sufficiently high transfers so that no retailer would accommodate potential up-stream entrants. In these papers, however, all parties are rational and hence welfare and policy implications are different from my paper. Also, their results would be different when there are multiple incumbents or heterogenous consumers, whereas I analyze these extensions and show the robustness of my results in Sections 5 and 6.

[31] Notice that $N$ does not depend on the total number of intermediaries, $J$, but on how many intermediaries consumers visit. Section 4.3 discusses policies that enhance the access to intermediaries.

an alternative product becomes more attractive, a deceptive firm needs to give higher commissions in order to maintain deception.

If Condition (CD) does not hold, then all consumers are educated about the hidden attribute, intermediaries earn zero profits, and social welfare is maximized. Hence, deception is a concern when and only when consumer misperception is substantial. On the one hand, Condition (CD) holds only when $\overline{a} \geq v_T - c_T$. This indicates the lack of "minor" deception: intermediaries educate consumers about small misperceptions under competition. On the other hand, Condition (CD) implies that the more important the educational role of intermediaries is (the higher $\overline{a}$ is), the less likely the intermediaries serve their role (educating consumers about $\overline{a}$). The next subsection further investigates the perverse welfare effect on the educational role of intermediaries.

### 3.3 Welfare Effects of Intermediaries

This subsection highlights two significant welfare effects of intermediaries under deception. Note again that if Condition (CD) does not hold, then intermediaries educate all consumers. In this case, consumers are not exploited and commissions are competed down. When Condition (CD) holds, however, perverse welfare effects arise due to the presence of expert intermediaries.

I first examine the effect on the educational role of intermediaries. To investigate it, consider an alternative case described in Result 3: consumers are naive and no intermediary can educate them. When Condition (CD) is satisfied, all consumers buy the deceptive product. Since no one can educate consumers in such a case, of course deception occurs. However, consumers' ex-post utility in this case is $(v_T - c_T) - \overline{a}$ while one in the original model is $-\overline{a}$: the ex-post utility under deception in the model where intermediaries have an ability to educate consumers is *lower* than in the alternative case where intermediaries do not.

**Proposition 2** (Welfare Effect on the Educational Role of Intermediaries)**.** Suppose Condition (CD) holds. Then, consumer welfare is lower when intermediaries can educate consumers than when they cannot.

Proposition 2 demonstrates that the existence of expert intermediaries, who have an ability to educate consumers, may decrease consumer welfare. This result indicates the perverse welfare effect on the educational role of intermediaries. To see the intuition, notice again that when intermediaries cannot educate consumers, commissions are competed down to zero. In contrast, when intermediaries can educate consumers, high commissions are paid for maintaining deception. Because these high commissions increase equilibrium product prices, the consumers partly bear the cost of such high commissions. Hence, conditional on deception, consumer welfare is lower in the case where intermediaries can educate consumers compared to the alternative case where intermediaries cannot educate. When deception is an issue, experts may make consumers worse off due to the misalignment of educational incentives.

I next discuss the effect on the presence of competition among intermediaries. Suppose a modified model in which each consumer visits only one intermediary ($N = 1$). Since there is no competition among intermediaries, each intermediary promotes product $D$ if and only if $v_D - c_D + \overline{a} \geq v_T - c_T$; the inequality is satisfied when Condition (CD) holds.[32] The equilibrium in this case is $p_{Di} = v_D$, $f_{Di} = v_T - c_T$, $p_{Ti} = v_T$, $f_{Ti} = v_T - c_T$, and each intermediary $i$ promotes the deceptive product without educating consumers. Consumers' ex-post utility in this case is $-\overline{a}$, which is the *same* as in the model under multiple intermediaries.

**Proposition 3** (Welfare Effect on the Presence of Competition among Intermediaries)**.** Suppose Condition (CD) holds. Then, the ex-post utility of consumers is the same under a monopoly intermediary and under multiple intermediaries.

Proposition 3 sharply contrasts with the predictions from models of rational consumers with $v_D - c_D > 0$, where consumers get zero utility under a monopoly intermediary but get positive utility under competition among intermediaries. When consumers have misperceptions, having competition among intermediaries may not benefit consumers at all.[33] The condition for deception, however, becomes stringent as $N$ increases. Therefore, introducing competition among intermediaries in the model either makes the market transparent or does not increase consumer and social welfare.

[32] If $v_D - c_D + \overline{a} < v_T - c_T$, then the monopolistic intermediary promotes the transparent product and consumers' ex-post utility is zero.

[33] Interestingly, the effect of increasing $N$ under profitable deception is different when there are multiple deceptive firms as analyzed in Section 5. Specifically, if there are multiple deceptive firms and $v_D - c_D \leq v_T - c_T$, then an increase from $N = 1$ to $N = 2$ increases consumer welfare because an intermediary loses its monopoly power, but a further increase in $N$ *decreases* consumer welfare as long as Condition (CD) holds. See Section 5 for the detail.

### 3.4 Effects of Reputation

This subsection analyzes the effects of intermediaries' reputational concern in a reduced-form manner. As a natural extension of the model, suppose that each intermediary receives either (i) a reputational benefit $\rho \geq 0$ from educating each consumer or (ii) a reputational or dishonesty cost $\rho \geq 0$ from not educating each consumer (Bolton, Freixas and Shapiro 2012, Inderst and Ottaviani 2012c). In either case, a deceptive firm needs to give even highr commissions in order to maintain deception—the level of commissions under deception is *increasing* in the degree of reputational concern.

**Corollary 1** (Effects of Reputation)**.** (i) Suppose that intermediaries receive a reputational benefit $\rho \geq 0$ from educating each consumer. If $\min\{v_D - c_D, v_T - c_T\} + \overline{a} \geq N(v_T - c_T + \rho)$, then a deceptive equilibrium exists in which $p^*_{Ti} = v_T$, $f^*_{Ti} = v_T - c_T$, $p^*_{Di} = v_D$, $f^*_{Di} = N(v_T - c_T + \rho)$ for all $i$.

(ii) Suppose that intermediaries incur a reputational cost $\rho \geq 0$ from not educating each consumer. If $\min\{v_D - c_D, v_T - c_T\} + \overline{a} \geq N(v_T - c_T) + \rho$, then a deceptive equilibrium exists in which $p^*_{Ti} = v_T$, $f^*_{Ti} = v_T - c_T$, $p^*_{Di} = v_D$, $f^*_{Di} = N(v_T - c_T) + \rho$ for all $i$.

Note that the level of commissions for deception is higher in (i) than in (ii). This is because in either case the deceptive firm needs to compensate for the intermediaries' forgone profits of not educating consumers. Furthermore, when there are multiple deceptive firms as analyzed in Section 5, higher $\rho$ also decreases consumer welfare under deception. Though the presence of reputational concern makes deception less likely to occur, it can further distort welfare if it fails to generate market transparency.

## 4 Effects of Policies

This section discusses various policy interventions. Section 4.1 analyzes policies regulating commissions. Section 4.2 discusses direct regulations on the hidden attribute. Section 4.3 examines policies that lead consumers to reach more intermediaries. Section 4.4 discusses mandatory disclosure of commission structures.

## 4.1 Regulating Commissions

This subsection discusses regulations on commissions; Inderst (2015) provides an excellent survey on this topic. In the model, a simple intervention can eliminate deception. Suppose a policymaker caps the level of commissions. Under this regulation, intermediaries always educate consumers in order to increase market share:

**Proposition 4** (Regulating Commissions)**.** Suppose commissions are restricted to $f_{xi} < N(v_T - c_T)$ for all $x, i$. In any equilibrium, all consumers are educated about the hidden attribute, intermediaries earn zero commissions, and social welfare is maximized.

Proposition 4 shows that a direct price control on commissions in a competitive environment may increase welfare. Once the difference in commissions is restricted, intermediaries cannot get much higher commissions from deception. Hence, intermediaries would educate consumers to increase their market share. If Condition (CD) holds, then the ex-post utility of consumers increases from $-\overline{a}$ to $\min\{\max\{0, v_D - c_D\}, v_T - c_T\} \geq 0$ by the regulation. Social welfare also increases when $v_D - c_D < v_T - c_T$.

As real-world examples, the UK Financial Services Authority banned commissions in the mutual-fund industry "to address the potential for adviser remuneration to distort consumer outcomes" effective in January 2013.[34] The Australian government also banned commissions in order that "investors receive advice that is in their best interests, rather than being directed to products as a result of incentives or commissions offered to an adviser" effective in July 2013.[35] Also in many countries, doctors are not allowed to receive direct commissions from pharmaceutical companies. Proposition 4 shows that such policies can increase welfare when deception is a concern.[36]

An alternative regulation—analogous to a recent policy in the US mortgage industry—is to set a uniform commission in a market. As a prominent example before the US financial crisis, commissions to mortgage brokers were sometimes directly tied to the level of prepayment penalties, where arguably many consumers either were unaware of or underestimated when signing up a

[34] Inducements Rules and the Retail Distribution Review Adviser Charging Rules, Financial Services Authority (October 1, 2012).

[35] Future of Financial Advice 2011 Information Pack, Australian Government (April 28, 2011).

[36] Precisely, banning commissions does not necessarily predict educating consumers in the model. This is because given the regulation, intermediaries are indifferent between promoting deceptive products and promoting non-deceptive products. However, if intermediaries have a reputational concern as in Section 3.4, then—no matter how small the reputational concern is—all consumers are educated under the regulation.

contract. In 2011, "to protect mortgage borrowers from unfair, abusive, or deceptive lending practices," the Federal Reserve Board prohibited compensation to a mortgage broker based on terms or conditions of a mortgage transaction.[37] If commissions are regulated to be uniform across products in the model ($f_{Di} = f_{Ti}$), then intermediary $i$ has no incentive to conceal the hidden attribute. Note that this policy does not regulate the "level" of commissions.

As a potential advantage, regulating commissions requires less knowledge about hidden attributes than regulating the attributes directly. In order to regulate a product attribute itself, policymakers need to know which attributes are used by firms to exploit consumers. In order to regulate commissions, in contrast, policymakers do not need to identify how firms exactly exploit consumer misperceptions—they only need to know deception is an issue in a market. Though the optimal regulation on commissions in practice would depend on the nature of industries, I also provide a condition to potentially detect such deception from market data—a negative relation between commissions and product valuations—in Section 5.

One caveat regarding commission regulations is that, as Inderst and Ottaviani (2012c) and others have pointed out, such regulations may create moral-hazard problems for intermediaries. For example, commission regulations may decrease intermediaries' incentives to search for better products for each customer. However, I show in Section 5 that under deception with multiple deceptive firms, there is a negative relation between the level of commissions and the net value of products, whereas such a relation would be hard to predict under a rational moral-hazard model. Since evaluating net value of products is possible for some financial products (such as payment streams of mortgages, risk-adjusted returns of mutual funds, or coverages of insurance plans), this relation would be potentially helpful to identify markets in which deception is a major issue.

#### Effect of Regulating Commissions on Exploitative Innovations

Regulating commissions has a positive effect on another relevant issue on deception: preventing firms from inventing new consumer-exploiting technologies. Suppose that before the price-setting stage, the deceptive firm is able to engage in "exploitative innovation" with a positive innovation cost $I_a > 0$ that increases the maximum hidden payment by $\Delta a > 0$. Assume that the innovation

[37] Banking and Consumer Regulatory Policy Press Release, Federal Reserve Board on August 16, 2011: `http://www.federalreserve.gov/newsevents/press/bcreg/20100816d.htm` (accessed November 1, 2014).

is appropriable (i.e., other firms cannot copy the innovation).[38] The next corollary highlights the positive role of intermediaries when commissions are regulated:

**Corollary 2** (Exploitative Innovation)**.** Suppose Condition (CD) holds in the model. Consider an extended model in which firm D has an opportunity to increase the amount of the hidden attribute from $\overline{a}$ to $\overline{a} + \Delta a$ by paying an investment cost $I_a > 0$ prior to the price-setting stage.

(i) If there is no regulation, then firm D invests in the innovation if and only if $I_a \leq \Delta a$. Consumers' ex-post utility is $-\overline{a} - \Delta a$ if the investment takes place and is $-\overline{a}$ otherwise. Social welfare is not maximized if $v_D - c_D < v_T - c_T$ or $I_a \leq \Delta a$.

(ii) If commissions are regulated to $f_{xi} < N(v_T - c_T)$ for all $x$ and $i$, then firm D never invests in the innovation. Consumers' ex-post utility is non-negative. Social welfare is maximized.

Corollary 2 (i) shows that welfare-harming innovations can occur in the absence of regulation. Since the increase in $\overline{a}$ enables more transfer from naive consumers to a deceptive firm, the deceptive firm has a strong incentive to invent a new consumer-exploiting technology. Such an investment is a pure waste from a social perspective. Moreover, it implies a vicious cycle of deception: once the hidden attribute is large enough, deception takes place, and the profit from deception further finances the development of deception, and so forth.

In contrast, Corollary 2 (ii) shows that deceptive firms do not invest in exploitative innovations because intermediaries would educate consumers about new hidden attributes under commission regulations. Hence, intermediaries can improve welfare through their educational role under commission regulations. So long as commissions do not distort the incentive of intermediaries, policymakers may want to have intermediaries *because of* the problem of hidden attributes.

To the best of my knowledge, this is the first theoretical result of which policymakers can prevent firms from inventing unanticipated hidden attributes. Though there is a potentially huge welfare loss, this problem has not been investigated in the literature. Recently, innovations of hidden fees seem to be occurring in the credit-card, mortgage, and mutual-fund markets.[39] Corollary 2 shows a positive aspect of regulating commissions that discourages firms from inventing new hidden fees. However, intermediation does not seem to play a central role specifically in the credit-card market,

[38] Heidhues, Kőszegi and Murooka (2016) investigate innovation incentives of deceptive firms in a retail market. By focusing on the appropriability of the innovation, Heidhues et al. (2016) highlight perverse effects of innovation incentives when the up-front price of the products is binding from below.

[39] See, for examples, Bar-Gill and Bubb (2012), Bar-Gill (2009), and Anagol and Kim (2012).

and a policymaker needs some other interventions to prevent deception in the market. Hence, this kind of policy works only when intermediaries have a key educational role in a market.

### 4.2 Regulations on Hidden Attributes

This subsection discusses regulations that directly decrease the maximum amount of hidden attributes.[40] In the deceptive equilibrium, an decrease in $\overline{a}$ leads to a transfer from consumers to firms, and hence it benefits consumers. Further, such a decrease in $\overline{a}$ makes Condition (CD) less likely to hold. Once Condition (CD) is not satisfied, the market becomes non-deceptive, commissions are competed down, and welfare is improved.

In contrast to the commission regulations described in the previous subsection, a policy decreasing $\overline{a}$ is effective even when deceptive firms can give secret bribes to intermediaries. There are some potential drawbacks, however. First, it would be often difficult for a policymaker to identify how consumers are exploited. Second, even when a policymaker identifies the source of exploitation, it would be hard to directly regulate when the exploitation is coming from a misperceived quality or risk. Third, deceptive firms still have strong incentives to invent new hidden attributes that policymakers do not anticipate.

### 4.3 Enhancing Access to Intermediaries

As discussed in Section 3.2, an increase in $N$ makes deception less likely to occur. On the one hand, Proposition 1 highlights the welfare increase when the number of intermediaries increases beyond a critical threshold. On the other hand, the increase in $N$ does not affect consumer and social welfare so long as Condition (CD) holds.

It is worth mentioning that the policy increasing consumers' search intensity is robust to secret bribing and to the detailed knowledge of which attributes are hidden. However, the policy has at least one potential drawback: firms have strong incentives to invent new hidden attributes. Moreover, Section 5 and 6 show that in extended models, the increase in $N$ further harms naive consumers under deception.

[40] Although employing such regulations seem difficult in general, it may be possible in some specific cases. For example, the Credit Card Accountability, Responsibility, and Disclosure Act of 2009 limits late-payment penalties and other fees, preventing credit-card companies from charging high additional payments. See Bar-Gill and Bubb (2012) for detailed discussion, and Agarwal, Chomsisengphet, Mahoney and Stroebel (2015) for the effects of such an act.

Relatedly, regulations of disallowing exclusive dealings, as in the pharmaceutical industry, could be harmful to naive consumers because non-deceptive firms may not be able to sell their products under common agencies. As discussed in Section 7, allowing exclusive dealing in my model is beneficial to consumers when (and only when) intermediaries affiliated with a non-deceptive firm reach a fraction of consumers.

### 4.4 Mandatory Disclosure of Commission Structure

In the model, naive consumers do not infer the existence of hidden attributes from product prices or commissions. If consumers can rationally anticipate the existence of hidden attributes from observing high commissions, then mandatory disclosure of commission structures is effective to eliminate deception. As a potential advantage, this policy does not require the detailed knowledge of the hidden attributes.

Evidence suggests that, however, people often do not rationally infer how the advice of experts is distorted from observable information.[41] Daniel, Hirshleifer and Teoh (2002) extensively discuss investor credulity in financial markets. Experimental evidence provided by Cain, Loewenstein and Moore (2005) suggests that people under-infer the strategic response of intermediaries. As empirical evidence, Malmendier and Shanthikumar (2007) show that small investors are inattentive to the systematic upward bias of stock recommendations of analysts. These investors also fail to utilize information about affiliations of the analysts, even though affiliated analysts have a stronger upward bias than unaffiliated analysts.

Also, if consumers misinterpret the value of the products from observable information, then the disclosure of commission structure may not work well. For example, individual investors might naively guess that high commissions of mutual funds predict high performance, whereas Christoffersen et al. (2013) report that the high commissions actually predict future low performance. Finally, Section 6 shows that if such disclosure makes only a small fraction of naive consumers sophisticated and is not enough to eliminate deception, then the disclosure can decrease consumer and social welfare.

[41] Eyster and Rabin (2005) develop a model where a player does not rationally infer how other players' actions depend on their own situations. By applying this model, Eyster, Rabin and Vayanos (2015) analyze an asset-pricing market in which traders fail to take into account the informational content of prices.

# 5 Competition among Deceptive Firms

This section investigates a modification of the model in which there are multiple deceptive firms as well as multiple non-deceptive firms in a market.[42] I focus on identifying conditions for deceptive equilibria in which each type of firm chooses the same strategy and consumers buy deceptive products.

When there are multiple firms in each type of product, all firms earn zero profits. As summarized in Proposition 5, whether or not intermediaries earn positive profits from deception depends on the relative social surplus of the products:

**Proposition 5** (Equilibria under Competition among Deceptive Firms)**.** Suppose that there are multiple firms for each type of product.

(i) If $v_D - c_D > v_T - c_T$, then in any equilibrium all intermediaries and firms earn zero profits. Consumers' ex-post utility is positive. Social welfare is maximized.

(ii) If $v_D - c_D \leq v_T - c_T$ and Condition (CD) holds, then there exists a deceptive equilibrium in which $p^*_{Ti} = v_T, f^*_{Ti} = v_T - c_T$, $p^*_{Di} = c_D - \overline{a} + N(v_T - c_T), f^*_{Di} = N(v_T - c_T)$ for all $i$. All intermediaries earn $N(v_T - c_T) > 0$ per sale. All firms earn zero profits. Consumers' ex-post utility is $(v_D - c_D) - N(v_T - c_T) < 0$. Social welfare is not maximized if $v_D - c_D < v_T - c_T$.

Proposition 5 sharply illustrates the relation between profitable deception and selling inferior products. On the one hand, if deceptive products are superior to transparent products, then competition among deceptive firms leads them to decrease prices and commissions, and all profits from deception are passed back to the consumers. Neither firms nor intermediaries earn positive profits. Since all consumers buy deceptive products which are socially superior, social welfare is maximized. On the other hand, if deceptive products are inferior to transparent products, the same trade-off between the level of commissions and market share still arises. It is worth emphasizing that high commissions can be kept in the equilibrium even when neither intermediaries nor firms have monopoly power. Intuitively, the threat of educating consumers and promoting non-deceptive products prevents deceptive firms from decreasing commissions.[43]

[42] The analysis does not change when there are multiple deceptive firms and one non-deceptive firm.

[43] Note also that the equilibrium outcome in Proposition 5 (ii) is sustained even when consumers can observe a non-promoted product and can ask an intermediary to deliver it. Specifically, consumers never ask intermediaries to deliver product $T$ if their perceived utility from product $D$ is higher, i.e., $v_D - c_D + \overline{a} - N(v_T - c_T) \geq v_T - c_T$. Also, no deceptive firm can profitably deviate by setting a commission lower than $N(v_T - c_T)$ because then intermediaries would promote transparent products with educating consumers.

Some empirical studies suggest a link between profitable deception and selling inferior products. In the mutual-fund industry, Gil-Bazo and Ruiz-Verdú (2009) report that mutual funds charging higher fees have worse before-fee risk-adjusted performance—product prices *negatively* reflect their valuations. Also, Del Guercio and Reuter (2014) find that actively-managed mutual funds which are recommended by financial advisors significantly underperform alternative options such as index funds.

The consumers' ex-post utility in Proposition 5 (ii) is negative but larger than that in Proposition 1 (i). Competition among deceptive firms increases naive consumer's ex-post utility, though the utility is still negative under profitable deception.

Furthermore, Proposition 5 (ii) provides a potentially testable condition to detect such deception from market data. Note that the net valuation of the deceptive product is $v_D - p^*_{Di} - \overline{a} = v_D - c_D - f^*_{Di}$, where $f^*_{Di}$ is a commission to maintain deception. In contrast to a standard agency model where agents with higher fees typically bring higher benefits to consumers, the net valuation is decreasing in commissions under non-education.[44] This is because under competition among deceptive firms, the cost of commissions for deception is directly passed on to consumers:

**Corollary 3** (Relation between the Level of Commissions and Net Valuation)**.** In Proposition 5 (ii), the level of commissions is negatively correlated with the net valuation of products.

Corollary 3 is consistent with recent empirical studies. In the Indian life-insurance industry, Anagol et al. (2017) report that strictly-dominated insurance plans sold by salespeople are often associated with higher commissions. In the US mutual-fund industry, Christoffersen et al. (2013) find that a higher commission predicts a future poorer net performance. Since there is a potential to measure net valuations for some other financial products (such as payment streams of mortgages), Corollary 3 could be helpful to identify markets in which deception is a major issue.[45]

[44] Formally, under non-education, an increase of $v_T - c_T$ or $N$ raises $f^*_{Di} = N(v_T - c_T)$. Under multiple deceptive firms, this increase also lowers the equilibrium net valuation of the deceptive product. Hence, a negative relation between the commission and the net value can arise. Note that the net valuation is constant across commissions in the model with one deceptive firm; the difference comes from whether some firm has monopoly power for exploiting consumers or not.

[45] A premise for the identification is that the net valuation of products is identical to consumers' ex-post utility. In general, it is possible that consumers are rational but receive some non-monetary benefit from high-commission intermediaries. However, since the main objective of purchasing a mutual fund is to receive its future return and since the predicted loss of future fund performance in Christoffersen et al. (2013) is substantial, it is hard to imagine that consumers rationally choose such high-commission funds.

## 6 Heterogenous Consumers

This section analyzes markets with consumer heterogeneity in naivete. Suppose that there is competition among each type of firm as in Section 5. Assume that a fraction $\sigma \in (0,1)$ of consumers are informed as defined in Section 3.1: they know which products have the hidden attributes. The remaining fraction $1-\sigma$ of consumers are naive. I first analyze a model in which each intermediary can offer only one product at a time, and then discuss models in which each intermediary can offer multiple products to all consumers at a time. In what follows, I assume that $v_D - c_D \leq v_T - c_T$.[46]

**Single-Product Offer**

Suppose each intermediary can offer only one product and no consumer can buy a product that is not offered by intermediaries. This single-product dealing can be regarded as a case in which firms cannot screen consumers. In a retail market, Gabaix and Laibson (2006) consider such a setting in which each firm can sell only one type of product, and hence no firm can screen between naive and sophisticated consumers ex-ante.

In this case, a candidate of a profitable deceptive equilibrium is $p^*_{Ti} = v_T$, $f^*_{Ti} = v_T - c_T$, $p^*_{Di} = c_D - \overline{a} + \frac{N}{1-\sigma}(v_T - c_T)$, $f^*_{Di} = \frac{N}{1-\sigma}(v_T - c_T)$. Informed consumers do not buy the product because all intermediaries sell only deceptive products that yield negative ex-post utility. Such a deceptive equilibrium exists if the following condition holds:

$$\min\{v_D - c_D, 0\} + \overline{a} \geq \frac{N}{1-\sigma}(v_T - c_T). \tag{1}$$

Naive consumers' ex-post utility is $(v_D - c_D) - N(v_T - c_T)/(1-\sigma) < 0$, which is *decreasing* in the fraction of informed consumers through the increase in commissions. This effect might look close to the cross-subsidization effect in Gabaix and Laibson (2006), but here the effect arises even though informed consumers do not buy any product and hence do not get any benefit from the payments of naive consumers. The welfare effect of increasing informed consumers for naive consumers is non-monotonic, and is discontinuous at the threshold value at which Condition (1) holds with equality. Further, conditional on deception, consumer welfare is $(1-\sigma)(v_D - c_D) - N(v_T - c_T)$ and social welfare is $(1-\sigma)(v_D - c_D)$; both are increasing in $\sigma$ if and only if the

[46] If instead a deceptive product is superior, there exists an equilibrium as the same equilibrium outcome with Proposition 5 (i) in each of the following cases, and both naive and informed consumers buy deceptive products in the equilibrium.

deceptive product is socially wasteful. Intuitively, since the total amount of commissions to maintain deception in the market is independent of $\sigma$, only the fraction of consumers who take up deceptive products determine consumer and social welfare. These results imply that educational policies aimed at making consumers sophisticated to the hidden attributes can have a non-monotonic effect on welfare.[47]

### Multi-Product Offer

Next, suppose that each intermediary can offer multiple products at a time. This multi-product dealing can be regarded as a menu contract or a multi-product marketing; Heidhues et al. (2017) analyze such a setting in a retail market. In any of the following cases, competition leads that informed consumers buy a superior non-deceptive product at $(p^*_{Ti}, f^*_{Ti}) = (c_T, 0)$. I discuss how other equilibrium outcomes depend on what extent intermediaries can hide information to naive consumers; the formal analysis is provided in the Supplementary Material.

First, I discuss a model in which each intermediary can conceal both the existence of superior non-deceptive products and the hidden attributes of deceptive products from naive consumers. In this case, intermediaries can screen consumers at no cost. As in Proposition 5 (ii), naive consumers buy inferior deceptive products with $(p^*_{Di}, f^*_{Di}) = (c_D - \overline{a} + N(v_D - c_D), N(v_D - c_D))$ which are advertised by intermediaries. Informed consumers buy superior non-deceptive products which are available but are not advertised by the intermediaries. Intuitively, if naive consumers cannot buy products without the help of experts while informed consumers can find and buy any product, then their markets are segregated. This result delivers a practical implication: sophisticated and naive consumers buy products at different markets or prices. Indeed, in the mutual-fund industry, some consumers buy index funds through intermediaries with paying more than 1 percent fees, whereas other consumers directly buy funds using the same index with around 0.1 percent fees. Bergstresser, Chalmers and Tufano (2009) report that broker-sold funds attain lower risk-adjusted returns than direct-sold funds do. Hackethal, Haliassos and Jappelli (2012) and Del Guercio and Reuter (2014) also find that consumers who buy products through financial advisors are worse off than those who buy products directly because of commissions and operational costs.

[47] Kosfeld and Schüwer (2017) investigate a similar welfare effect of increasing sophisticated consumers. In their model, however, welfare losses come from the effort cost of educated consumers to avoid an add-on instead of socially wastefulness of products. See also Grubb (2015) for a perverse welfare effect of disclosure policy when firms screen consumers according to their tastes.

Second, I discuss a case where naive consumers observe superior non-deceptive products and intermediaries cannot conceal these products. Consider a model in which each intermediary shows all promoted products to all consumers. In this case, if an intermediary educates, then all naive consumers buy the same product as informed consumers buy. Hence, if intermediaries earn zero *gross* profits from informed consumers, then commissions for deception are competed down to zero. Though naive consumers still buy inferior deceptive products and there are consumer and social welfare losses due to deception, these naive consumers at least do not suffer from high commissions. This result could help explain, for example, why online search-engine companies such as Orbitz and Expedia sometimes put additional surcharges at non-salient places, although they do not seem to get high commissions from product providers.

However, high commissions for maintaining deception still arise when intermediaries can earn positive *gross* profits from selling non-deceptive products due to the presence of fixed costs, positive market power, or reputational concerns. To describe it in a simple manner, suppose as in Section 3.4 that intermediaries receive a reputational benefit $\rho \geq 0$ from educating each naive consumer. In this case, there exists a deceptive equilibrium in which naive consumers buy deceptive products with $(p^*_{Di}, f^*_{Di}) = (c_D - \overline{a} + N\rho, N\rho)$ if the following condition holds:

$$\min\{v_D - c_D, 0\} + \overline{a} \geq (v_T - c_T) + N\rho.$$

Intuitively, when intermediaries earn positive gross profits from selling non-deceptive products, deceptive firms need to give a sufficient amount of "bribes" to intermediaries in order to prevent education. In sum, while the presence of informed consumers and observability of superior non-deceptive products improve naive consumers' welfare, the main logic and welfare effects still hold as long as intermediaries earn positive gross profits from their sales.

# 7 Further Extensions and Modifications

This section summarizes further extensions and modifications of the model. I discuss in turn a model incorporating (i) positive costs of educating consumers about hidden attributes, (ii) heterogeneity in consumers' search intensity, (iii) heterogenous bargaining power between firms and intermediaries, (iv) the possibility of vertical integration, and (v) the possibility that intermediaries can directly charge advising fees or give perks to consumers.

### Costly Education

To investigate the educational incentive of intermediaries in a clear manner, I have assumed that expert intermediaries can modify consumer misperceptions at no cost. In practice, however, educating consumers can be costly even for experts. In the Supplementary Material, I investigate an extended model in which intermediaries incur a cost $\eta \geq 0$ per customer when they choose to educate. I show that if the deceptive equilibrium exists in the original model (i.e., the case of $\eta = 0$), then it becomes a *unique* equilibrium in a model with any positive $\eta$. Intuitively, if some intermediary educates consumers, then other intermediaries have an incentive to free-ride because the education is costly. But then the deceptive firm would give the educating intermediary a high commission to maintain deception, and doing so is always profitable when a deceptive equilibrium exists in the case of $\eta = 0$.

In the extended model, each intermediary earns a commission $N(v_T - c_T - \eta)$ per sale from the deceptive firm. Notice that as education becomes less costly ($\eta$ becomes smaller), intermediaries earn higher commissions from deception. It indicates an additional perverse effect on their educational role: intermediaries with more expertise earn higher commissions not because they help consumers more but because the deceptive firm gives higher commissions to maintain deception.

### Heterogeneity in Consumers' Search Intensity

In the model, the number of intermediaries each consumer visits, $N$, is the same across consumers. Here I consider a model incorporating heterogeneity in consumers' search intensity. Let $(t_1, \cdots, t_J)$ denote the type space of consumers with associated probability distribution $(q_1, \cdots, q_J)$. Suppose consumers with type $t_s$ visit $s$ number of intermediaries randomly. Then, each intermediary has measure $(s/J)q_s$ of type-$t_s$ consumers.

Let $\tilde{N} = \sum_{s=1}^{J} sq_s$. If $q_1 = 0$ and Condition (CD) holds with $N = \tilde{N}$, then there exists a deceptive equilibrium in which intermediaries earn positive profits. This equilibrium outcomes are the same as in Proposition 1. Intuitively, so long as intermediaries do not have monopoly power ($q_1 = 0$), then only the expected increase of market share from educating consumers matters in the deceptive equilibrium. If $q_1 > 0$, however, commissions in the non-deceptive equilibrium are also positive because each intermediary has monopoly power.

### Bargaining Power between Firms and Intermediaries

In the model, I analyzed a particular situation in which firms have bargaining power relative to intermediaries in the sense that firms are residual claimants of profits. The main results of this paper, however, are robust to heterogenous bargaining power between firms and intermediaries. To see it in a simple manner, consider a variant of the model in Section 2 where each intermediary receives a share $\alpha \in (0, 1)$ of a firm's profits (net of commissions) $\pi_i^*$ as well as its commission. If Condition (CD) holds, firm $D$ can maintain deception by setting $f_i^* = \max\{N(v_T - c_T) - \alpha\pi_D^*, 0\}$, i.e., firm $D$ passes its total profits to each intermediary at least $N(v_T - c_T)$. This highlights that irrespective to the bargaining power, firm $D$ has a strong incentive to give a sufficient amount of profits to each intermediary to maintain deception.

### Vertical Integration

So far, I have assumed that firms and intermediaries are not vertically integrated. Indeed, all results are robust to allowing various kinds of such possibilities. First, note that if Condition (CD) holds, then the non-deceptive firm cannot profitably vertically integrate with an intermediary. This is because the firm has to pay more than its social surplus to buy out an intermediary. Second, if the non-deceptive firm and some intermediary are vertically integrated or form an exclusive-dealing contract a priori, then the deceptive firm has a strong incentive to buy out such an integrated intermediary. Third, if Condition (CD) holds, then the deceptive firm has an incentive to commit to disallow intermediaries from buying out products and setting prices by themselves (i.e., imposing retail price maintenance). This is because without such a commitment, the market becomes essentially equivalent to retail markets analyzed in Section 3.1, and all profits from deception are competed away. Hence, the deceptive firm does not want intermediaries to set their own product prices. As examples, financial advisors and mortgage brokers are typically not allowed to change product prices (e.g., management fees and interest rates) by themselves.[48]

Going slightly beyond the model, a caveat is that a non-deceptive firm has an incentive to train own in-house intermediaries to educate consumers. This practice is essentially equivalent to direct marketing with education. If the cost of developing such in-house intermediaries is small, then

[48] In contrast, front-load commissions are sometimes discounted by financial advisors. See the next extension where intermediaries can charge advising fees or give perks to customers directly.

consumers would be educated. In some industries, however, this kind of practice is either quite costly or prohibited. For example, doctors cannot sign prescription agreements with any company.

### Competition on Advising Fees or Perks

So far, I have assumed that intermediaries cannot charge advising fees or give additional rebates to consumers directly. On the one hand, as described in Inderst and Ottaviani (2012a, 2012b), direct payments for advice are not prevalent in financial services. Moreover, policy regulations sometimes prevent intermediaries from charging direct advising fees or giving perks to their customers. For example, many US states prohibit life-insurance agents to charge broker fees.[49] On the other hand, intermediaries seem to be able to set direct advising fees in some other industries.

Here I discuss how equilibrium outcomes change if intermediaries can charge direct advising fees or directly pass their profits to consumers. Suppose that intermediaries can charge and announce their advising fees to consumers after they choose which product to promote but before consumers visit them. Consumers observe these advising fees (without knowing about product attributes nor prices) and then choose $N$ intermediaries to visit simultaneously.

Suppose first that intermediaries can set only non-negative advising fees. That is, advisors can charge fees for advice but cannot give additional rewards or perks to their customers. In this case, intermediaries compete down their advising fees to zero in order to attract profitable naive consumers. Hence, none of this paper's results changes.[50]

Suppose next that intermediaries can hand out their profits to consumers by setting negative advising fees (i.e., giving perks) upon purchase. In this case, intermediaries pass their profits to consumers through their perks. Although no intermediary earns positive profits in equilibrium, deception through high commissions still occurs. Intuitively, intermediaries are able to give a larger perk by promoting a deceptive product because they can receive higher commissions financed by deception, and naive consumers only visit intermediaries who give the largest perks. While the profits from deception are handed out to naive consumers, the deceptive firm still pays high

[49] See, for example, California Department of Insurance Bulletin No. 80-6.

[50] Inderst and Ottaviani (2012c) also investigate a model with zero price floor. In practice, intermediaries may not be able to profitably set negative advising fees if the negative fees attract not only customers but also "arbitrageurs" who are only interested in perks and can avoid additional fees or harmful qualities because they do not use the product itself (Ellison 2005, Heidhues, Kőszegi and Murooka 2012). Furthermore, if intermediaries give perks to consumers, then some of the consumers might become suspicious—they would think there is a catch—and try to understand how firms and intermediaries can make profits from such perks.

commissions to intermediaries and naive consumers may make suboptimal purchase decisions.

As a related issue, in the US mutual-fund industry there are fee-only advisors who do not receive any commission but charge only direct advising fees to customers. Consider a modified model in which a fraction of intermediaries accept no commissions; the remaining fraction of intermediaries receive commissions and maximize profits. Assume that a deceptive firm cannot buy out such no-commission intermediaries; otherwise, the deceptive firm would vertically integrate. Assume also that intermediaries cannot set direct advising fees and consumers visit $N$ intermediaries randomly; if naive consumers choose which intermediaries to visit based on the level of advising fees, then they have no incentive to visit no-commission intermediaries as discussed in the previous paragraph. For simplicity, assume that such no-commission intermediaries always educate consumers and promote non-deceptive products. In such a model, if a fraction of consumers who reach some no-commission intermediary are small, then profit-maximizing intermediaries still choose to not educate consumers about the hidden attribute. Intuitively, when most consumers are uneducated by no-commission intermediaries, the profit-maximizing intermediaries just earn profits from the remaining uneducated consumers.[51] On the other hand, if a sufficient number of consumers reach some no-commission intermediary, then profit-maximizing intermediaries also choose to educate.

# 8 Related Theoretical Literature

This section summarizes theoretical literatures closely related to this paper. As mentioned in the previous sections, the occurrence of deception itself may not be very surprising based on the literatures. But beyond the existing theories, this paper (i) shows how intermediaries can earn high commissions by employing deception despite competition, (ii) identifies perverse welfare effects on the educational role of intermediaries under deception, (iii) sheds light on new positive aspects of commission regulations, and (iv) provides a condition to detect deception from market data.

This paper is most closely related to a growing literature analyzing markets with intermediaries under consumer naivete. Stoughton, Wu and Zechner (2011) investigate a model with a monopolistic financial intermediary and show that commissions are used either for price discrimination across individual wealth levels or for socially-inefficient marketing, depending on the degree of investor

[51] Indeed, in the US mutual-fund industry, the market share of the fee-only advisors is small. There are about 200,000 personal financial advisors in total, whereas members of fee-only personal financial advisors (NAPFA) are about 2,500.

naivete. Bolton et al. (2012) analyze competition among credit-rating agencies with credulous investors who always take the ratings at face value. Because firms want to disclose only the most favorable rating to attract credulous investors, the presence of multiple (truth-telling) credit-rating agencies facilitates ratings shopping of the firms and distorts social welfare. Inderst and Ottaviani (2012c) analyze a market with a monopolistic intermediary and horizontally-differentiated firms. The authors show that when consumers are naive, the intermediary charges no direct advising fees to consumers but earns high commissions provided by firms, which leads to biased advice to the consumers.

This paper, as well as the papers summarized in the previous paragraph, builds on the theoretical literature investigating the effects of consumer naivete.[52] Specifically, this paper assumes that consumers have misperceptions about certain product attributes but experts can educate them. Gabaix and Laibson (2006) develop a model of such "educable" naivete in a retail market. In their model, each firm sells a base product and an add-on. Naive consumers are initially inattentive to the prices of add-ons, but each firm can choose whether or not to inform the consumers about the prices of the add-ons. Because naive consumers can substitute away from add-ons once informed, such information disclosure can decrease the demand for add-ons and may not be profitable for firms even under competition.[53] Building upon this insight, Heidhues et al. (2017) investigate retail markets with a floor on a base-product price, analyze a screening problem between sophisticated and naive consumers by offering multiple products, and identify the role of socially-inferior products for maintaining profitable deception.

This paper also belongs to the literature analyzing the role of intermediaries as information providers.[54] Lizzeri (1999) investigates an information-disclosure problem under a monopolistic intermediary. He also shows that competition among intermediaries can lead to full information disclosure. Inderst and Ottaviani (2009) analyze how the quality of advice can be distorted from

[52] See, for instance, DellaVigna and Malmendier (2004), Eliaz and Spiegler (2006, 2008), Spiegler (2006a, 2006b), Carlin (2009), Grubb (2009, 2015), Heidhues and Kőszegi (2010), Piccione and Spiegler (2012), Inderst and Ottaviani (2013), and Gabaix, Laibson, Li, Li, Resnick and de Vries (2016). Relatedly, Gennaioli, Shleifer and Vishny (2015) analyze a retail fund market where investors perceive the variance of a risky asset smaller as they trust a fund manager more. The distribution of trust in the market makes the managers horizontally-differentiated and enables them to charge a fee above their marginal cost. They predict that the existence of such managers increases consumer welfare because the investors originally under-invest. In contrast, I predict negative relation between the level of commissions and consumer welfare under deception as in Corollary 3.

[53] See also Carlin (2009), Miao (2010), Carlin and Manso (2011), Armstrong and Vickers (2012), Dahremöller (2013), Li, Peitz and Zhao (2014), Warren and Wood (2014), Kosfeld and Schüwer (2017), Johnen (2014), and Herweg and Rosato (2018) for pricing and consumer education in retail markets.

[54] See Gorton and Winton (2003), Dranove and Jin (2010), and Inderst and Ottaviani (2012b) for review.

the socially optimal level when a monopolistic intermediary pays a private cost to find a potential customer. Inderst and Ottaviani (2012a) investigate a market with a monopolistic intermediary and horizontally-differentiated product providers. The authors show that the mandatory disclosure of commission levels can distort the efficient provision of the products when there is a cost asymmetry between firms. This is because the market share of a cost-efficient firm is below the social optimum before the commission disclosure, and the disclosure further reduces the equilibrium product supply of the cost-efficient firm.

# 9 Concluding Remarks

This paper analyzes the educational incentive of intermediaries when consumers misperceive product attributes. I show that when firms can give sufficiently high commissions financed by the misperceived attributes, intermediaries do not educate consumers even when they are competing for consumers. Because consumers ultimately incur the cost of commissions, having expert intermediaries who have an ability to educate consumers further lowers consumer welfare. When there is an appropriate regulation and commissions do not distort the incentive of intermediaries, however, such expert intermediaries can work for the consumers.

In what follows, I illustrate several questions raised by, but beyond the scope of, this paper. First, except for an extension in Section 7, I focus on the case where expert intermediaries can costlessly modify consumers' misperceptions. While this assumption is useful to analyze the educational role of intermediaries in a clear manner, education costs can be non-negligible even when consumers directly consult with experts. Indeed, several studies report that just providing unbiased information is sometimes not enough to modify consumer misperceptions.[55] On the other hand, studies by Anagol et al. (2017), Stango and Zinman (2014), and Allcott and Taubinsky (2015) show that consumers are responsive to provided information. How firms or policymakers can effectively educate naive consumers is an important topic for future research.

Second, consumers may learn about product attributes after incurring hidden costs. They may

[55] Beshears, Choi, Laibson and Madrian (2011) conduct a lab experiment on fund purchase and report that a non-negligible fraction of consumers do not take up the lowest-cost fund even when they receive all relevant information. Choi, Laibson and Madrian (2011) conduct a field experiment in which employees randomly receive either an informational survey explaining about suboptimal choices in their retirement plans or a non-informational survey. The authors find that the change of the employees' contribution rates in their retirement plans through completing the informational survey is statistically insignificant. Bhattacharya, Hackethal, Kaesler, Loos and Meyer (2012) report that mere availability of unbiased advice is not sufficient for most consumers to make the best decision.

also learn from neighbors about hidden attributes. It seems that, however, merely having the opportunity of repeated sales may not be enough to eliminate deception in an emerging market.[56] Moreover, if a sufficient number of new consumers enter the market in each period, then deception would be sustained in every period to exploit these new consumers. A general analysis of learning and market dynamics under consumer naivete is an interesting topic.

Finally, consumers' search intensity, $N$, is exogenously given in this paper. All results would remain the same if consumers' visiting costs are zero for first $N$ intermediaries and are positive after visiting $N$ intermediaries.[57] If instead consumers incur a positive cost per visit, then all consumers would visit only one intermediary as shown in Diamond (1971). Developing a tractable endogenous consumer-search model under naivete, as well as investigating why and how naive consumers search for advice in financial markets, is left for future research.

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[56] To see it, suppose that the market described in Section 2 is repeated twice and no party enters in the second period. Assume that after the first period, all consumers become informed due to an exogenous learning force. In this case, competition among intermediaries drives down commissions to zero in the second period. Given this, the trade-off between the level of commissions and market share in the first period does not change, and the deceptive equilibrium exists in the first period if Condition (CD) holds.

[57] In a sequential consumer-search model, it is often assumed that a fraction of consumers can visit multiple shops at no cost. See, for example, Stahl (1989).

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