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***Symposium on Credence Goods***



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# Symposium on Credence Goods

*Editorial Preface*

by

Winand Emons, Rudolf Kerschbamer, and Gerd Muehlheusser*

## 1 Introduction

In this introduction to the symposium, we first briefly recall the nature of credence goods, the informational asymmetries involved, and the resulting incentives for experts to behave opportunistically (section 2). We then provide a brief outline of some seminal modeling frameworks that have been used as workhorse models in the subsequent literature, including this symposium (section 3). Finally, we briefly introduce the six contributions to the symposium (section 4) and conclude (section 5).

## 2 The Nature of Credence Goods, Information Asymmetries, and Ensuing Incentive Issues

The key property of credence goods or expert services is that sellers are better informed than their customers on the type of good or service that fits the customers' needs best. Consider the example of a car repair: The car owner realizes that the vehicle does not start. She brings the car to the next garage, and the mechanic makes a diagnosis. The mechanic tells the car owner that the generator is broken and needs replacement. As a laywoman the car owner cannot tell whether this diagnosis is correct – from her viewpoint it could well be that the replacement of a fuse would do the job. What can she do? She can trust the mechanic and let him perform the repair. Alternatively, she can visit the next mechanic and ask for a second opinion.

Visiting a second garage is expensive. Therefore, assume that the car owner accepts the first mechanic's recommendation and authorizes the repair. When she picks up the car, she can verify whether the car works, but she might be unable to

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observe which kind of repair has been performed. The bill says the generator has been replaced – but it could well be that the mechanic only changed a fuse.

Two kinds of informational asymmetries are involved in this story. First, the mechanic is better informed than the owner about the repair needed to bring the vehicle back on the road. This informational asymmetry (regarding the question whether a given product or service is suitable for the specific needs of the customer) is the defining characteristic of a credence good.[1] The second informational asymmetry is that the car owner cannot observe and verify which repair has actually been performed. This is a secondary characteristic of a credence good, which may additionally be present.

Important examples of credence goods are medical or dental services, where the doctor or dentist is better informed about the appropriate treatment than the patient (Lu, 2014; Das et al., 2016; Gottschalk, Mimra, and Waibel, 2020); financial or insurance advice, where the adviser typically knows better than the customer which product fits to the needs of the latter (Mullainathan, Noeth, and Schoar, 2012; Anagol, Cole, and Sarkar, 2017); legal services where the attorney knows how to proceed with a case (Dana and Spier, 1993; Emons, 2000); computer repair and car repair services, where the expert is better informed about the appropriate repair than the client (Schneider, 2012; Kerschbamer, Neururer, and Sutter, 2016; Bindra et al., 2021); and taxi rides in an unknown city, where the driver is better informed about the shortest route to the destination than the passenger (Balafoutas et al., 2013; Balafoutas, Kerschbamer, and Sutter, 2017).

The informational asymmetries in markets for credence goods open the door for opportunistic expert behavior. Two types of fraud have attracted much attention in the literature. First, the provision of an inefficient repair: the mechanic might replace more parts than are actually necessary to bring the car back on the road. This case is referred to as overprovision, overtreatment, or supplier-induced demand. Overprovision is inefficient because the additional benefit to the car owner when she receives a new generator when only a new fuse is needed is less than the additional costs. The repair might also be insufficient – thus, leaving the car owner with a bill and a car that still does not work properly. This case is termed underprovision or undertreatment. Underprovision is also inefficient since there is a cost but no benefit.[2] As for the second type of fraud, for a given repair the mechanic might charge for more than he has actually provided: he charges for the generator although he has only changed a fuse. Such behavior is referred to as overcharging.

[1] There is a second strand of literature that also uses the term *credence good* but defines that good differently – namely as a good that has unobservable attributes that remain undetected even after consumption. Here the asymmetric information regards the characteristic of the good itself. Balafoutas and Kerschbamer (2020) call this second kind of credence good a *label credence good*. This symposium is about *expert credence goods*.

[2] Under- and overprovision are only well defined in a vertically differentiated market. In a horizontally differentiated market we speak of misprovision when the product provided does not fit to the needs of the customer; see, e.g., Inderst and Ottaviani (2012) and Emons and Lenhard (2022).

In the short run, overcharging is a pure transfer from the customer to the expert. In the long run, overcharging might also lead to inefficiencies if the fear of getting overcharged induces consumers to search for multiple opinions, to procrastinate repairs, or to leave the market altogether.

## 3 *Workhorse Models of Credence Goods Markets*

In the following, we briefly discuss four modeling frameworks (Dulleck and Kerschbamer, 2006; Wolinsky, 1993; Sülzle and Wambach, 2005; Fong, 2005) that have become workhorse models in the theoretical analysis of credence goods markets.

Dulleck and Kerschbamer (2006, henceforth DK) show that the market mechanism generates the honest and efficient outcome provided that a small set of organizing assumptions is satisfied. Turning off one or two of these assumptions immediately results in inefficiencies. Since several contributions to this symposium are based on DK, let us shortly introduce their framework. Each consumer faces a problem, which is either minor or major. The consumer does not know from which problem she suffers. An expert is able to identify the nature of the problem by performing a diagnosis. He can then recommend and provide either a minor or a major repair. The minor repair is less costly but it only solves the minor problem; the costlier major repair solves both kinds of problems.[3] A successful repair generates utility that is independent of the severity of the original problem.

DK identify three conditions, which together eliminate the incentives for expert dishonesty:

(i) consumer homogeneity in the expected cost of solving the problem and in the valuation for a successful repair;
(ii) commitment on both sides of the market (the consumer is committed to accept the repair recommended by the expert once she has received a recommendation, and the expert is committed to provide a repair at the price he has posted ex ante for the service even if the price does not cover the cost);
(iii) either liability or verifiability. Liability means that the mechanic cannot return a car that does not work – or more neutrally framed that the expert cannot provide the minor repair to a customer who suffers from the major problem. Verifiability means that consumers can observe and verify ex post the repair that has been provided by the seller (without knowing, however, whether this repair was appropriate) – as a consequence, the expert cannot provide the minor repair and charge for the major repair.

Liability eliminates the underprovision problem per definition. It has, however, no direct impact on the other two problems of overprovision and overcharging. DK show that under liability, but without verifiability, the prices of the two repairs

[3] Experts only incur marginal costs and have no capacity constraints. For an analysis of experts with limited capacity, see Emons (1997, 2001, 2013).

converge to a uniform price: If the car owner observes whether the problem has been solved – but cannot tell how it was fixed – the mechanic has an incentive to charge for the replacement of the generator even if he only replaced the fuse. The owner anticipates that she will always pay for the new generator and never for the fuse alone. When deciding whether to interact with the garage, she will therefore only look at the price for the generator – ignoring the price of the fuse. Expert sellers anticipate that they cannot fool their customers. Therefore, they post a single price for both repairs. Under such a uniform price the expert has neither an incentive to change the generator when only the fuse is needed (he has higher costs without getting a higher price) nor an incentive to charge for a new generator when only the fuse has been replaced (because the prices for the two services are the same).

Without liability the market still solves the fraudulent expert problem if verifiability holds – that is, if the car owner can verify which repair has been provided. Under verifiability (but without liability) the overcharging problem is eliminated more or less by definition – but the problems of under- and overprovision are not directly addressed. The market will solve those problems by equal markup prices: provided that the mechanic's profit is the same for the minor and the major repair, he has neither an incentive to replace the generator if the car needs only a new fuse nor an incentive to replace the fuse if the car needs a new generator – the expert is indifferent as to the repair he recommends.

Turning off at least one of the assumptions results in inefficiencies identified in the earlier literature on credence goods. For future reference we describe here the inefficiency of the second-opinion equilibrium first derived by Wolinsky (1993). In the binary framework Wolinsky's second-opinion equilibrium emerges (i) if experts compete, (ii) if liability condition holds, while the verifiability and commitment conditions are violated, and (iii) if prices are regulated such that major repairs have higher prices than minor repairs.[4] The price difference implies that experts have an incentive to recommend the major repair to customers who suffer only from the minor problem, because if accepted they can provide the minor repair and charge for the major one. There is no incentive for misreporting for the major problem as liability prevents experts from providing the minor repair and providing the major repair at the price of the minor repair is not a profitable strategy either. Accordingly, there is an overcharging incentive, but no incentive to over- or underprovide. DK show that in this constellation there is a mixed-strategy configuration in which experts overcharge with strictly positive probability and consumers search for a second opinion with strictly positive probability. In equilibrium the extent of overcharging fraud is just sufficient to make consumers indifferent between accepting a major recommendation for sure (this option solves the problem at the price for the major repair) and seeking for a second opinion (this option causes additional search

[4] DK show that with flexible prices the most natural equilibrium in this context is a specialization equilibrium in which some garages specialize in the minor repair (by posting an unacceptable high price for the major repair) while others specialize in the major repair.

costs but yields the price for the minor repair with some probability). Customers seek second opinions sufficiently vigorously to make an expert who identifies a minor problem indifferent between honestly recommending the minor repair (yielding a small profit for sure) and dishonestly recommending the major one (yielding a higher profit only if the customer accepts).

Sülzle and Wambach (2005) show that (under some conditions) there are actually two symmetric mixed-strategy equilibria with overcharging experts. In one equilibrium, the level of fraud is relatively low, i.e., experts recommend major repairs to consumers with minor problems with low probability and few customers seek second opinions. In this equilibrium customers on their first visit do not reject major recommendations all the time (but only with positive probability), because the current diagnosis is likely to be correct anyway. In the second equilibrium, the level of fraud is high and many customers seek second opinions. In this equilibrium first-time customers do not reject major recommendations all the time because the next expert is likely to be dishonest too.[5]

In Fong (2005) consumers' valuation for a successful repair depends on the severity of the problem, while it is independent of the severity of the problem in the papers discussed so far. Moreover, the expert is a monopolist while several experts compete in the second-opinion literature. Finally, prices are flexible in Fong (2005) while they are regulated in the literature on second opinions. For the rest the models are rather similar. For the case where a monopolistic expert provides repairs under liability but without verifiability the model of DK predicts that the expert posts a uniform price equal to the expected valuation of the customer for a successful repair and recommends honestly. This solution maximizes the gains from trade, and the expert appropriates the surplus. In Fong (2005) this solution is infeasible due to two assumptions: first, the expected valuation of the customer for a successful repair is lower than the cost of providing the major repair (implying that a uniform price equal to the expected efficiency gain does not cover the cost of the major repair); and second, the expert cannot commit ex ante to provide a repair at a price below cost.

Fong (2005) shows that with homogeneous consumers the expert posts two prices – a higher one for the major repair and a lower one for the minor repair – and still recommends honestly despite the incentive of always recommending the major repair. In equilibrium the expert does not recommend the major repair to a customer who has the minor problem because minor recommendations are always accepted while major recommendations are often rejected (as in the second-opinion literature described earlier). Again, in equilibrium the rejection probability sets the expert facing a customer in need of the minor repair indifferent between recommending the minor and recommending the major repair. In the second-opinion equilibria characterized by DK, Sülzle and Wambach (2005), and Mimra, Rasch,

[5] Mimra, Rasch, and Waibel (2016) analyze the same equilibria as Sülzle and Wambach (2005) the only exception being that verifiability is imposed on top of liability. As a consequence, fraud comes in the form of overtreatment in this contribution instead of coming in the form of overcharging.

and Waibel (2016) consumers are indifferent between acceptance and rejection of major recommendations because of the experts' fraudulent recommendations. By contrast, in Fong (2005) consumers are indifferent (despite knowing that the recommendation is truthful) because the price of the major repair is so high that it leaves zero surplus to a customer who has the major problem. Although fraud does not occur in equilibrium, the outcome is inefficient because major problems are often left unrepaired to discipline the expert's overcharging incentive.

In addition to the homogeneous consumer case, Fong (2005) also investigates a model in which a fraction of the consumers suffers a high loss from an unrepaired major problem, while the rest suffers a small loss. Under the assumptions that consumer types are identifiable by the expert and that the expert cannot price-discriminate, it is shown that cheating arises in equilibrium if the fraction of high-valuation consumers is small enough. When the expert cheats, she cheats only high-valuation consumers. The intuition is that with a single price vector, the expert can implement the no-cheating result discussed in the previous paragraph for a single customer group only. If the fraction of low-loss consumers is large, the expert tailors the no-cheating tariff to the needs of the low-loss consumers. This implies that the high-loss consumers get a rent if they are treated honestly. But with a positive rent, they have a strict incentive to accept – and if they always accept, the expert has a strict incentive to cheat. So high-loss consumers must be kept indifferent between accepting and rejecting a major recommendation, and in order to guarantee this indifference the expert has to be dishonest to high-loss consumers suffering from the minor problem sufficiently often.

## 4 *Symposium Contributions*

In this symposium, we are pleased to bring together six papers on credence goods. Five out of these build on the binary framework and three present results closely related to the mixed-strategy equilibria discussed in the previous section.

Li, Ouyang, and Zhang (2024) address the question how imposing verifiability on top of liability affects the performance of a credence goods market. In their model, based on Fong (2005), a monopolistic expert serves homogeneous consumers under liability without verifiability. In Fong's honest equilibrium the expert posts two prices, a high one for the major repair and a low one for the minor repair, yet (despite the incentive to overcharge) behaves honestly. The expert recommends honestly because major recommendations are often rejected while minor recommendations are always accepted. Although there is no fraud in equilibrium, there is still an inefficiency as some major problems remain unsolved.

Building on this result, Li, Ouyang, and Zhang (2024) impose verifiability on top of liability. With liability and verifiability the expert can only cheat through overtreatment – that is, by providing a major repair to a customer with a minor problem. In this modified setting there exist two classes of equilibria that are payoff-equivalent for the expert. In one class the expert posts equal markup prices (as predicted by the DK model for the case where verifiability holds) and provides honest recommendations. This equilibrium yields full efficiency. The other class is inefficient: the expert posts prices that yield a higher markup for the major repair and overtreats customers with positive probability. As in the setting without verifiability, the expert does not always recommend a major repair to a customer with the minor problem because major recommendations tend to be rejected while minor recommendations are always accepted. While the efficient equilibrium obviously leads to an increase in efficiency relative to the inefficient outcome in the setting without verifiability, the same holds true also for the class of inefficient equilibria despite the social waste from overtreatment and the social loss from unresolved major problems. The reason is that if verifiability is imposed on top of liability, the customer accepts major recommendations with a higher probability. The social gain from increasing the probability of solving a major problem dominates the social waste from overtreatment.

Li, Ouyang, and Zhang (2024) show that this result continues to hold when treatment costs are the expert's private information. In the setting without verifiability, an expert who wants to charge the price for the major repair from a customer with the minor problem does not have to provide the major repair. As a result, the equilibrium under symmetric information about repair costs is still supported. When both liability and verifiability are in place, neither of the two classes of equilibria discussed in the previous paragraph exists. Instead, there are multiple pooling equilibria. With the help of some refinements, the authors are able to obtain a unique prediction which they compare with the liability case. As in the basic model, social welfare is always higher with liability and verifiability (than with liability alone) because consumers accept major recommendations with a higher probability, and the benefits from the increased probability of a major problem being repaired dominate the social waste from overtreatment. The result also extends to the case where the credence goods market is competitive.

In Fong et al. (2024) customers may delay receiving the repair recommended by the expert. Delaying repairs reduces their effectiveness (customers' valuation for a successful repair shrinks), but by doing so the customer learns about the severity of her problem. Their workhorse is again the Fong (2005) model with liability, but no verifiability. The main departure is the assumption that a customer who has rejected a recommendation today can buy the recommended repair in the next period after having learned something about the severity of her problem. If customers can receive the repair after learning through delay, the loss from unrepaired serious problems can be avoided.

In their main model consumers are homogeneous and if they delay the repair they receive a perfect signal about the severity of their problem at the beginning of the second period. For this model the equilibrium depends on the cost of delay. If the cost of delay is high, the most profitable equilibrium is Fong's (2005) honest equilibrium: The expert posts prices that exactly correspond to the customer's valuation for a successful repair and recommends honestly. The expert does not recommend the major repair to a customer with a minor problem because minor recommendations are always accepted while major recommendations are often rejected; the customer often rejects major recommendations despite knowing that the recommendation is truthful because the price of the major repair is so high that it leaves zero surplus to a customer with the major problem. By contrast, if the cost of delay is low, the most profitable equilibrium is a fraudulent mixed-strategy equilibrium that is similar to the mixed-strategy equilibria studied in the second-opinion literature. In this equilibrium, the expert charges low enough prices to make the delay worthwhile for consumers, and when he meets a customer with a minor problem he randomizes between honestly recommending the minor repair and fraudulently recommending the major one. Why does the expert randomize in equilibrium despite being able to extract all the surplus? Because he wants to induce a customer with a major problem who has delayed the repair to the second period to buy in the second period. To ensure this, the price for the major treatment cannot be higher than the valuation of the customer for a major problem solved in the second period. Since delay is costly, this price gives a positive surplus to a customer with the major problem in the first period. This in turn means that a customer who expects that the expert recommends truthfully will accept a major recommendation in period one for sure. Yet, if the major recommendation is always accepted, the expert does not have an incentive to recommend truthfully – he will rather always recommend the major repair to a customer with the minor problem. Thus, the expert has to cheat to keep the customer (in period one) indifferent between accepting and rejecting; and the customer has to be indifferent between accepting and rejecting to be prepared to reject major recommendations sufficiently often to keep the expert who meets a minor problem indifferent between recommending the minor and recommending the major repair.

In an extension, Fong et al. (2024) analyze a setting in which customers are heterogeneous regarding their valuation for a successfully repaired major problem. They investigate which type of customer is more likely to be defrauded and which type is more likely to delay the repair. The answer depends on whether heterogeneity is observable to the expert or not.

When heterogeneity is observable (and third-degree price discrimination is infeasible), high-valuation consumers are more likely to become the victims of fraud and are more likely to delay the repair than low-valuation consumers. As in Fong (2005), in equilibrium both types of consumers must be kept indifferent between accepting and rejecting a major recommendation. Since the delay cost is proportional to the valuation of the customer, the cost of rejecting a major recommendation in the first period is higher for high-valuation consumers than for low-valuation ones, while the potential benefit is the same for both types. It follows that the expert must defraud (by recommending the major repair to a customer with the minor problem) high-valuation consumers more frequently than low-valuation ones to keep both types indifferent.

With unobservable heterogeneity the expert has to adopt the same recommendation strategy for both types of consumers. Here the solution depends on the frequency of high- and low-valuation consumers. The authors focus on the case where low-valuation consumers are quite frequent. In this case the expert posts prices that allow him to play the mixed-strategy equilibrium described earlier with low-valuation consumers. Since low-valuation consumers are indifferent between accepting and rejecting in the first period and high-valuation consumers have a higher cost of delay, they accept the major recommendation for sure in the first period. Since only those consumers who reject in period one can delay the repair to period two, low-valuation consumers are more likely to delay in this case.[6]

Baumann and Rasch (2024) analyze the effects of second opinions in a model in which diagnostic outcomes can be incorrect. Thereby they complement and extend models of second opinions where inappropriate repair recommendations are purely due to fraud. The workhorse in this paper is the mixed-strategy equilibrium characterized by Wolinsky (1993). Unlike Fong (2005), Li, Ouyang, and Zhang (2024), and Fong et al. (2024), but in line with Wolinsky (1993) and the other literature discussed above, (i) consumers' valuation for a successful repair is independent of the nature of the problem, (ii) there is competition among experts, and (iii) prices are exogenously given with the property that the markup for the major repair is larger than for the minor repair. As in Fong (2005), liability prevents the expert from recommending the minor repair if the diagnosis indicates that the problem is most likely major. Yet since the diagnostic outcome is noisy, the liability rule – in the interpretation employed by the authors – does not prevent the customer from an unsuccessful repair. Finally, there is verifiability on top of liability – as in Mimra, Rasch, and Waibel (2016) and Li, Ouyang, and Zhang (2024). With this combination of assumptions, the expert will always recommend the major repair when the diagnosis indicates a major problem, and recommend either the minor or the major repair when the diagnosis indicates the minor problem.

When the diagnosis yields a perfect signal, we are in the Wolinsky (1993) world, the only difference being that fraud comes about as overtreatment (as in Mimra, Rasch, and Waibel, 2016) and not as overcharging. With diagnostic uncertainty the authors consider two main scenarios – imperfect diagnosis for the minor problem, but perfect diagnosis for the major problem; and imperfect diagnosis for the major problem, but perfect diagnosis for the minor problem. For the former case they find that an improvement in diagnostic precision affects welfare and customer surplus only in a pure-strategy equilibrium in which customers always search for a second opinion when confronted with a major recommendation and experts never defraud customers. Indeed, in a mixed-strategy equilibrium, higher diagnostic precision is fully offset by more fraudulent behavior by the expert, and customers do not adapt search behavior. This is due to the fact that in a mixed-strategy equilibrium the wrong-recommendation rate must keep customers indifferent between acceptance and rejection (implying that more precise signals must go hand in hand with more fraudulent behavior), and the search behavior of the customer must keep an expert

[6] The analysis of the heterogeneous consumer case has close parallels in Fong (2005) for the case with observable heterogeneity and in Hyndman and Ozerturk (2011) and De Jaegher (2012) for the case of unobservable heterogeneity.

who gets the signal that the customer is likely to have the minor problem indifferent between recommending the minor and recommending the major repair. For the opposite case in which major problems are correctly diagnosed only with some probability while minor problems are always diagnosed correctly the results are less clear-cut. For some limit case the authors find that an improved diagnostic precision can lead to less search and less overtreatment.

Dulleck, Kerschbamer, and Konovalov (2024) investigate the economic consequences of second-degree price discrimination in a monopolistic market for credence goods building on the DK framework. In contrast to the papers discussed up to now, the authors look at a setting where verifiability holds while liability is violated. In this constellation overcharging is precluded, but undertreatment and overtreatment are potentially an issue. Moreover, consumers are heterogeneous – as in Fong (2005) and Fong et al. (2024). But there are two main differences between the settings: First, the expert does not observe the characteristic of the consumer while in Fong (2005) and in (one of the models of) Fong et al. (2024) he can. An immediate implication is that third-degree discrimination is infeasible in the former case but feasible in the latter one. Second, the expert is able to post more than one tariff, while in Fong (2005) and Fong et al. (2024) this is not possible. An immediate implication is that second-degree price discrimination through a menu of tariffs is feasible in the former but not in the latter case.

Dulleck, Kerschbamer, and Konovalov (2024) first present a benchmark result for a setting in which the expert is forced to post a single tariff, as in Fong (2005) and Fong et al. (2024). In this case the expert posts an equal markup tariff, under which the consumer receives honest advice and appropriate repair. If the efficiency gain from serving the least profitable consumer type is sufficiently high, all consumers are honestly served. Otherwise, equal markup prices are such that some consumers inefficiently do not consult the expert. This is nothing but the familiar monopoly-pricing inefficiency: the monopolistic expert would like to appropriate as much of the net gain from trade as possible but, because of heterogeneous consumers, he puts up with losing some consumers in order to extract more surplus from the remaining ones.

If the expert is allowed to price-discriminate via a menu of tariffs, he posts two tariffs – an equal markup tariff with honest advice intended for the most profitable segment of the market and a second tariff under which the customer receives a given repair without any advice. Interestingly, the properties of this second tariff depend on the main source of heterogeneity among consumers. If the heterogeneity is in the expected cost needed to generate consumer surplus, then low-cost consumers receive honest advice and efficient service, while high-cost consumers are induced to self-select into an overprovision tariff under which they receive the major repair without advice. By contrast, if consumers differ in the surplus generated whenever the consumer's needs are met, then high-valuation consumers receive honest advice and efficient service, while low-valuation ones are induced to self-select into an underprovision tariff under which they receive the minor repair without advice.

The intuition for why consumers are never served under an underprovision tariff when the heterogeneity is in the expected cost of repair is that such a contract would be especially attractive for the most profitable market segment, a segment that would otherwise self-select into the efficient-service contract. To attract the most profitable market segment with an underprovision tariff, the markup on the minor repair in that contract has to be lower than the markup under the equal-markup tariff because a consumer's expected gross utility is lower under the former. Hence offering such a contract is less profitable to the expert and given that no customer is lost by not offering this contract, the expert will refrain from posting it. The intuition for the case with heterogeneity in valuations is similar: Since consumers are homogeneous in the expected cost of efficient service, an overprovision tariff, if attractive for low-valuation consumers, will also attract high-valuation ones and hence cannot be used for discriminatory purposes. An underprovision tariff, on the other hand, is unattractive for high-valuation consumers because they have more to lose if the repair fails while low-valuation customers are willing to take the gamble given the lower markup. It is therefore potentially useful for discrimination.

Obradovits and Plaickner (2024) consider a setup where consumers can get minor and major repairs from a monopolistic expert who can perfectly identify the needs of consumers at no cost. They can also purchase minor repairs from fringe firms after a costly search. The expert has to make a recommendation which consumers do not have to accept – they might rather free-ride on the expert's diagnosis and get their problems fixed at a fringe firm as in Dulleck and Kerschbamer (2009). Another important ingredient of the model is that there is liability and verifiability as in Baumann and Rasch (2024) and in Li, Ouyang, and Zhang (2024). In this constellation undertreatment and overcharging are precluded by assumption, but overtreatment is potentially an issue.

Let us first explore the conditions for existence of a pure-strategy equilibrium in which the monopolist always recommends the appropriate repair and in which consumers accept immediately.[7] If the monopolist recommends honestly (and this is correctly anticipated by consumers), then the highest markup he can earn from a customer with the minor problem corresponds to the search cost (as search cost plus marginal cost from the minor repair is the cost to the consumer of receiving the same repair from a fringe firm); and the highest markup that can be earned from a customer with the major problem is the valuation for a successful repair minus the cost of the major repair (since the expert is the only provider of the major repair, a consumer who expects to have the major problem for sure is willing to accept when the price does not exceed her valuation for a successful repair). Now, for the expert not having an incentive to fool low-severity consumers into thinking that they suffer from the major problem, the former markup must be higher than

[7] Throughout it is assumed that consumers have to start their search at the expert. In Obradovits and Plaickner (2024) this is guaranteed by the assumption that each consumer suffers from one of a large number of different problems, each coming in two severities. Effective treatment then requires that the correct problem is identified, and only the expert is able to accomplish this.

the latter. This yields a lower bound on the search cost. If the search cost exceeds this bound, the expert recommends honestly. Accordingly, a separating equilibrium with a correct expert recommendation requires the search friction to be sufficiently large.

While the argument in the previous paragraph is valid in principle, the resulting bound on the search friction is outside the feasible range of the model. The authors derive a milder condition that yields an honest equilibrium with properties very similar to those stated in the previous paragraph – the only difference being that the markup the expert earns from a customer with the major problem is the valuation for a successful repair minus the search cost minus the cost of the major repair. This lower markup ensures that the consumer is willing to return to the expert after having tried to get the problem repaired by a fringe firm. In equilibrium the expert does not increase the markup on the major repair above this level because consumers' off-equilibrium beliefs when getting offered a major repair at a higher price make them sufficiently optimistic about suffering from the minor problem, such that they would leave the expert and never return.

If the search cost is lower than the bound discussed in the previous paragraph, the monopolist's market power for selling the minor repair is low. In this case, the expert can guarantee a higher profit from selling major repairs. This gives him an incentive to try to trick consumers with a minor problem into believing that they suffer from a major one. Depending on the frequency of major problems, one of the following two equilibria emerges. If consumers consider it very likely to suffer from the major problem, then even anticipating that the expert will always recommend the major repair, they do not find it worthwhile to try whether the minor repair (bought from a fringe firm) solves their problem. The result is a pooling equilibrium in which the expert always recommends the major repair, and consumers immediately accept. By contrast, for a low incidence of major problems, if consumers were to assume that the expert always recommends the major repair, they would find it optimal to purchase the minor repair from a fringe firm. But then the expert would find it profitable to retain low-severity consumers by offering them the minor repair at the maximum feasible markup (corresponding to search cost) instead. Due to this tension, a mixed-strategy equilibrium emerges in which the expert randomizes which repair to recommend to low-severity consumers, and consumers randomize between immediately accepting the major recommendation and purchasing a minor repair from a discounter.

Ulrichshofer and Walzl (2024) consider financial advice as a credence good, arguing that the adviser is typically better informed than the client about the needs of the client.[8] Specifically, the authors investigate the impact of records of successful and unsuccessful customer complaints on behavior and labor market mobility of financial advisers. This paper is somewhat an alien in this symposium as (i) the

[8] In the model the informational asymmetry regards the profitability of an asset and not the needs of the customer. Financial advice is thus a label credence good.

theoretical framework is different from the ones studied in the other contributions and (ii) the theoretical analysis is supplemented by an empirical analysis.

The theoretical model features three players – an adviser, a client, and a firm. The firm hires the adviser with a franchise contract to convince the client that the asset sold by the firm is a profitable investment. Whether the asset is profitable depends on the true state of the world. To convince the client that the asset is profitable, the adviser can provide her information about the asset. To generate information about the asset the adviser uses an information technology yielding one of two possible signals, good or bad. The adviser has full control about the quality of the information technology, i.e., whether the signal fully reveals the true state or is imprecise. The client does not observe the quality of the information technology but she observes the realization of the signal. After having observed the signal, the client decides whether to buy the asset or not. If the client buys, then after having observed the profitability, she can complain. The more imprecise the signal, the more likely is a complaint by the client and the more likely is the success of the complaint.

In the model the adviser comes in different types. Types differ with respect to their *persuasiveness*, i.e., the ability to avoid (successful) complaints. A more persuasive adviser faces a lower cost of a (successful) complaint and therefore sends a less precise signal. While the client prefers a less persuasive adviser and refuses to take advice if she expects the adviser to be too persuasive, the firm's preferences regarding the adviser's persuasiveness is non-monotone. If the client expects the adviser to be very persuasive and refuses to take advice, no profits are made by the adviser and the franchise value is zero. If the adviser is not persuasive (i.e., complaints are never prevented), the adviser's information technology fully reveals the true state, and the asset is purchased if and only if the state is good. But if the adviser is expected to be modestly persuasive, the information technology is sufficiently precise to motivate the client to take advice and sufficiently imprecise to induce purchasing with a positive probability even if the state is actually bad. As a consequence, firms prefer advisers whom they expect to be modestly persuasive since they are willing to accept higher franchise fees. Since in the model modestly persuasive advisers have records with more than average complaints but (conditional on there being a complaint) less than average successful complaints, firms are predicted to predominately (re-)hire advisers with a record of unsuccessful complaints.

In the empirical part of their paper, Ulrichshofer and Walzl (2024) use adviser data from the FINRA BrokerCheck database to test this prediction. They demonstrate that advisers with a record of unsuccessful complaints in the FINRA BrokerCheck database are 42% more likely to be re-employed by another firm than advisers without such a record. Moreover, advisers with such a record are more likely to receive unsuccessful complaints in the future. Ulrichshofer and Walzl (2024) conclude that publicly available adviser records may supply valuable information about adviser misconduct to clients and firms.

## 5 Concluding Remarks

This symposium brings together six papers dealing with credence goods. Each paper has been evaluated by several anonymous referees and has benefited from their insightful comments, for which we are very grateful. We hope that readers will enjoy this symposium as much as we did in putting it together.

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