Consumers with limited attention in a credence goods market*

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Abstract

Limited attention may amplify inefficiencies associated with information asymmetries. We study how consumers' limited attention affects outcomes in a monopolistic credence goods market. In contrast to theory, real-world observations cast doubt on market efficiency. Our study presents theoretical arguments and experimental evidence that consumers' limited attention regarding sellers' costs can explain these differences. In our experiment, we vary consumer attention and find that increasing attention by explicitly showing firm profits boosts efficiency. Sellers are more likely to provide sufficient verifiable quality, and prices are significantly closer to equal-markup prices. Furthermore, we describe how social preferences interact with limited attention.

JEL Codes: C91; D82; D91.

Keywords: Credence goods; Limited attention; Market inefficiency; Laboratory experiment.

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1 Introduction

The distinct feature of credence goods markets is informational asymmetry. Sellers are experts and have an informational advantage over consumers. More precisely, sellers know which types of services consumers need, whereas consumers do not (Darby and Karni, 1973). Consumers have to trust experts to provide the correct service. Experts may exploit their informational advantage by providing more or more expensive services than necessary.

One of the key theoretical predictions is that (liable) experts should have no incentives to provide an inappropriate amount of service whenever consumers can verify the type of service (Dulleck and Kerschbamer, 2006). In equilibrium, experts post prices with equal markups for the different types of services. By posting equal-markup prices, experts credibly signal to perform the type of service that the consumer needs. As consumers anticipate that experts provide necessary services under equal markups, consumers' willingness to pay for a service is maximal. A monopolistic expert sets these equal markup prices in a way to fully extract consumer rent. In a competitive credence goods market, prices cover experts' marginal costs of providing a service.

In real markets, however, these predictions appear to contradict observations. Prime examples are markets for repair services and healthcare. The FBI estimates that up to 10% of the 3.3 trillion US dollars of yearly health expenditures in the United States are due to fraud (Federal Bureau of Investigation, 2011).[1] Gottschalk et al. (2020) show that 28% of dentists' treatment recommendations involve overtreatment recommendations. In car repair services, Taylor (1995), Schneider (2012), and Rasch and Waibel (2018) report fraudulent behavior by garages. Kerschbamer, Neururer, et al. (2016) document fraud in computer repair services. Balafoutas, Beck, et al. (2013) and Balafoutas, Kerschbamer, et al. (2015) identify fraud in the market for taxi rides.

So far, the literature has offered different reasons to explain such discrepancies between the theoretical results and real-life observations. Explanations include expert heterogeneity (see, for example, Dulleck and Kerschbamer, 2009, Frankel and Schwarz, 2014, and Hilger, 2016), the coexistence of selfish and conscientious experts (see, for instance, Liu, 2011 and Fong et al., 2014), and a lack or ban of price discrimination (see, for example, Dulleck and Kerschbamer, 2006). In this paper, we offer an alternative explanation: consumers' limited attention. The idea is based on insights from psychological research and recent economic literature:[2] Due to cognitive constraints and large amounts of information, people often fail to account for all relevant details when making decisions. Our approach assumes that consumers do not take into account all relevant information that determines an expert's payoff.

We employ a simple model to investigate the existence and impact of limited attention in a credence goods market. In the model, consumers suffer from either a minor or a major problem. The major service solves both problems but is more costly for a monopolistic expert than the minor service. The minor (and less costly) service can only solve the minor problem. Service costs are common knowledge among experts and consumers. By posting an equal-markup price vector, the expert could credibly signal that she has no incentive to over- or undertreat. We assume that consumers can verify the treatment applied (that is, we rule out overcharging) but do not fully account for treatment costs. It crucially affects their evaluation of expert profits and, hence, the expert's incentive to defraud them. We predict that consumers' limited attention increases the

[1] For an overview of the phenomenon of so-called physician-induced demand (PID), see McGuire (2000).

[2] See Lim and Teoh (2010) for an overview in the context of finance and accounting. Heidhues and Kőszegi (2018) discuss limited attention in the context of applications in industrial organization. Bordalo et al. (2012) and Bordalo et al. (2013) provide an in-depth analysis of the concept of salience.

insufficient service provision and raises the markup difference between the major and the minor services. Moreover, consumers are more willing to pay for an offer that triggers insufficient service provision if their attention is limited.

We test the predictions in a laboratory experiment. We vary whether a consumer observes – in addition to the expert's price vector – the expert's profit vector. Crucially, a consumer always observes experts' costs. Hence, displaying experts' profits does not introduce any new information. Instead, it increases the prominence of the existing information. A consumer then decides whether or not she wants to interact given the posted prices. The expert observes which type of problem her consumer has and decides whether to provide either the minor or the major service and charges for the provided service. In the treatment ATTENTION, consumers observe the prices, and experts' profits as a direct indication of their costs are explicitly mentioned again before consumers decide on interaction, whereas, in the NOATTENTION treatment, consumers only observe prices. Experts and consumers are randomly rematched in our lab experiment and hence do not suffer from reputational concerns. We find that experts' price vectors are significantly closer to the equal markup when consumers are reminded about the experts' costs than when they are not. Consumers' interaction probability decreases by around 20 percentage points over time and does not significantly vary across treatments. Controlling for subjects' covariates, experts undertreat consumers significantly more often under NOATTENTION than under ATTENTION. Following Mimra et al. (2016), we define welfare as accumulated profit minus the outside option and account for random differences in the consumers' type of problem (minor or major). We find that welfare improves under ATTENTION.

In many credence goods markets, there is a call to make experts' financial interests more transparent. Due to limited attention, consumers do not fully account for experts' financial incentives. An example of a sector in which more transparency is demanded is the market for health services. In Germany, for instance, many health services are paid for by the patients' insurance companies. The payments are organized bilaterally between the insurance company and the physician without any patient involvement. To increase transparency for such services, patients have had the right to ask for a patient receipt since 2012. This receipt must report the treatments performed and the (expected) costs.[3] The market for financial advice has seen a similar discussion of making financial incentives more transparent.[4]

Providers themselves can also advocate for increased transparency. For example, for their car repair services, carmaker Opel introduced a new app-based information service called "MyDigitalService". When car owners have their cars inspected or repaired, they can now more easily follow the different steps in the process and are provided with information regarding additional costs when unanticipated services become necessary.[5]

Our study is directly related to the literature on credence goods. Closest to our paper is the article by Dulleck, Kerschbamer, and Sutter (2011), which employs a large-scale laboratory experiment challenging the seminal model by Dulleck and Kerschbamer (2006). In particular, the authors study the impact of institutions, such as verifiability or liability, on outcomes in credence goods markets and show that liability is an effective tool for improving outcomes in credence goods markets. However, the authors find no evidence that verifiability fosters market results.

There are multiple explanations for why verifiability seems to be less effective for improv-

[3] See, for example, `https://www.bundesgesundheitsministerium.de/themen/praevention/patientenrechte/patientenquittung.html`.

[4] See, for example, `https://www.financialadvice.co.uk/news/10/savings/5821/transparency-call-for-financial-advice-market.html`.

[5] See, for example, `https://www.auto-motor-und-sport.de/tech-zukunft/werkstatt/opel-mydigitalservice-transparenz-inspektion-reparatur/`.

ing market outcomes. Previous work has explained the differences between the prediction of no overtreatment if services are verifiable and the observation in real markets is primarily based on experts' characteristics. Emons (1997, 2001) argues that experts' utilization of capacities drives overtreatment. If demand is low, experts may have the incentive to provide excess services to fill capacities. Gottschalk et al. (2020) provides evidence from a field experiment. Dentists with a low utilization are correlated with a higher probability of receiving an overtreatment recommendation. Hilger (2016) develops a model that accounts for experts' heterogeneity with respect to experts' costs of service provision. If costs are unobservable, experts cannot credibly signal equal markups. Hilger (2016) assumes experts are liable for their services. Hence, experts may have an incentive to overtreat.

To our knowledge, the only paper that focuses on consumers' characteristics is Kerschbamer, Sutter, and Dulleck (2017) as a tool to improve efficiency in credence goods markets. The authors suggest that consumers' preferences may drive the deviations observed in Dulleck, Kerschbamer, and Sutter (2011). More precisely, the authors argue that heterogeneity in social preferences may explain the observed behavior. They show theoretically that equal-price equilibria are robust to pro-social but not anti-social preferences. Our study extends this strand of literature by adding the perspective of consumers' limited attention.

Our paper also contributes to the literature on the behavioral industrial organization that investigates market outcomes when consumers have behavioral biases.[6] The closest strand of literature to our setup are studies on add-on pricing, where consumers do not pay attention to the additional price of a two-part tariff (Armstrong and Vickers, 2012; Gabaix and Laibson, 2006; Grubb, 2015a; Heidhues and Kőszegi, 2017). Our study contributes by investigating limited attention with regard to a different factor, namely sellers' costs. In particular, consumers are fully attentive to the prices of two treatments offered by the sellers, but not to the cost of each treatment. Costs do not directly show up in the consumers' payoff function, yet they influence the treatment offered by sellers. The chosen treatment then determines whether consumers receive proper treatment, affecting their payoffs.

The remainder of the paper is as follows. Section 2 provides the theoretical framework for the credence goods market. Section 3 lays out our experimental design and shows our hypotheses. Section 4 displays and discusses our results before we conclude in Section 5.

2 Theoretical framework

2.1 Market

We model a market with verifiability and without liability following Dulleck and Kerschbamer (2006). Consider a market with an expert and a consumer. A consumer (she) has either a major or a minor problem. The consumer knows that she has a problem but does not know whether it is major or minor. However, the consumer knows that she has the major problem with an ex ante probability h and the minor problem with an ex ante probability $1-h$. These probabilities are common knowledge to both the expert and the consumer.

The expert (he) can identify the problem at no cost. He can choose to provide either the major treatment or the minor treatment. The cost of the major treatment is $\bar{c}$, and the cost of the

[6] See, for example, Grubb (2015b) and Heidhues and Kőszegi (2018) for an overview.

minor treatment is $\underline{c}$, with $\underline{c} < \bar{c}$. The major treatment solves both problems, whereas the minor treatment only solves the minor problem. The expert posts take-it-or-leave-it prices.

The consumer has a valuation of $v > 0$ when receiving sufficient treatment. The expert is *not liable* – that is, he can treat a consumer who has a major problem with minor treatment. The prices for the major and the minor treatment are denoted as $\bar{p}$ and $\underline{p}$, respectively, with $\underline{p} < \bar{p}$. Due to the *verifiability* of treatment, the expert has to charge $\bar{p}$ if he provides the major treatment and $\underline{p}$ if he provides the minor treatment, that is, overcharging is not possible. The consumer does not know the necessary treatment but knows whether her problem has been solved. We refer to appropriate treatments whenever the consumer has a major problem and receives a major treatment or when she has a minor problem and receives a minor treatment. Undertreatment occurs when the consumer has a major problem but only receives a minor treatment. Finally, overtreatment means that a consumer with a minor problem receives a major treatment. The game and the payoffs are illustrated in Figure 1.

The step-by-step timeline of the game is as follows:

1. The expert posts a price menu $(\bar{p}, \underline{p})$ for the major and minor treatment, respectively.

2. The consumer chooses whether to interact with the expert. We refer to this decision as "interaction" or "no interaction", respectively. The presentation of information differs across conditions:

   (a) NoAttention condition: The consumer observes the price menu posted by the expert.

   (b) Attention condition: The consumer observes the price menu posted by the expert and the expert's (potential) profit for each price.[7]

   If the consumer chooses not to interact, the game ends. In that case, the expert and the consumer both get the outside option u. If the consumer chooses to interact, the game proceeds with stage 3.

3. Nature draws the type of problem that the consumer has.[8]

4. The expert observes the problem type of the consumer. The expert then provides either major or minor treatment and charges a price according to his treatment recommendation ($\bar{p}$ or $\underline{p}$).

5. The expert observes his payoff, and the consumer observes her payoff.

If there is interaction, the expert's payoff (profit) is determined by the price p ($p \in \{\underline{p}, \bar{p}\}$) minus the cost c ($c \in \{\underline{c}, \bar{c}\}$) of the treatment applied, that is, $\pi_e = p - c$. If there is no interaction, the payoff amounts to u.

If the consumer chooses to interact and the expert does not undertreat her, she derives her gross valuation of v. If she decides to interact and the expert undertreats her, she derives a valuation of zero. In either case, the consumer must pay the price p for the treatment she receives. Hence, for each period, her payoff is either $\pi_c = v - p$ if she is not undertreated or $\pi_c = -p$ if she is undertreated. If the consumer decides not to interact, she receives a payoff of u.

[7] Note that even when a consumer cannot directly observe the expert's profit, she can calculate the profit because the costs of both treatments are common knowledge.

[8] As Dulleck and Kerschbamer (2006) point out, it does not make a (game-theoretic) difference whether nature determines the severity of the problem after the consumer has consulted an expert (but before the expert has performed the diagnosis) or at the very beginning.

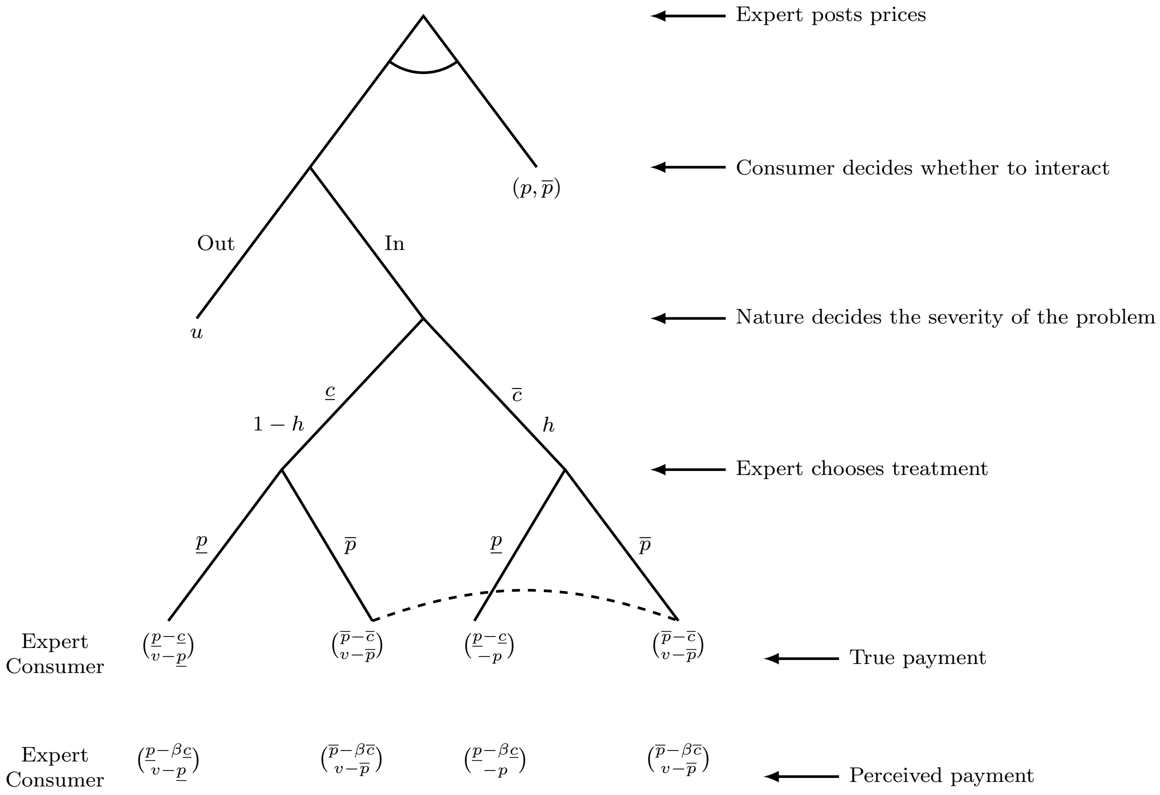

Figure 1: Game tree.

2.2 Consumers with limited attention

We assume that the consumers have limited attention. When deciding on interaction, there are three key determinants of this decision: prices $(\underline{p}, \overline{p})$, valuation v, and the likelihood of being undertreated. The likelihood of being undertreated is determined directly by two factors: the severity of the consumer's problem and the action chosen by the expert. With the expert being a profit-maximizing agent, he always chooses the action that gives him the higher profit.

We assume that prices and the valuation are features that are taken into account by consumers, whereas the probability of being undertreated determined by the expert's profit is a hidden feature. We back up this assumption by three observations. First, several laboratory experiments on credence good markets (see, for example, Dulleck, Kerschbamer, and Sutter, 2011, and screenshots from our condition NoAttention in Figure 7 in the appendix) have a design feature that only prices are shown to consumers when they decide on interaction. Second, valuation and prices immediately show up in the consumer's payoff function. Third, although the expert's profit function and costs are common knowledge, they are communicated to the consumer once at the beginning of the experiment. Thus, it is reasonably more difficult for consumers to recall this information in every period (see Bordalo et al., 2020). When seeing the information concerning the expert's profit in Decision 3 of the Attention condition (see Figure 8 in the appendix), the consumer considers the hidden feature when deciding on interaction.

Because the expert's profit equals price minus cost, we consider the cost of each treatment as the direct proxies for the hidden feature of the likelihood to be undertreated. In the experiment, we manipulate consumers' attention of this hidden feature by (not) showing the expert's profits for each condition at the interaction stage, hence by (not) indicating costs. We assume that the expert is aware that the consumer has limited attention, but the consumer is not aware that the expert knows thereof.

The degree of limited attention is captured by parameter $\beta \in (0,1]$ (see Bordalo et al., 2020). If $\beta = 1$, all features are equally taken into account by consumers. If $\beta \to 0$, consumers pay attention only to those features that are explicitly mentioned and completely neglect other features. If the consumer decides to interact, the expert's profit is $\pi = p - c$, whereas profit as perceived by a consumer with limited attention equals $\pi_c = p - \beta c$. We differentiate among two cases: $\beta = 1$ and $0 < \beta < 1$.

Case 1: No limited attention ($\beta = 1$).

In this case, the consumer is equally attentive to all features. Then $\pi = \pi_c$. As shown by Dulleck and Kerschbamer (2006), in equilibrium:

- The expert posts equal-markup prices:

$$\bar{p} = v + (1-h)(\bar{c} - \underline{c}) - u$$
$$\underline{p} = v - h(\bar{c} - \underline{c}) - u.$$

- The expert provides the appropriate treatment.
- The consumer chooses to interact.

Case 2: Limited attention ($0 < \beta < 1$).

When consumers are inattentive to the hidden feature, equal-markup prices from the consumers' point of view take the following form:

$$\bar{p}_c = v + \beta(1-h)(\bar{c} - \underline{c}) - u$$
$$\underline{p}_c = v - \beta h(\bar{c} - \underline{c}) - u.$$

Note, however, that $\forall \beta \in (0,1)$, $\underline{p}_c$ is strictly larger than $\underline{p}$ and $\bar{p}_c$ is strictly smaller than $\bar{p}$. We thus have:

Lemma 1 *When consumers have limited attention, the equal-markup tariff $(\bar{p}, \underline{p})$ is perceived by consumers as a tariff, such that the markup for the major treatment exceeds that for the minor treatment.*

Now we analyze the optimal price-setting by the expert. To this end, consider the three classes of tariffs as perceived by consumers:

(i) The perceived markup for the major treatment exceeds that for the minor treatment ($\bar{p} - \beta\bar{c} > \underline{p} - \beta\underline{c}$),

(ii) the perceived markup of the minor treatment exceeds that for the major treatment ($\bar{p} - \beta\bar{c} < \underline{p} - \beta\underline{c}$), and

(iii) perceived markups are the same for both treatments ($\bar{p} - \beta\bar{c} = \underline{p} - \beta\underline{c}$).

Consumers with limited attention expect the following: The expert performs the major treatment if he posts (i), he performs the minor treatment if he posts (ii), and he is indifferent if he posts (iii).[9] The consumers observe the price and infer experts' incentives accordingly. Expert's perceived profits in these cases amount to:

(i) $v - u - \beta\bar{c}$

(ii) $(1-h)v - u - \beta\underline{c}$

(iii) $v - u - \beta(h\bar{c} + (1-h)\underline{c})$.

Given that $u > 0, \bar{c} > \underline{c}, v > (\bar{c} - \underline{c}), \beta \in (0,1)$, and $h \in [0,1]$, the perceived equal-markup tariff gives the highest obtainable profit for the expert. We can thus state the following proposition:

Proposition 1 *When the consumer has limited attention, conditional on interaction,*

(i) the expert always posts tariffs, such that the markup of the minor treatment exceeds that for the major treatment, and

(ii) the expert always provides the minor treatment.

3 Experiment

3.1 Experimental design

We build our between-subject experimental design on Dulleck, Kerschbamer, and Sutter (2011). Our NoAttention condition replicates the results from the baseline condition with verifiability in Dulleck, Kerschbamer, and Sutter (2011). The expert's profit is explicitly stated in our second condition Attention.

Subjects are assigned to be either an expert (called player A in the experiment) or a consumer (called player B in the experiment). Each market consists of eight subjects, with four experts and four consumers. In each period, one expert interacts with one consumer. The assignment to group and role is random and does not change during the experiment. The stage game is repeated for 16 periods. Subjects are re-matched within their market at the beginning of each period. At the end of each period, subjects are informed about their profit for the current period and their own accumulated profit.

Figure 2 summarizes the timeline of the experiment. In each period, the expert chooses prices $p_i \in [1, 11] \in N$ for each of the two conditions. The consumer then chooses whether to interact with a matched expert. If a consumer chooses not to interact, the period ends and both players get $u = 1.6$ ECU (outside option). If a consumer decides to interact, the expert provides either the minor treatment $\underline{c}$ at costs of 2 ECU (called Action 1 in the experiment) or the major treatment $\bar{c}$ at costs of 6 ECU (called Action 2 in the experiment). The consumer derives a utility $v = 10$ ECU if she is sufficiently treated and 0 otherwise. The probability of a consumer having a major problem is $h = 0.5$. The expert and the consumer both learn their respective payoffs after every round.

After the experiment, we use two incentivized choices to elicit individuals' risk and loss preferences. We employ the standard choice list by Holt and Laury (2002) to measure individuals'

[9] Similarly to Dulleck and Kerschbamer (2006), we assume that the expert is indifferent between two treatments if he posts an equal-markup tariff. Moreover, this is common knowledge.

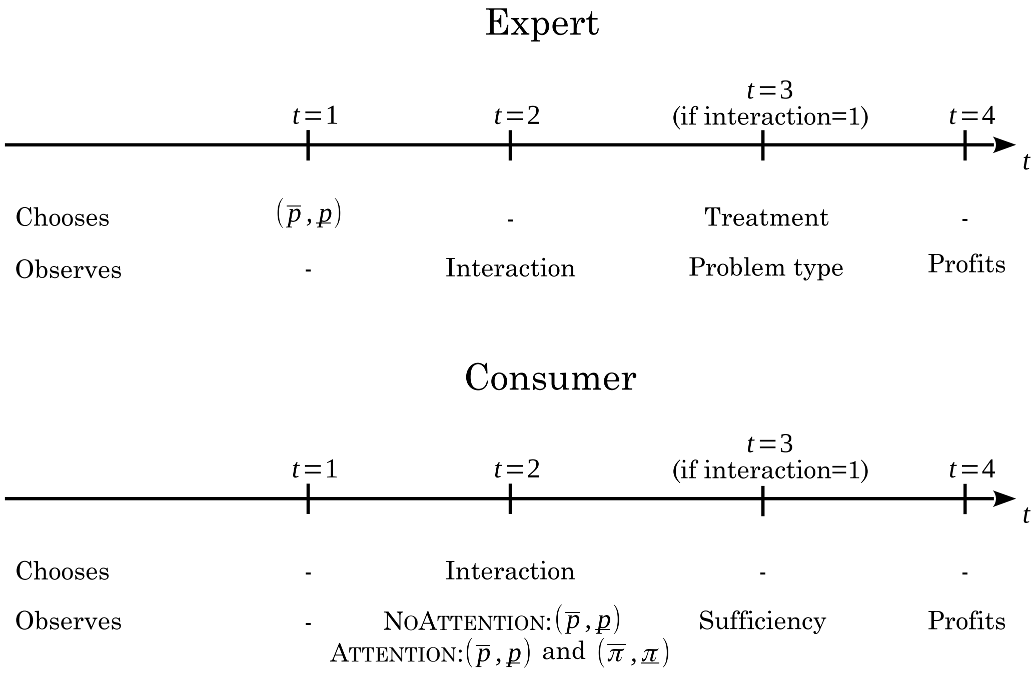

Figure 2: Timeline.

Note: $\bar{\pi}$ and $\underline{\pi}$ denote the expert's profit associated with providing the major treatment and the minor treatment.

level of risk aversion. In a second choice list similar to Karle et al. (2015), we measure individuals' degrees of loss aversion. We ask for individuals' beliefs conditional on the subjects' role of a buyer or a seller.[10] We further complement the incentivized decisions by the validated question on risk aversion by Falk, Becker, Dohmen, Huffman, et al. (2016). Selected questionnaire items from the preference survey module of Falk, Becker, Dohmen, Huffman, et al. (2016) serve as a measure of social preferences. We complete the post-experimental part by recording individuals' reasoning for their decision in the experiment and socio-demographics.

Table 1 provides an overview on subjects' covariates. The left column shows averages across all participants, the two middle columns show descriptive statistics per condition along with the significance level of the difference in the right column. Our randomly drawn subjects are on average slightly risk-loving (following Holt and Laury, 2002, the switching point < 5 implies risk-loving). It holds for both conditions. Subjects are loss averse with again virtually no variation across conditions. The preference measures from the General Preference Survey (GPS) by Falk, Becker, Dohmen, Enke, et al., 2018 confirm, consistently with Holt and Laury (2002), that our subjects are risk averse.

[10]See the elicitation of beliefs in subsection A.3.

Table 1: Descriptive statistics.

	All	NoAttention	Attention	Difference
Loss aversion (lottery)	4.31	4.33	4.29	$p = 1.000$
Risk aversion (lottery)	4.22	4.23	4.22	$p = 0.953$
Risk aversion (question)	3.78	3.60	3.90	$p = 0.370$
Social preference	4.14	4.08	4.18	$p = 0.679$
Generosity	118.64	140.67	103.96	$p = 0.409$
Belief (buyer)	0.31	0.33	0.29	$p = 0.616$
Belief (seller)	0.42	0.42	0.43	$p = 0.678$
Gender	0.53	0.63	0.47	$p = 0.038$
Age	24.72	25.15	24.43	$p = 0.345$
Number of obs.	120	48	72	15

To account for heterogeneous treatment effects consistent with Kerschbamer and Sutter (2017), we classify individuals into two categories based on their social preferences. We define a subject as pro-social or selfish based on the median split in the elicited social preference.[11] Then, our split threshold also conveniently corresponds to giving a stranger the same amount she spent to help. We thus call subjects pro-social if they are willing to give at least the amount the stranger spent to help them (more than 15 ECU), and call them selfish otherwise (15 ECU and less). We then define a market as pro-social based on the number of pro-social experts in this market (from 0 to 4) and treat this measure as a continuous control variable in all following regressions. We only take into account the number of pro-social experts (but not consumers), because experts make the two main decisions in the market: pricing and mistreatment. consumers, on the other hand, can only accept or reject experts' offers.

3.2 Experimental procedure

We conducted our experiment at the DICE Lab of the University of Düsseldorf in June 2019. We programmed the experiment using zTree (Fischbacher, 2007). Subjects were recruited via ORSEE (Greiner, 2004) and were mostly enrolled as students at the University of Düsseldorf. Upon arriving in the lab, each subject was randomly assigned to a cubicle and provided with instructions. Subjects were given enough time to read the instructions and were allowed to ask experimenters clarifying questions privately. The sessions started after all questions had been addressed.

In total, 120 subjects participated in six sessions of the experiment. Each session lasted for about one and a half hours. On average, subjects earned 18.34 euro. In total, 48 subjects participated in the NoAttention condition, and 72 subjects participated in the Attention condition.

3.3 Hypotheses

Based on our theoretical model and the experimental parameterization, we now form our hypotheses for expert and consumer behavior. As consumers do not observe the expert's profit when deciding whether to interact under NoAttention, our model predicts the following expert behavior:

[11] In both conditions, the means are slightly higher than the median: It is 15.42 in Attention and 15.90 in NoAttention, and, therefore, we assign 15 to the selfish group.

Hypothesis 1 *The expert is more likely to post an undertreatment tariff in* NoAttention *than in* Attention*.*

Hypothesis 2 *The expert's mark-up difference is larger in* NoAttention *than in* Attention*.*

Hypothesis 3 *The expert is more likely to undertreat a consumer in* NoAttention *than in* Attention*.*

Consumer behavior is predicted as follows:

Hypothesis 4 *A consumer is more likely to interact given undertreatment price vectors in* NoAttention *compared to* Attention*.*

4 Results

This section is organized as follows: First, we present how consumers' limited attention affects experts' decisions. We analyze the price vectors that experts post and the treatment composition they provide given their posted prices. We then focus on the buyers' side of the market, that is, how limited attention affects their decisions to interact. Finally, we discuss how increased attention influences consumers' and experts' welfare in our experiment. Additionally, we look in-depth at how each market outcome varies with explicitly displaying experts' profits for different types of individuals and markets according to the social preferences classification (see Section 3).

Table 2: Summary statistics.

	Attention		NoAttention	
	Mean	Std. dev.	Mean	Std. dev.
Major price $\bar{p}$	7.93	1.35	7.77	1.57
Minor price $\underline{p}$	5.39	1.73	5.68	1.67
Markup difference Δ	−1.47	1.94	−1.91	1.69
Interaction	0.52	0.50	0.48	0.50
Sufficient	0.38	0.49	0.37	0.48
Number of obs.	1152	1152	768	768

Table 2 provides a first overview of the outcomes on the aggregate level. In the individual-level data analysis, we control for the price level and previous period market characteristics. We further account for individual experts' characteristics that include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs.

Expert outcomes

Prices and markups

We start by analyzing how the probability of posting undertreatment price vectors varies with the degree of attention. In our experiment, experts post undertreatment vectors frequently independent of the condition. More precisely, 79.2% of the price vectors in NoAttention and 77.4% of the price vectors in Attention are undertreatment vectors. On the aggregate level, the share of undertreatment vectors is not significantly different ($p = 0.649$, t-test with clustering on subject level). On the individual level, Table 3 reveals however that, keeping everything else constant,

Table 3: Probability of posting an undertreatment vector.

Undertreatment vector	All experts	Pro-social experts	Selfish experts
Attention	−0.17***	−0.05	−0.20**
	(0.05)	(0.09)	(0.08)
Pro-social market		0.03	0.04
		(0.04)	(0.05)
Major price	☑	☑	☑
Undertreatment vector $_{t-1}$	☑	☑	☑
Interaction $_{t-1}$	☑	☑	☑
Sufficient $_{t-1}$	☑	☑	☑
Individual controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Number of obs.	900	360	540

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions are estimated using probit, average marginal effects are displayed. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs. We also include time (period) and market fixed effects.

experts are significantly less likely to post an undertreatment vector in Attention than in NoAttention. We find that the probability of posting an undertreatment price vector in Attention is 17 percentage points lower compared to NoAttention. Our finding is in line with Hypothesis 1, that is, experts are more likely to post undertreatment price tariffs in NoAttention than in Attention.

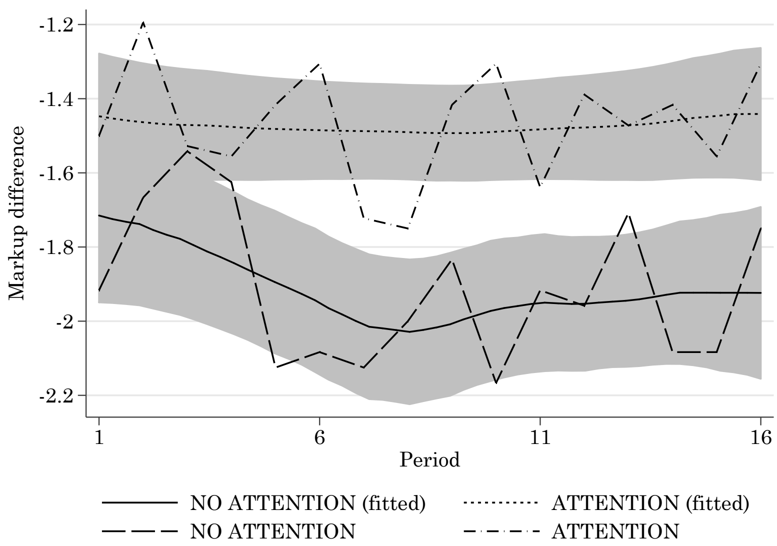

Figure 3: Average markup difference.

Note: Fitted values are estimated using Epanechniov kernel with an optimal bandwidth. Gray areas correspond to 95% confidence intervals.

The impact of explicitly displaying experts' profits on the likelihood of posting an undertreatment vector varies for experts with different social preferences. Selfish experts are 20 percentage points more likely to post undertreatment vectors in NoAttention than in Attention. For pro-social experts, the likelihood does not change significantly across conditions. The number of pro-social experts in the market does not seem to matter for price-setting behavior.

Experimental evidence suggests that the markup difference is, on average, negative in both conditions with mean values of −1.91 and −1.47 in NoAttention and Attention, respectively. Figure 3 shows that the average markup difference in Attention is less negative than in NoAttention that is, prices set are significantly closer to the equal-markup prices predicted by standard theory. This difference is significant on the aggregate level ($p = 0.027$, t-test with clustering on subject level). Additionally, Table 4 shows a substantial effect of Attention on an individual level: Experts whose profits are displayed to consumers post price vectors with a significantly higher markup difference. We account for market characteristics and observe that the markup difference is also heavily affected by the overall price level and inertia. We include them in our regression analysis to control for these possible explanations. However, experts do not account for interaction in the previous period and the sufficiency of the treatment they have previously provided.

Social preference classification provides surprising evidence: Displaying the experts' profits has the opposite impact on the average markup difference for pro-social and selfish experts. We find that the increase in the markup difference we have documented on the aggregate and market levels is driven entirely by selfish experts. Consumers' attention to their profits has a substantial positive effect on them. Pro-social experts, on the contrary, post price vectors with an even lower markup difference in Attention condition in comparison to NoAttention.

Table 4: Markup difference.

Markup difference Δ	All experts			Pro-social experts	Selfish experts
	(1)	(2)	(3)		
Attention	2.93***	1.22***	1.22***	−0.78**	1.76***
	(0.34)	(0.26)	(0.26)	(0.31)	(0.50)
Pro-social market				−0.23	−0.26
				(1.37)	(0.29)
Major price		0.55***	0.55***	0.67***	0.43***
		(0.06)	(0.06)	(0.08)	(0.08)
Markup difference $_{t-1}$		0.52***	0.52***	0.19***	0.41***
		(0.04)	(0.04)	(0.07)	(0.06)
Interaction $_{t-1}$			0.01	−0.17	0.12
			(0.13)	(0.13)	(0.19)
Sufficient $_{t-1}$			−0.05	−0.13	−0.11
			(0.14)	(0.16)	(0.20)
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Number of obs.	960	900	900	360	540

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences and elicited beliefs. We also include time (period) and market fixed effects.

Next, we want to analyze whether the increase in the markup difference was driven by an increase of $\overline{p}$, a decrease of $\underline{p}$, or both. The price for the minor treatment is on average 5.68 in NoAttention and 5.39 in Attention. The price for the major treatment is on average 7.77 in NoAttention and 7.93 in Attention. Regression analysis in Table 5 shows, however, that the higher markup difference in Attention than in NoAttention is driven mainly by the lower price of the minor treatment. Both prices for major and minor treatments are significantly autocorrelated, that is, are highly correlated with the respective prices set in the previous period. Both prices are also positively correlated to the interaction in the previous period.

Table 5: Prices.

Prices	All experts		Pro-social experts		Selfish experts	
	$\underline{p}$	$\overline{p}$	$\underline{p}$	$\overline{p}$	$\underline{p}$	$\overline{p}$
Attention	−0.93***	0.12	0.81***	0.25	−1.23**	0.23
	(0.26)	(0.22)	(0.28)	(0.25)	(0.48)	(0.38)
Pro-social market			0.44	0.82	0.16	0.23
			(1.61)	(1.78)	(0.26)	(0.22)
Minor price $_{t-1}$	0.54***		0.33***		0.57***	
	(0.05)		(0.07)		(0.07)	
Major price $_{t-1}$		0.47***		0.43***		0.43***
		(0.05)		(0.08)		(0.07)
Markup difference $_{t-1}$	−0.09**	0.03	−0.00	−0.13**	0.05	−0.01
	(0.04)	(0.03)	(0.07)	(0.07)	(0.06)	(0.05)
Interaction $_{t-1}$	0.40***	0.30***	0.35**	0.23	0.39**	0.30**
	(0.11)	(0.11)	(0.14)	(0.15)	(0.16)	(0.14)
Sufficient $_{t-1}$	0.05	0.03	0.19	0.17	0.06	−0.05
	(0.12)	(0.12)	(0.16)	(0.18)	(0.18)	(0.15)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	900	900	360	360	540	540

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs. We also include time (period) and market fixed effects.

Table 5 also shows the mechanism of price setting for pro-social and selfish experts. There is no effect of displaying experts' profits on the price of the major treatment: neither for pro-social nor for selfish experts. Instead, the difference in their behavior is captured entirely by $\underline{p}$. Pro-social experts set the price of the minor treatment 0.8 ECU higher in Attention compared to NoAttention, whereas selfish experts, on the contrary, lower it by 1.2 ECU in Attention. Therefore, the price for the minor treatment drives the gap of the display effect on the markup difference of about 2 ECU.

One could argue that displaying expert's profits to consumers decreases the overall complexity of the experiment. However, as shown in Figure 4, time trends in both prices are very similar in Attention and NoAttention, which suggests that price differences can be explained by condition and not by difference in learning. Parallel development of prices over 16 periods helps us to rule out this potential explanation.

Mistreatment

If a consumer decided to interact upon posted prices, an expert observes the severity of her problem and chooses which treatment to provide. Given verifiability, there is no scope for overcharging. However, experts may still mistreat consumers. Mistreatment can generally occur in two cases: when a consumer with a minor problem receives a major treatment (overtreatment), and when a consumer with a major problem receives a minor treatment (undertreatment). Under- and overtreatment rates are calculated as a share of all under-/overtreatments given under-/overtreatment was possible (that is, undertreatment rates for only consumers with major problems, overtreatment rates for only consumers with minor problems).

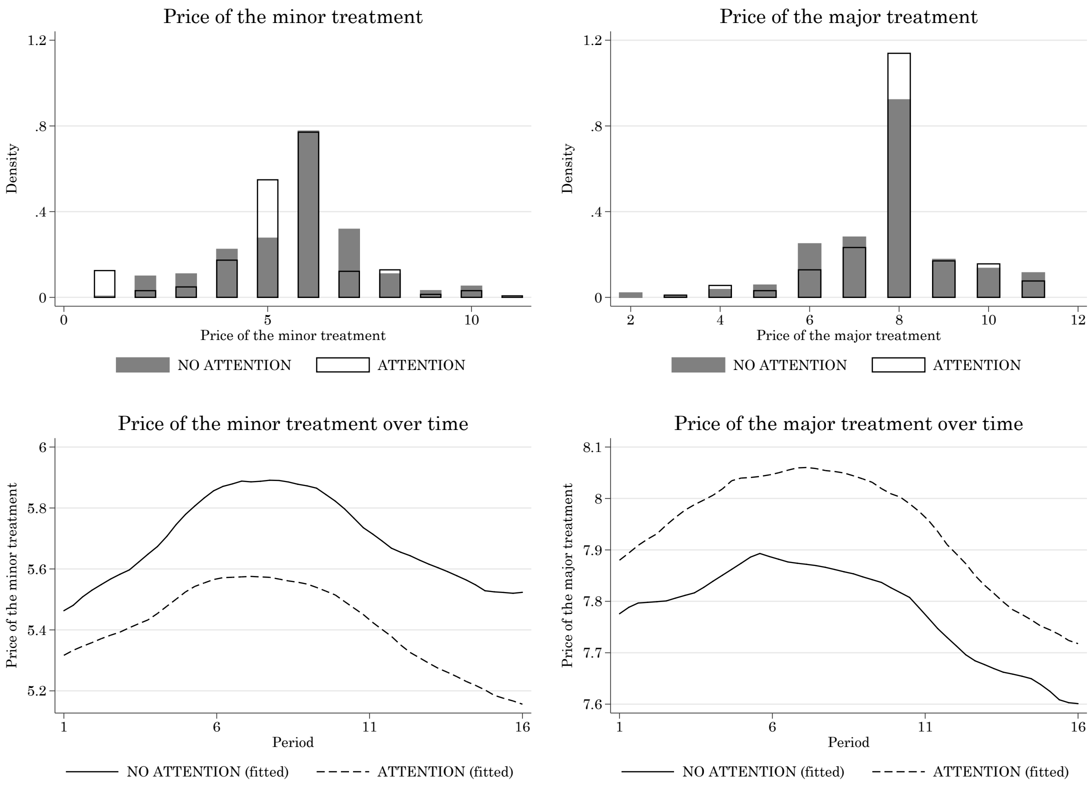

Figure 4: Prices

Note: Fitted values are estimated using Epanechniov kernel with optimal bandwidth.

Undertreatment rates are 53.66% and 49.69% in NoAttention and Attention, respectively (MWU test, $p = 0.560$). Overtreatment rates are 20.19% and 20.57% in NoAttention and Attention, respectively (MWU test, $p = 0.943$). We estimate the probability of sufficient treatment provision for consumers with a major problem and show the results in Table 6. We find that, overall, consumers in Attention are more likely to receive a sufficient treatment in comparison to those in NoAttention, which is in line with Hypothesis 3. The impact of displaying experts' profits is insignificant for selfish experts but large and highly significant for pro-social experts: Pro-social experts are almost twice as likely to provide a sufficient treatment in Attention compared to NoAttention. Interestingly, despite posting more undertreatment price vectors, pro-social experts undertreat less. Selfish experts, on the contrary, post fewer undertreatment vectors in Attention; however, their likelihood of sufficient treatment provision does not vary significantly.

Generally, experts in Attention make more efficient decisions. The probability of providing a sufficient treatment conditional on a consumer having a minor problem is 50.31%, and it differs a lot depending on the price vector, an expert chose in this period: It is less likely that an expert provides sufficient treatment if he posted an undertreatment vector (41.60%) and more likely otherwise (82.35%). In NoAttention this pattern is much less pronounced. The probability of providing a sufficient treatment conditional on a consumer having a minor problem is 46.34%, and it differs rather little depending on the price vector set: When an undertreatment vector has been posted, an expert provides a sufficient treatment with a probability of 45.07%. Otherwise, the probability of sufficient treatment provision is higher (54.55%), but only marginally.

Table 6: Probability of sufficient treatment provision.

Sufficient	All experts			Pro-social	Selfish
	(1)	(2)	(3)	experts	experts
Attention	0.34***	0.27**	0.23*	0.97***	0.40
	(0.12)	(0.13)	(0.13)	(0.36)	(0.25)
Pro-social market				−0.16	−0.15
				(0.16)	(0.15)
Undertreatment vector		☑	☑	☑	☑
Overtreatment vector			☑	☑	☑
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Number of obs.	241	241	241	86	155

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs. We also include time (period) and market fixed effects.

Table 7: Overtreatment probability.

Overtreatment	All experts			Pro-social	Selfish
	(1)	(2)	(3)	experts	experts
Attention	0.50***	0.20**	0.14*	0.19	0.38***
	(0.13)	(0.09)	(0.08)	(0.13)	(0.15)
Pro-social market				-0.15**	-0.22**
				(0.07)	(0.10)
Undertreatment vector		☑	☑	☑	☑
Overtreatment vector			☑	☑	☑
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Number of obs.	241	241	241	74	158

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences and elicited beliefs. We also include time (period) and market fixed effects.

Average overtreatment probabilities are very similar in Attention (20.57%) and NoAttention (20.19%) (MWU test, $p = 0.943$). However, we find that conditional on other market outcomes, consumers in Attention are more likely to be overtreated than in NoAttention (see Table 7). More precisely, when an expert in Attention condition posts an overtreatment vector, and a matched consumer has a minor problem the expert overtreats with certainty (a probability of 100%), whereas the probability of overtreatment is only 7.44% when another price vector was posted. In NoAttention the pattern is similar but less pronounced. When an overtreatment price vector was posted, consumers are 55.56% likely to be overtreated, and 16.84% otherwise. The social expert classification shows that the probability of overtreatment increases with displaying experts' profits but only for selfish experts. Pro-social experts only have an insignificant increase in their likelihood to overtreat, whereas selfish experts are about 38 percentage points more likely to overtreat in Attention.

Consumer outcomes

In our experiment, the only decision consumers make is whether to interact after observing the prices posted by experts. The trade-off they face is whether to go for a safe outside option of 1.6

ECU or interact and face the risk of being mistreated.

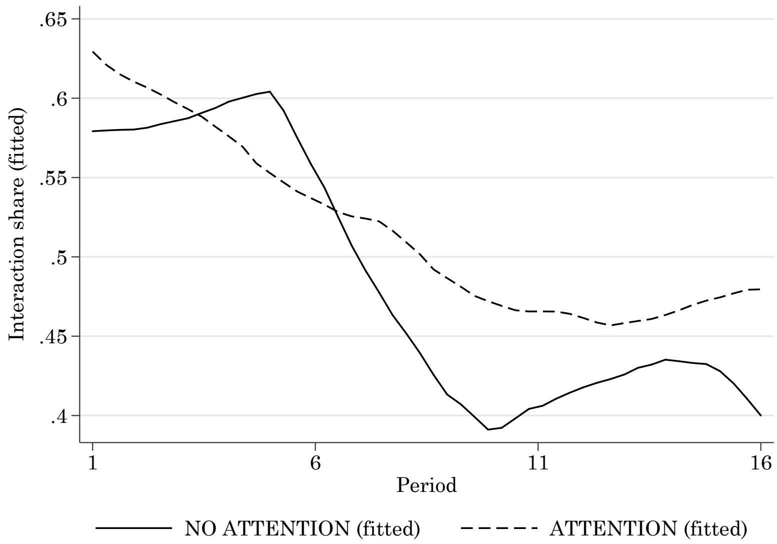

Figure 5: Interaction probability over time.

Note: Fitted values are estimated using Epanechnikov kernels with an optimal bandwidth.

In both conditions, consumers interact about half of the time: Interaction rates are 48.44% and 52.08% in NoAttention and Attention, respectively. Table 8 summarizes interaction probabilities depending on the posted price vector: consumers are most likely to interact when undertreatment price vectors are posted. It is in line with our theoretical predictions: When a consumer's attention is limited, she perceives an undertreatment price vector as an equal-markup vector, an equal-markup vector as an overtreatment vector, etc. Therefore, when an expert posts an actual overtreatment price vector, it is perceived as a very unattractive offer by consumers with limited attention who thus become less likely to interact.

Table 8: Interaction probability by price vector posted (%).

	NoAttention	Attention
Undertreatment vector	50.66	52.47
Equal-markup vector	45.45	49.15
Overtreatment vector	33.33	52.11

As shown in Figure 5, interaction probability has a rather strong time trend. In the early periods, consumers are likely to interact, and this probability decreases over time. For example, in the first period, 62.5% of consumers in NoAttention and 72.2% of consumers in Attention choose to interact, whereas in the last (16^{th}) period, only 33.33% of consumers in NoAttention and 50% of consumers in Attention choose to do so. Our regression analysis in Table 9 provides evidence that there is no significant effect of displaying experts' profits on interaction probability.

Welfare

Various key market outcomes, such as markup difference and mistreatment rates, are influenced by attention which can lead to welfare implications. We analyze how welfare differs between

Table 9: Interaction probability.

Interaction	All consumers (1)	(2)	(3)	Pro-social consumers	Selfish consumers
ATTENTION	−0.01	0.01	−0.07	0.10	0.22
	(0.09)	(0.10)	(0.10)	(0.15)	(0.15)
Pro-social market				−0.08	−0.08
				(0.08)	(0.08)
Markup difference	☑	☑	☑	☑	☑
Markup difference $_{t-1}$			☑	☑	☑
Major price	☑	☑	☑	☑	☑
Major price $_{t-1}$			☑	☑	☑
Interaction $_{t-1}$		☑	☑	☑	☑
Sufficient $_{t-1}$		☑	☑	☑	☑
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Number of obs.	960	900	900	480	420

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs. We also include time (period) and market fixed effects.

Table 10: Efficiency.

Efficiency	All	Pro-social	Selfish
ATTENTION	0.05***	0.02**	0.11***
	(0.01)	(0.01)	(0.01)
Pro-social market	−0.06***	−0.04***	-0.08***
	(0.00)	(0.00)	(0.00)
Major price	☑	☑	☑
Markup difference	☑	☑	☑
Interaction	☑	☑	☑
Sufficient	☑	☑	☑
Individual controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Number of obs.	1920	896	1024

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Individual controls include age, gender, measures for loss aversion, risk aversion, social preferences, and elicited beliefs. We also include time (period) and market fixed effects.

conditions, and break it down to consumer and expert surplus. We construct a market-level efficiency following Mimra et al. (2016). We calculate efficiency level as cumulative profits in the market less the outside option of all players, and normalize it with respect to the distribution of consumers in the respective market, which allows accounting for the random differences in total welfare generated by the severity of consumers' issues.[12]

Our data show that, despite the theoretical probability of consumers to have a minor problem is 50%, the minor problem actually arises in 47% and 56% of cases in ATTENTION and NOATTENTION. The severity of the treatment affects crucially the cumulative profits a consumer-expert pair can generate, and, thus, it is important to take it into account for estimating efficiency.

[12]Given interaction, every consumer is randomly assigned to have a major or a minor problem with a probability of 50%. In case of a minor problem, every consumer-expert pair can generate at least $(10 - p) + (p - 6) = 4$ and at most $(10 - p) + (p - 2) = 8$. In case of a major problem, every consumer-expert pair can only generate $(0 - p) + (p - 2) = -2$ in the worst case and $(10 - p) + (p - 6) = 4$ in the best case. We thus account for these differences when calculating the market efficiency measure.

We find that efficiency indeed increases if experts' profits are displayed to consumers. On average, efficiency increases by five percentage points with displaying experts' profits. The effect is significant for sub-samples with different social preferences. However, we find a particularly pronounced efficiency gain from displaying experts' profits for selfish subjects: It accounts for eleven percentage points increase in market efficiency on average.

5 Conclusion

There are contradictions between theoretical predictions and empirical evidence on the role of verifiability in the credence goods market. While theory predicts that, under certain conditions, verifiability leads to market efficiency, observations from real markets go against this prediction. We are the first to provide theoretical argumens and experimental evidence that consumer's limited attention plays a role in this inconsistency. Our finding goes in line with recent advocacy for more transparency on experts' pay in credence goods markets, such as healthcare or repair services.

Based on the inherent features of lab experiments on the credence goods market, we set up a model of a monopolistic credence goods market in which consumers pay limited attention to expert's costs, resulting in a false assessment of the expert's financial incentives. Our model further assumes that the expert knows that consumers pay limited attention to their costs, whereas consumers are unaware thereof. Our main hypotheses are that an increase in consumers' attention with regard to experts' costs results in (i) a decrease in consumer interaction given an undertreatment tariff, (ii) a decrease in the number of undertreatment tariffs and insufficient treatments, and (iii) a smaller markup difference between the major treatment and the minor treatment.

We test the hypotheses in a laboratory experiment and find support for the last two hypotheses. When expert costs are displayed, we observe less undertreatment, and experts' price vectors are significantly closer to equal-markup pricing. We do not find strong supporting evidence for the first hypothesis. Interestingly, we observe that interaction given an overtreatment tariff when experts' cost are displayed is much higher than under limited attention. We argue that risk aversion and experimental parameterization might account for this effect. In terms of welfare, displaying experts' profits leads to an increase in accumulated payoffs. Throughout, we observe a heterogeneity of results with regard to social preference. Increasing consumers' attention is most beneficial to them when they face selfish experts. It drastically reduces selfish experts' probability to post undertreatment price vectors, bringing their markup difference much closer to equal. For pro-social experts, increasing consumers' attention gives a large boost in probability of providing a sufficient treatment independent of their pricing strategy.

Overall, our results suggest that consumers' limited attention is a possible explanation for the empirical evidence on the inefficiency of verifiability in credence goods market. Furthermore, our study draws a rather nuanced picture when it comes to the merits of displaying experts' costs or profits. We observe a positive effect on undertreatment, markups, and welfare, but we do not find an overall increase in interaction compared to the case in which costs are not explicitly mentioned again. Hence, increasing consumer awareness might serve consumers who choose to interact and all experts, but might do more harm than good to consumers who interact less, or refrain from interaction altogether. Taken on its own, our findings explain why providers in healthcare and repair service appear not to object to calls for more information for consumers.

References

Armstrong, Mark and John Vickers (2012). “Consumer Protection and Contingent Charges”. *Journal of Economic Literature* 50.2, 477–93.

Balafoutas, Loukas, Adrian Beck, Rudolf Kerschbamer, and Matthias Sutter (2013). “What drives taxi drivers? A field experiment on fraud in a market for credence goods”. *Review of Economic Studies* 80.3, 876–891.

Balafoutas, Loukas, Rudolf Kerschbamer, and Matthias Sutter (2015). “Second-Degree Moral Hazard In A Real-World Credence Goods Market”. *Economic Journal* 127.599, 1–18.

Bordalo, Pedro, Nicola Gennaioli, and Andrei Shleifer (2012). “Salience theory of choice under risk”. *The Quarterly journal of economics* 127.3, 1243–1285.

— (2013). “Salience and Consumer Choice”. *Journal of Political Economy* 121.5, 803–843.

Bordalo, Pedro, Nicola Gennaioli, Andrei Shleifer, et al. (2020). “Memory, Attention, and Choice”. *Quarterly Journal of Economics* 135.3, 1399–1442.

Darby, Michael R. and Edi Karni (1973). “Free Competition and the Optimal Amount of Fraud”. *Journal of Law and Economics* 16.1, 67–88.

Dulleck, Uwe and Rudolf Kerschbamer (2006). “On doctors, mechanics, and computer specialists: The economics of credence goods”. *Journal of Economic Literature* 44.1, 5–42.

— (2009). “Experts vs. Discounters: Consumer Free-Riding and Experts Withholding Advice in Markets for Credence Goods”. *International Journal of Industrial Organization* 27.1, 15–23.

Dulleck, Uwe, Rudolf Kerschbamer, and Matthias Sutter (2011). “The economics of credence goods: An experiment on the role of liability, verifiability, reputation, and competition”. *American Economic Review* 101.2, 526–555.

Emons, Winand (1997). “Credence Goods and Fraudulent Experts”. *RAND Journal of Economics* 28.1, 107–119.

— (2001). “Credence Goods Monopolists”. *International Journal of Industrial Organization* 19.3-4, 375–389.

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde (2018). “Global Evidence on Economic Preferences”. *Quarterly Journal of Economics* 133.4, 1645–1692.

Falk, Armin, Anke Becker, Thomas Dohmen, David Huffman, and Uwe Sunde (2016). “The preference survey module: A validated instrument for measuring risk, time, and social preferences”. *IZA DP No. 9674*.

Federal Bureau of Investigation (2011). *Financial Crimes Report to the Public: Fiscal Year 2010-2011*. United States Department of Justice.

Fischbacher, Urs (2007). “z-Tree: Zurich Toolbox for Ready-Made Economic Experiments”. *Experimental Economics* 10.2, 171–178.

Fong, Yuk-fai, Ting Liu, and Donald J. Wright (2014). “On the role of verifiability and commitment in credence goods markets”. *International Journal of Industrial Organization* 37, 118–129.

Frankel, Alexander and Michael Schwarz (2014). “Experts and Their Records”. *Economic Inquiry* 52.1, 56–71.

Gabaix, Xavier and David Laibson (2006). “Shrouded attributes, consumer myopia, and information suppression in competitive markets”. *Quarterly Journal of Economics* 121.2, 505–540.

Gottschalk, Felix, Wanda Mimra, and Christian Waibel (2020). “Health Services as Credence Goods: A Field Experiment”. *Economic Journal* 130.629, 1346–1383.

Greiner, Ben (2004). *The Online Recruitment System ORSEE 2.0 - A Guide for the Organization of Experiments in Economics.* Report. University of Cologne.

Grubb, Michael D. (2015a). "Consumer Inattention and Bill-Shock Regulation". *Review of Economic Studies* 82.1, 219–257.

— (2015b). "Failing to Choose the Best Price: Theory, Evidence, and Policy". *Review of Industrial Organization* 47.3, 303–340.

Heidhues, Paul and Botond Kőszegi (2017). "Naïveté-Based Discrimination". *Quarterly Journal of Economics* 132.2, 1019–1054.

— (2018). "Behavioral industrial organization". In: *Handbook of Behavioral Economics - Foundations and Applications 1.* Ed. by B. Douglas Bernheim, Stefano DellaVigna, and David Laibson. Vol. 1. Handbook of Behavioral Economics: Applications and Foundations 1. North-Holland. Chap. 6, pp. 517–612.

Hilger, Nathaniel G. (2016). "Why Don't People Trust Experts?" *The Journal of Law and Economics* 59.2, 293–311.

Holt, Charles A. and Susan K. Laury (2002). "Risk Aversion and Incentive Effects". *American Economic Review* 92.5, 1644–1655.

Karle, Heiko, Georg Kirchsteiger, and Martin Peitz (2015). "Loss aversion and consumption choice: Theory and experimental evidence". *American Economic Journal: Microeconomics* 7.2, 101–20.

Kerschbamer, Rudolf, Daniel Neururer, and Matthias Sutter (2016). "Insurance coverage of customers induces dishonesty of sellers in markets for credence goods". *Proceedings of the National Academy of Sciences* 113.27, 7454–7458.

Kerschbamer, Rudolf and Matthias Sutter (2017). "The Economics of Credence Goods–A Survey of Recent Lab and Field Experiments". *CESifo Economic Studies* 63.1, 1–23.

Kerschbamer, Rudolf, Matthias Sutter, and Uwe Dulleck (2017). "How social preferences shape incentives in (experimental) markets for credence goods". *Economic Journal* 127.600, 393–416.

Lim, Sonya S. and Siew Hong Teoh (2010). "Limited attention". In: *Behavioral Finance: Investors, Corporations, and Markets.* Ed. by H. Kent Baker and John R. Nofsinger. The Robert W. Kolb Series in Finance. Wiley. Chap. 16, pp. 295–312.

Liu, Ting (2011). "Credence Goods Markets with Conscientious and Selfish Experts". *International Economic Review* 52.1, 227–244.

McGuire, Thomas G. (2000). "Physician agency". In: *Handbook of Health Economics.* Ed. by J. Culyer Anthony and P. Newhouse Joseph. Vol. 1, Part A. Elsevier. Chap. 9, pp. 461–536.

Mimra, Wanda, Alexander Rasch, and Christian Waibel (2016). "Price competition and reputation in credence goods markets: Experimental evidence". *Games and Economic Behavior* 100, 337–352.

Rasch, Alexander and Christian Waibel (2018). "What Drives Fraud in a Credence Goods Market? Evidence From a Field Study". *Oxford Bulletin of Economics and Statistics* 80, 605–624.

Schneider, Henry S. (2012). "Agency Problems and Reputation in Expert Services: Evidence From Auto Repair". *Journal of Industrial Economics* 60.3, 406–433.

Taylor, Curtis R. (1995). "The Economics of Breakdowns, Checkups, and Cures". *Journal of Political Economy* 103.1, 53–74.

Wagner, Gert G, Joachim R Frick, and Jürgen Schupp (2007). "The German Socio-Economic Panel Study (SOEP) - evolution, scope and enhancements". *SOEP Papers on Multidisciplinary Panel Data Research, No. 1.*

A Appendix

A.1 Experimental instructions (translated from German)

Thank you for your participation in this experiment. Please do not to talk to any other participants during the experiment. Today's experiment consists of several parts. Your earning is the total income from these parts. In addition, you will receive a show-up fee of 4 Euros for today's participation and for answering the questionnaire.

INSTRUCTIONS

2 roles and 16 rounds
This experiment consists of **16 rounds**, each of which consists of the same sequence of decisions. This sequence of decisions is explained in detail below.
There are 2 kinds of roles in this experiment: **player A** and **player B**. At the beginning of the experiment you will be randomly assigned to one of these two roles. On the first screen of the experiment you will see which role you are assigned to. Your role remains the same throughout the experiment. In your group, there are 4 players A and 4 players B.
One player A always interacts with one player B. However, the pairs **change** after each round. That means you will interact with a **new** player (the other role) every round.

All participants get the same information on the rules of the game, including the costs and payoffs of both players.

Overview of the sequence of decisions in a round
Each round consists of a maximum of 3 decisions which are made consecutively. Decisions 1 and 3 are made by player A, decision 2 is made by player B.

1. Player A chooses one price for action 1 and one price for action 2.
2. Player B gets to know the prices chosen by player A. Then player B decides whether he/she wants to interact with player A. If not, this round ends for him/her.
If yes...
3. Player A (but **not** player B) is informed whether player B is of type 1 or type 2. Player A chooses thereupon either action 1 or action 2. Player B has to pay the price specified by player A in decision 1 for the action chosen by player A.

Detailed illustration of the decisions and their consequences regarding payoffs

Decision 1

- **Player A** has to choose between 2 actions (action 1 and action 2) at decision 3.
- **Action 1** costs player A **2 points** (= currency of the experiment).
- **Action 2** costs player A **6 points.**
- Player A can charge prices for these actions from player B who decide to interact with him/her. At **decision 1** each Player A has to **set the prices for both actions**. Only

(strictly) positive integer numbers are possible, i.e., only 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 are valid prices.

- Note that the price for action 1 must not exceed the price for action 2.

Decision 2
**Instruction of Decision 2 differs between the two conditions.*
(NoAttention **condition)**

- **Player B** gets to know the **prices** of player A for the two actions at decision 1. Then player B decides whether he/she wants to interact with player A or not.
- **If he/she wants to do so**, player A can choose an action at decision 3 and charge a price for that action (see below). **If he/she does not want to interact,** this round **ends** for player B and he/she gets a **payoff of 1.6 points** for this round.

(Attention **condition)**

- **Player B** gets to know the **prices and profits** of player A for the two actions at decision 1. Then player B decides whether he/she wants to interact with player A or not.
- **If he/she wants to do so**, player A can choose an action at decision 3 and charge a price for that action (see below). **If he/she does not want to interact,** this round **ends** for player B and he/she gets a **payoff of 1.6 points** for this round.

Decision 3

- Before decision 3 is made (in case player B chooses "Yes" at decision 2) a type is randomly assigned to player B. **Player B** can be one of the two types: **type 1** or **type 2**. This type is randomly determined for each player B **in each new round**.
- With a probability of **50% player B is of type 1**, and with a probability of **50% he/she is of type 2**. Imagine that a coin is tossed for each player B in each round. If the result is, e.g., "heads", player B is of type 1; if the result is "tails", he/she is of type 2.
- Every **player A** gets to **know the types of player B** who interact with him/her before he makes his decision 3. Then player A chooses an action for each player B, either action 1 or action 2.
- An **action** is **sufficient** in the following cases:

  a) Player B has type 1 and player A chooses either action 1 or action 2.

  b) Player B has type 2 and player A choose action 2.
- An action is **not sufficient**, if player B has type 2 but player A chooses action 1.
- **Player B** receives **10 points**, if the action chosen by player A is **sufficient**. **Player B** receives **0 point**, if the action chosen by player A is **not sufficient**.
- **At no time player B** will be informed whether he/she is of type 1 or a type 2 player in each round, as well as which action player A has chosen.

- **Player A** charges player B the **price** set out in decision 1 for the action chosen in decision 3.

Payoffs
If player B chose not to interact with any of the players A (*decision **"No"** from player B*), both player A and player B get **1.6 points** for this particular round.

Otherwise (*decision "Yes" by player B*) the payoffs are as follows:
Player A receives the according **price** (denoted in points) he/she set at decision 1 **less the costs** for the action chosen at decision 3.

The payoff of **player** B depends on whether the action chosen by player A in decision 3 was sufficient or not:
a) If the action chosen by player A was sufficient, Player B gets 10 points less the price set in decision 1 for the action chosen at decision 3.
b) If the action chosen by player A was not sufficient, Player B has to pay the price set in decision 1 for the action chosen at decision 3.

At the beginning of the experiment you receive an **initial endowment of 6 points**. With this endowment you are able to cover losses that might occur in some rounds. Losses can also be compensated by gains in other rounds. If your total payoff sums up to a loss at the end of the experiment you will have to pay this amount to the supervisor of the experiment. By participating in this experiment you agree to this term. **Please note that there is always a possibility to avoid losses in this experiment.**

To calculate the payoff of this part, the initial endowment and the profits of all rounds are added up. This sum is then converted into cash using the following exchange rate:

1 point = 25 Euro-cents
(i.e., 4 points = 1 Euro)

You will see all further instruction on the computer screen.

A.2 Experimental instructions (German, original)

Herzlichen Dank für Ihre Teilnahme am Experiment. Bitte sprechen Sie bis zum Ende des Experiments nicht mehr mit anderen Teilnehmern. Das heutige Experiment besteht aus mehreren Teilen. Ihr Verdienst des Experiments ist das Gesamteinkommen aus diesen Teilen. Außerdem erhalten Sie pauschal 4 Euro für die heutige Teilnahme und für das Beantworten des Fragebogens.

INSTRUKTIONEN

2 Rollen und 16 Runden
Dieses Experiment besteht aus 16 Runden, die jeweils die gleiche Abfolge an Entscheidungen haben. Die Abfolge der Entscheidungen wird unten ausführlich erklärt.
Es gibt im Experiment 2 Rollen: Spieler A und Spieler B. Zu Beginn des Experiments bekommen Sie eine dieser Rollen zufällig zugelost und behalten diese Rolle für das gesamte Experiment. Auf

dem ersten Bildschirm des Experiments sehen Sie, welche Rolle Sie haben. Diese Rolle bleibt für alle Spielrunden gleich. In Ihrer Gruppe sind 4 Spieler A und 4 Spielern B.
Ein Spieler A interagiert immer mit einem Spieler B. Allerdings wechseln die Paare nach jeder Runde. D.h. dass Sie jede Runde mit einem neuen Spieler (der anderen Rolle) interagieren.

Alle Experimentteilnehmer erhalten die gleichen Informationen bezüglich der Regeln des Spiels, inklusive der Kosten und Auszahlungen an beide Spieler.

Überblick über die Entscheidungen in einer Runde
Jede einzelne Runde besteht aus maximal 3 Entscheidungen, die hintereinander getroffen werden. Die Entscheidungen 1 und 3 werden von Spieler A getroffen; die Entscheidung 2 wird von Spieler B getroffen.

1. Spieler A wählt Preise für Aktion I und Aktion II.
2. Spieler B erfährt die von Spieler A gewählten Preise. Spieler B entscheidet, ob er/sie mit Spieler A interagieren möchte. Falls nein, endet diese Runde.
Falls ja...
3. Spieler A (aber nicht Spieler B) erhält die Information, ob Spieler B die Eigenschaft I oder die Eigenschaft II hat. Spieler A wählt daraufhin Aktion I oder Aktion II. Spieler B hat den für die gewählte Aktion festgesetzten Preis zu bezahlen.

Detaillierte Darstellung der Entscheidungen und ihrer Konsequenzen hinsichtlich der Auszahlungen

Entscheidung 1

- **Spieler A** wählt in Entscheidung 3 zwischen zwei Aktionen, einer Aktion I und einer Aktion II.
- Die **Aktion I** verursacht **Kosten von 2 Punkten** (= experimentelle Währungseinheit) für Spieler A.
- Die **Aktion II** verursacht **Kosten von 6 Punkten** für Spieler A.
- Für diese Aktionen kann Spieler A Preise von Spieler B verlangen. In **Entscheidung 1** muss Spieler A diese **Preise für beide Aktionen festlegen**. Nur (strikt) positive Preise in vollen Punkten von 1 Punkt bis maximal 11 Punkte sind möglich. D.h. die zulässigen Preise sind 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 oder 11.
- Beachten Sie, dass der Preis für die Aktion I den Preis für die Aktion II nicht übersteigen darf.

Entscheidung 2
**Instruction of Decision 2 differs between the two conditions.*
(NoAttention condition)

- **Spieler B** erfährt zuerst die von Spieler A in Entscheidung 1 gesetzten Preise. Dann entscheidet Spieler B, ob er/sie mit Spieler A interagieren möchte.

- **Falls ja**, dann bedeutet das, dass Spieler A in Entscheidung 3 eine Aktion wählen und den dafür gesetzten Preis verlangen kann (siehe unten). **Falls nein**, dann endet diese Runde und beide Spieler erhalten als **Auszahlung für diese Runde 1,6 Punkte.**

(ATTENTION **condition)**

- **Spieler B** erfährt zuerst die von Spieler A in Entscheidung 1 gesetzten Preise und Profite des Spielers A. Dann entscheidet Spieler B, ob er/sie mit Spieler A interagieren möchte.
- **Falls ja**, dann bedeutet das, dass Spieler A in Entscheidung 3 eine Aktion wählen und den dafür gesetzten Preis verlangen kann (siehe unten). **Falls nein**, dann endet diese Runde und beide Spieler erhalten als **Auszahlung für diese Runde 1,6 Punkte**.

Entscheidung 3

- Vor der Entscheidung 3 (falls Spieler B in Entscheidung 2 „Ja" gewählt hat) wird dem Spieler B zufällig eine Eigenschaft zugelost. **Spieler B** kann 2 Eigenschaften haben: **Eigenschaft I** oder **Eigenschaft II**. Die Eigenschaft wird **jede Runde neu** zufällig bestimmt.
- Spieler B hat mit einer Wahrscheinlichkeit von **50% die Eigenschaft I** und mit einer Wahrscheinlichkeit von **50% die Eigenschaft II**. Stellen Sie sich in jeder Runde einen Münzwurf vor. Wenn beispielsweise „Kopf" kommt, dann hätte Spieler B die Eigenschaft I, falls „Zahl" kommt, hätte er die Eigenschaft II.
- **Spieler A erfährt** *vor* seiner Entscheidung 3 die **Eigenschaft von Spieler B**. Dann wählt Spieler A eine Aktion, entweder Aktion I oder Aktion II.
- Eine **Aktion** ist unter folgenden Bedingungen **ausreichend**:

  a) Spieler B hat die Eigenschaft I und Spieler A wählt entweder die Aktion I oder die Aktion II.

  b) Spieler B hat die Eigenschaft II und Spieler A wählt die Aktion II.
- Eine Aktion ist **nicht ausreichend**, wenn Spieler B die Eigenschaft II hat, aber Spieler A die Aktion I wählt.
- **Spieler B** erhält **10 Punkte**, wenn die von Spieler A gewählte **Aktion ausreichend** ist. **Spieler B** erhält **0 Punkte**, wenn die von Spieler A gewählte **Aktion nicht ausreichend** ist.
- **Spieler B** wird zu **keiner** Zeit auf dem Computerbildschirm darüber informiert, ob er/sie in einer Runde die Eigenschaft I oder die Eigenschaft II hatte bzw. welche Aktion Spieler A gewählt hat.
- Spieler A **verlangt** von Spieler B den in Entscheidung 1 festgelegten **Preis** für die in Entscheidung 3 gewählte Aktion.

Auszahlungen

Wenn Spieler B in Entscheidung 2 die Runde beendet (*Entscheidung „**Nein**" von Spieler B*), dann erhalten beide Spieler in dieser Runde **1,6 Punkte**.

Ansonsten (*Entscheidung „**Ja**" von Spieler B*) sind die Auszahlungen wie folgt:

Spieler A erhält den in Entscheidung 1 (für die in Entscheidung 3 gewählte Aktion) festgelegten Preis (in Punkten) **abzüglich der Kosten** für die in Entscheidung 3 gewählte Aktion.

Für **Spieler B** hängt die Auszahlung davon ab, ob die von Spieler A in Entscheidung 3 gewählte Aktion ausreichend war.
a) Die Aktion von Spieler A war ausreichend. **Spieler B** erhält **10 Punkte abzüglich** des in Entscheidung 1 festgelegten **Preises** für die in Entscheidung 3 gewählte Aktion. b) Die Aktion von Spieler A war nicht ausreichend. **Spieler B** muss den Preis für die in Entscheidung 3 gewählte Aktion bezahlen.

Zu Beginn des Experiments erhalten Sie eine **Anfangsausstattung von 6 Punkten**. Aus dieser Anfangsausstattung können Sie auch mögliche Verluste in einzelnen Runden bezahlen. Verluste sind aber auch durch Gewinne aus anderen Runden ausgleichbar. Sollten Sie am Ende des Experiments in Summe einen Verlust gemacht haben, müssen Sie diesen Verlust an den Experimentleiter bezahlen. Mit Ihrer Teilnahme am Experiment erklären Sie sich mit dieser Bedingung einverstanden. **Beachten Sie aber bitte, dass es in diesem Experiment immer eine Möglichkeit gibt, Verluste mit Sicherheit zu vermeiden.**

Für die Auszahlung dieses Teils werden die Anfangsausstattung und die Gewinne aller Runden zusammengezählt und mit folgendem Umrechnungskurs am Ende des Experiments in bares Geld umgetauscht:

1 Punkt = 25 Euro-Cent
(d.h. 4 Punkte = 1 Euro)

Alle weiteren Instruktionen sehen Sie auf Ihrem Bildschirm.

A.3 Questionnaire

The questionnaire at the end of the experiment contains the following items:

1. **Elicitation of beliefs:**
   (Only for sellers)
   When you set the price, did you expect that Player B will decide to interact? (Yes/No)
   Which action (Action 1 or Action 2) would you choose given the following scenarios?
   Price: 3 for Action 1 and 8 for Action 2
   Price: 4 for Action 1 and 8 for Action 2
   Price: 5 for Action 1 and 8 for Action 2
   Price: 6 for Action 1 and 8 for Action 2
   Price: 7 for Action 1 and 8 for Action 2
   (Only for buyers):
   As you decided to interact, did you expect that Player A will choose a sufficient action?
   Which action (Action 1 or Action 2) do you expect Player A to choose given the following scenarios? Price: 3 for Action 1 and 8 for Action 2
   Price: 4 for Action 1 and 8 for Action 2

Price: 5 for Action 1 and 8 for Action 2
Price: 6 for Action 1 and 8 for Action 2
Price: 7 for Action 1 and 8 for Action 2

2. **Risk preference, general risk question:** same wording as in German Socio-Economic Panel questionnaire (SOEP, see, for example, Wagner et al., 2007)
How do you evaluate yourself? Are you generally a risk-seeking person or do you try to avoid risks? The leftmost box means "not at all risk-seeking" and the rightmost "very risk-seeking". With the boxes in between, you can graduate your statement.

not at all risk-seeking ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ *very risk-seeking*

3. **Risk preference, incentivized choice list:** Subjects make eleven, pairwise decisions between a lottery with a fifty-fifty chance of winning either 2 EUR or 7 EUR and a safe payment. The safe payment increases in 0.5 EUR increments, ranging from 2 EUR to 7 EUR.

4. **Loss aversion** (similar to Karle et al., 2015)
You will answer questions related to lotteries. If you accept the lotteries, you can make either a profit or a loss. Below are six different lotteries. For each lottery, you can decide whether to accept or to reject it. If you reject, your payment remains unchanged. If you accept, your earning will make either an additional profit or an additional loss.

At the end of the experiment, one of the six lotteries will be randomly selected. So you should make every decision as if it were your only decision. The selected lottery is then randomly drawn to determine whether the additional profit or loss will be realized for you.

(All with the same options: Accept or Reject)

Lottery 1: With a 50% probability you lose 2 EUR and with a 50% probability you win 6 EUR.

Lottery 2: With a 50% probability you lose 3 EUR and with a 50% probability you win 6 EUR.

Lottery 3: With a 50% probability you lose 4 EUR and with a 50% probability you win 6 EUR.

Lottery 4: With a 50% probability you lose 5 EUR and with a 50% probability you win 6 EUR.

Lottery 5: With a 50% probability you lose 6 EUR and with a 50% probability you win 6 EUR.

Lottery 6: With a 50% probability you lose 7 EUR and with a 50% probability you win 6 EUR.

5. **Social preference** (Falk, Becker, Dohmen, Huffman, et al., 2016)
Question 1: Imagine the following situation: Today you unexpectedly received 1000 EUR. How much of this amount would you donate to a good cause? (Values between 0 and 1000 are allowed).
Question 2: Please think about what you would do in the following situation. You are

in an area you are not familiar with, and you realize that you lost your way. You ask a stranger for directions. The stranger offers to take you to your destination. Helping you costs the stranger about 20 EUR in total. However, the stranger says he or she does not want any money from you. You have six presents with you. The cheapest present costs 5 EUR, the most expensive one costs 30 EUR. Do you give one of the presents to the stranger as a "thank you" gift?
Which present do you give to the stranger?
1. No, would not give present
2. The present worth 5 EUR
3. The present worth 10 EUR
4. The present worth 15 EUR
5. The present worth 20 EUR
6. The present worth 25 EUR
7. The present worth 30 EUR

6. **Description of reasoning for decisions**
(Only for sellers)
Please answer the following questions:
How did you decide for the prices? Please describe what you thought when you set the prices.

How did you decide for the actions? Please describe, what you thought when you choose the action.

Did you change your strategy across periods? When yes, why?

(Only for buyers)
Please describe your thought when you made the decision whether or not to interact.
Did you change your strategy across periods? When yes, why?

7. **Socio-demographics:** age, gender, final grade point average at academic high school, last math grade at academic high school, field of study, monthly disposable amount of money, political orientation, number of experiments already participated in the same lab.

A.4 Exemplary screens of stage decisions

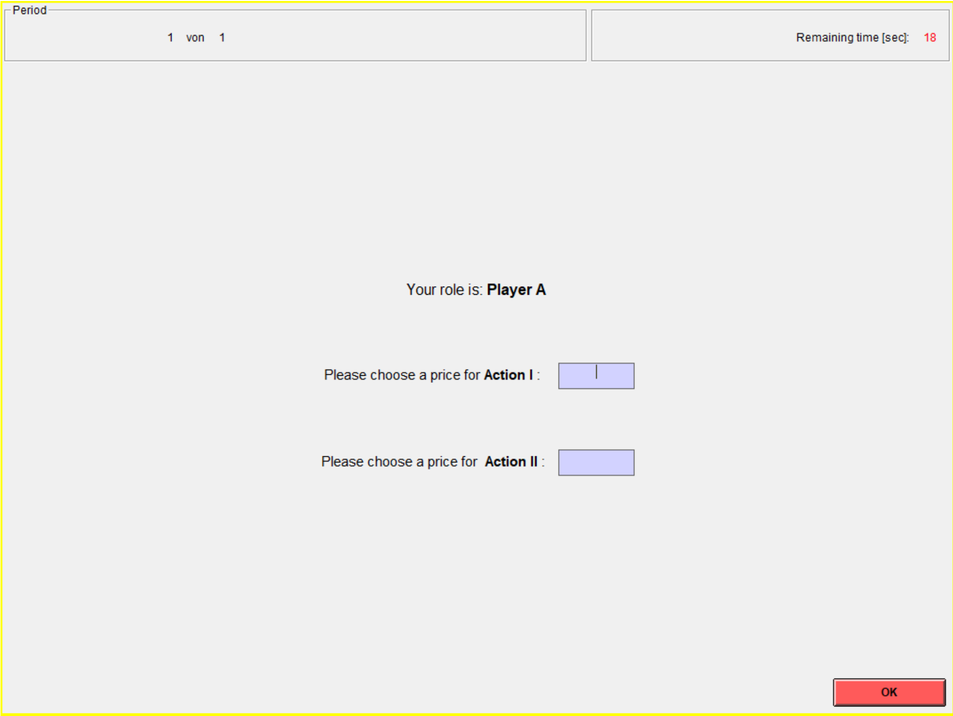

Figure 6: Exemplary screen (both conditions): Experts set prices.

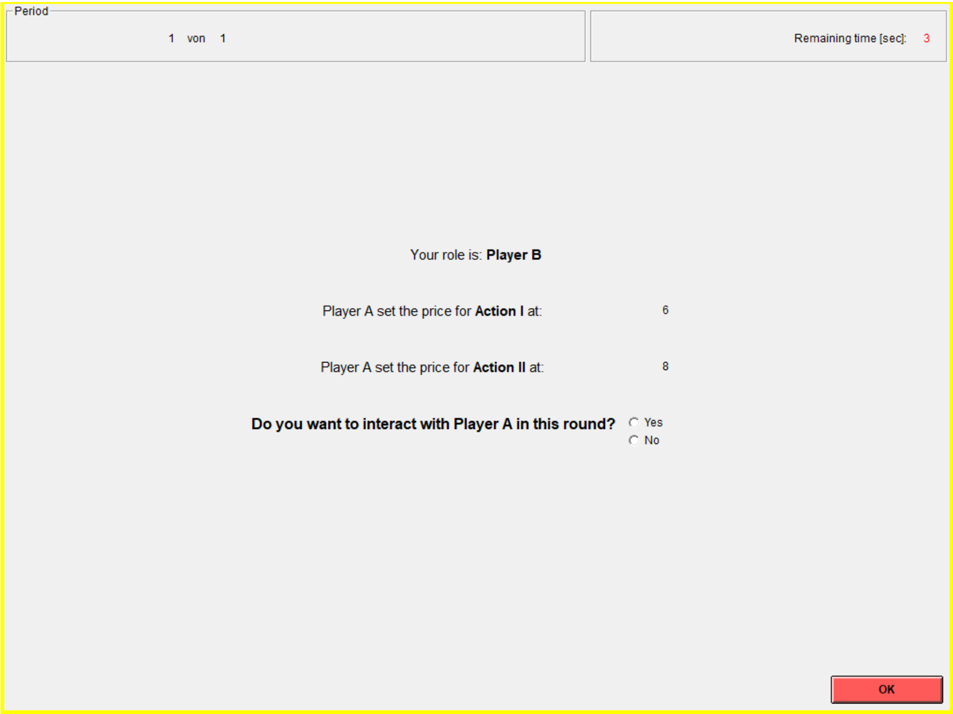

Figure 7: Exemplary screen (condition NoAttention): Consumers observe prices and decide on interaction.

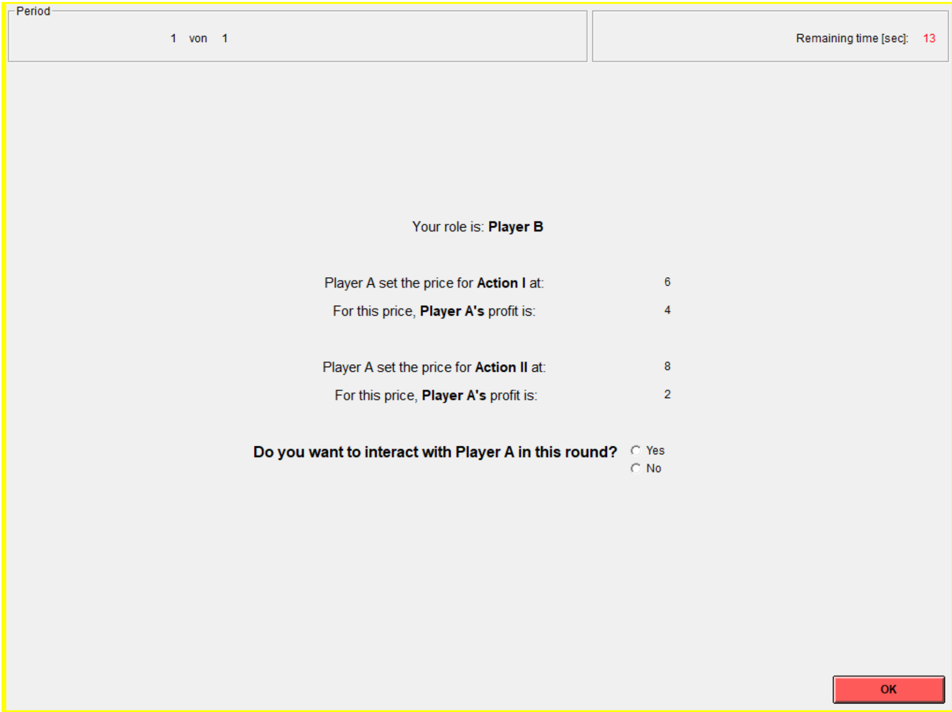

Figure 8: Exemplary screen (condition ATTENTION): Consumers observe prices and profits, and decide on interaction.

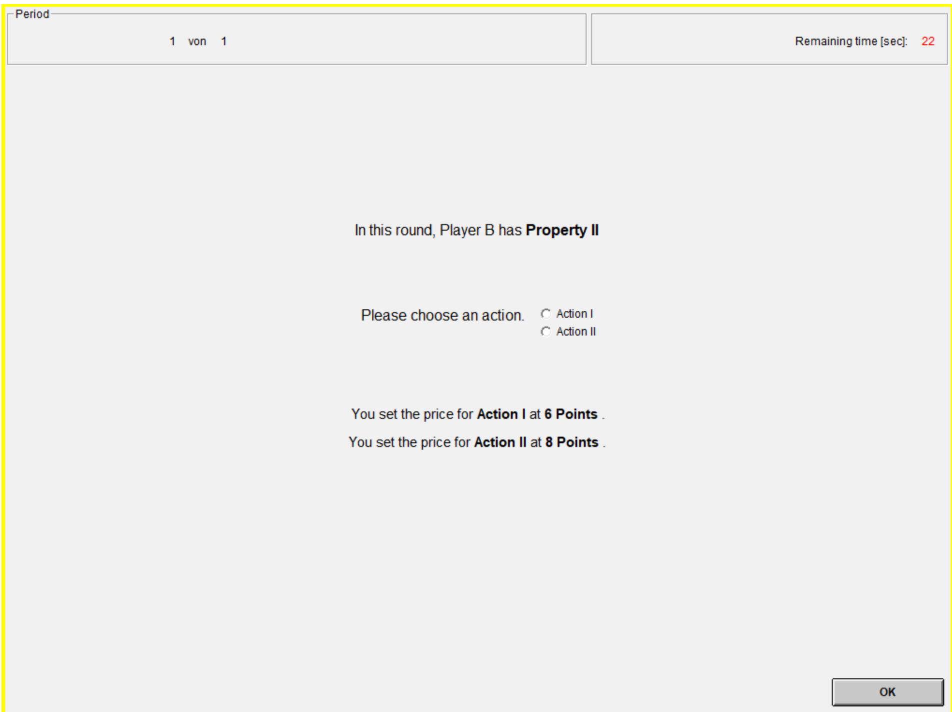

Figure 9: Exemplary screen (both conditions): Experts choose treatments.