Sales Talk, Cancellation Terms, and the Role of Consumer Protection*

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Abstract

This paper analyzes contract cancellation and product return policies in markets in which sellers advise buyers about the suitability of the products sold. By granting buyers the right to cancel or return on favorable terms, the seller's "cheap talk" at the point of sale becomes more credible. When all buyers are wary of the seller's incentives, equilibrium contractual provisions are second-best efficient, but involve excessive purchases (*ex ante* inefficiency) and excessive returns (*interim* inefficiency). Imposition of a minimum statutory standard (even if not binding) can improve welfare and consumer surplus by reducing sellers' incentives to target credulous buyers.

Keywords: Cheap talk, advice, credulity, refunds, return policy, contract cancellation, consumer protection.

JEL Classification: D18 (Consumer Protection), D83 (Search; Learning; Information and Knowledge), L15 (Information and Product Quality), L51 (Economics of Regulation).

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1 Introduction

It is often said that insurance plans and annuities are "sold, not bought." In retail as well as business-to-business transactions, buyers of complex service plans and durable products rely on the advice of sellers about the suitability of the offering for their particular needs and preferences. But is this "sales talk" credible? There are serious concerns that buyers might later regret purchases that turn out to be unsuitable. Should the cancellation terms be regulated? In which markets and how?

In this paper, we propose a simple modeling framework to characterize the advice strategy as well as the optimal pricing and cancellation terms offered by sellers in equilibrium. We investigate the effectiveness of different forms of policy intervention depending on the strategic sophistication of buyers. We show that consumer protection remedies are effective for channels populated predominantly by credulous buyers, but are counterproductive when (most) buyers are wary of the seller's strategic incentives. We obtain the opposite results for the effectiveness of competition policy.

Our model embeds a simple game of "cheap talk" communication (Crawford and Sobel 1982 and Green and Stokey 2007) into a trading environment. Whereas in other analyses of strategic information transmission the conflict of interest between the sender (seller) and the receiver (buyer) is exogenously given (as in Pitchik and Schotter 1987), in our model the degree of preference alignment is endogenously determined through the contractual terms (comprising a price for purchase and a refund for cancellation) the seller offers to the buyer at an initial stage.

After eliciting interest often through direct marketing techniques such as an unsolicited phone call or a visit at the buyer's doorstep, the seller advises the buyer whether to sign a service agreement or purchase a durable product. When the buyer is wary of the seller's incentives, credible communication is impossible if the seller makes a positive margin on the sale regardless of the buyer's final utility. By granting buyers generous terms for contract termination (upon cancellation of the service agreement or return of a physical product), sellers are able to partly align their interests with those of buyers, thus lending credibility to their sales talk.

Through usage or experimentation after signing the contract (or purchasing the product), the buyer learns the final utility. The buyer may then be in a position to terminate the service agreement prematurely (or to return the product), according to the contractual terms initially specified by the seller. When such early termination imposes a loss on the seller, taking into account the savings in service cost (or the product's salvage value), the initial offer of (excessively) generous cancellation terms credibly commits the seller to provide more valuable advice.

For channels populated by buyers who are wary of the seller's incentives, we show that the seller benefits from such a commitment to set the refund for cancellation above the first-best level. Given that the pre-sale signal possessed by the seller is correlated with the post-sale utility that buyers observe when deciding whether to cancel the contract, an increase in the refund for cancellation increases the seller's cost of lying and, thereby, improves the credibility of the sales talk. This commitment value is based on the fact that the seller's sale advice depends on the incentives of the *marginal* seller who is indifferent between advising in favor or against purchase. Given the correlation of the seller's signal with the buyer's utility, this marginal seller must necessarily believe that the buyer is *more* likely to cancel than the buyer believes *on average* when advised in favor of purchase.

In equilibrium, interests are not perfectly aligned, so the seller is willing to induce some *ex ante* inefficiency (at the advice and purchase stage) to reduce the inefficiently high return costs incurred at the *interim* stage (when the buyer exercises the option of early termination). At the *ex ante* stage, some buyers purchase even though the seller *knows* that the expected social surplus from a transaction is negative. At the *interim* stage, some buyers end up canceling the contract or returning the product even though, at that stage, it would be efficient not to do so. Thus, the seller's optimal policy involves too many early cancellations or returns *both* because too many buyers sign up initially *and* because buyers for which an initial purchase was efficient end up asking for a refund too often. However, we show that the seller's optimal return policy is second-best efficient.

Taking the level of ultimately dissatisfied buyers or, alternatively, the high level of cancellation requests as an indication of market failure and, thus, as a justification for policy intervention would be misleading.[1] In particular, consumer protection policies that impose even more generous terms of cancellation or refund than those resulting in equilibrium would reduce overall efficiency, because they would induce yet more inefficient cancella-

[1] As we show, all buyers for whom the seller observes a signal less favorable than the "average signal" for which the seller advises purchase would have preferred *not* to make the purchase in the first place if they had direct access to the seller's actual signal rather than to the purchase advice.

tions or returns. On the other hand, we show that competition policies that reduce the seller's pricing power improve efficiency. Intuitively, a reduction in the seller's maximum feasible margin reduces the seller's incentives to provide unsuitable advice. Therefore, when the buyer's outside option improves, the seller's need to distort contractual terms so as to ensure commitment is also reduced.

The logic of the downward distortion in cancellation terms in markets with wary buyers is reversed when buyers are credulous, and thus take the seller's inflated sales talk at face value. When deciding on the initial purchase, credulous buyers *underestimate* the probability of having to cancel later compared to the seller. Thus, the seller is able to exploit the inflated perceptions induced in the buyer by offering overly restrictive cancellation terms and extract all the buyer's *perceived* consumer surplus through the initial price. The buyer is then left with a negative *true* consumer surplus. For channels populated by credulous buyers, consumer protection policies that impose a minimum statutory right of cancellation become effective. On the other hand, we show that competition policy can be counterproductive. A reduction in the seller's pricing power can actually reduce social efficiency, even though it increases *perceived* consumer surplus.

When the market comprises a mix of wary and credulous buyers, we find that the imposition of a minimum statutory requirement for cancellation refunds can increase consumer surplus and social welfare by making it less profitable for sellers to target only credulous buyers. In this case, policy intervention can become effective even though sellers, in equilibrium, end up offering terms that are more generous than the minimum level that is imposed.[2] Once sellers are thereby successfully coaxed into making an offer attractive also to wary buyers, the second-best outcome prevails, as in the case all buyers are wary.

In the presence of credulous buyers, the imposition of a minimum refund standard at a level below or equal to the continued service cost (or to the salvage value for a returned physical product) becomes a "robust" instrument of consumer protection. The minimum standard has no impact when sufficiently many customers are wary, but otherwise it becomes effective irrespective of whether sellers still choose to target only credulous customers (through this particular sales channel) or whether they are, thereby, incentivized to make their offer attractive also to wary customers. Our results also highlight the merits of more

[2] As we argue below in detail, such a policy may have to be supported by a "non-discrimination" requirement, which essentially prescribes that all buyers have the right to cancel or ask for a refund at the most beneficial terms that are offered by the seller to any individual buyer.

fine-tuned interventions, such as the imposition of a higher minimum standard for sales channels for which it is reasonable to expect a predominance of credulous buyers.

Broadly consistent with the predictions of our model, policy makers regularly impose "cooling-off rules" to target purchases that require an active marketing effort by sellers and for which buyers learn their utility only after purchase, as in the case of doorstep sales.[3] Similarly, "unconditional refund periods" are commonly imposed for the sale of life insurance policies and annuity contracts (typically sold following advice) and are often combined with suitability rules.[4] Finally, regulations of cancellation terms and "free look periods" tend to cover retail channels populated by less wary buyers (such as senior citizens) who can easily fall prey to aggressive marketing techniques.[5] We know of no systematic empirical study of existing regulations on cancellation rights.[6]

Even though we frame our analysis mainly in terms of termination for long-term service contracts, our results equally apply to refunds for returns of (durable) physical products. In the marketing literature, Davis, Gerstner, and Hagerty (1995) and, more recently, Johnson and Myatt (2006), and Anderson, Hansen, and Simester (2009) analyze the value of the option of returning a product after buyers learn their utility value.[7] This experimentation

[3] In the U.S., the Federal Trade Commission requires sellers concluding transactions away from their premises to give buyers three days to cancel purchases of $25 or more, with the exception of some goods (such as arts or crafts) or services that are subject to other regulation (such as insurance). In the E.U., the "Doorstep Selling" Directive 85/577/EEC protects consumers who purchase goods or services during an unsolicited visit by a seller at their doorstep (or otherwise away from the seller's business premises). This regulation provides a cooling-off period of seven days, enabling the buyer to cancel the contract within that period and making the contract unenforceable if the buyer is not informed in writing of this right. Similar regulations are in place in most industrialized countries (see Office of Fair Trading 2004, Annex E, and Howells and Weatherill 2005 for additional details).

[4] Section 51.6 (D) of Regulation 60 by New York Insurance Department on "Replacement of Life Insurance Policies and Annuity Contracts" grants buyers an unconditional cancellation right for sixty days. Insurance Commissioners in many U.S. states have adopted a model regulation issued by National Association of Insurance Commissioners that mandates an unconditional refund period (typically of thirty days) for life insurance and annuity replacements.

[5] Similarly, New York State Bill A8965 extends the mandatory "free look" period (during which the insured may pull out of an insurance contract that has been purchased and obtain a refund) from thirty to ninety days for individual accident and health insurance policies or contracts that cover an insured who is 65 years of age or older on the effective date of coverage. Similarly, the Omnibus Budget Reconciliation Act of 1990 mandates a thirty-day free look period to allow beneficiaries time to decide whether the Medigap plan they selected is appropriate for them.

[6] See Stern and Eovaldi's (1984) Chapter 8 for an accessible introduction to the legal aspects related to sales promotion and personal selling practices. Some European countries also impose restrictions on the clauses governing early cancellation (e.g., in the form of a maximum penalty) for some long-term utility contracts, such as electricity. For a comprehensive list of relevant regulations in California see http://www.dca.ca.gov/publications/legal_guides/k-6.shtml.

[7] A seller's incentives to provide buyers with match-specific information is analyzed also by Bar-Isaac,

role of refunds is also present in our model, in addition to two new roles on which we focus: commitment (leading to excessively high refunds for wary customers) and exploitation (leading to excessively low refunds for credulous customers).

Che (1996) shows that sellers find it optimal to insure risk-averse buyers by offering generous refund policies. Our complementary explanation of the excess refund puzzle relies on a different mechanism.[8] Matthews and Persico (2007) develop a theory of how refunds can be used to screen consumers with different costs of early information acquisition and to affect, more generally, their costs of learning.[9] Instead, in our baseline model, customers have no pre-existing private information and are *ex ante* identical—refunds are used by the seller as a commitment rather than a screening device.[10]

The literature has also investigated the role of money-back guarantees as signal of product quality (cf. Shieh 1996; see also Grossman 1981 on warranties, which are based on verifiable information, rather than only on whether the product is returned) and as incentive device to solve a moral-hazard problem in quality provision by the seller (cf. Mann and Wissink 1990 who show that the first-best quality level results). In our model, instead, product prices and refunds do not serve a signaling role, because the value of the product is specific to the customer and the seller learns a signal about the buyer's utility for the product only after setting the contractual terms that apply to all buyers.

The extensions in Sections 5 and 6 are based on the simple approach to modeling credulity in strategic information transmission games proposed by Kartik, Ottaviani, and Squintani (2007) and Bolton, Freixas, and Shapiro (2009). Spence (1977) provides an early analysis of market outcomes when consumers misperceive quality—in our setting

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Caruana, and Cuñat (forthcoming) and Ganuza and Penalva (forthcoming).

[8] There is also a literature on how manufacturers refund retailers for unsold merchandise to induce optimal stocking in the presence of demand uncertainty (see Marvel and Peck 1995 and Kandel 1996). We leave to future work the analysis of contractual terms for returns when sale advice is provided by a seller's agent. We refer to Inderst and Ottaviani (2009) for a model of sales advice by a seller's employee, whose preferences depend on the incentives set by the seller. While in that model the seller bears an exogenous penalty when providing unsuitable advice, in the model analyzed here the penalty for unsuitable advice is endogenously determined through the refund terms offered for product returns.

[9] See also Courty and Li's (2000) analysis of price discrimination through refunds when customers differ in their *ex ante* valuation.

[10] The commitment role of return policies is also key in Hendel and Lizzeri's (2002) and Johnson and Waldman's (2003) models of leasing under asymmetric information. While in those models the redemption price set by the seller affects the quality of products returned and, therefore, the informational efficiency in the second-hand market, in the present model the refund (or price for continuing service) offered by the seller affects the seller's own incentives to report information.

such misperceptions are induced by the seller, rather than being exogenous.[11] Our analysis of pricing in this extension is related to recent work on contracting with bounded rational agents by DellaVigna and Malmendier (2004), Ellison (2006), Gabaix and Laibson (2006), Eliaz and Spiegler (2006), Grubb (2008), and Heidhues and Kőszegi (2008), among others.

Our main contribution is a comparison of the effectiveness of consumer protection and competition policies in markets with sales advice.[12] The role of advice is key throughout our analysis. With wary buyers, advice generates a commitment role for generous cancellation terms. With (a public largely composed of) credulous buyers, advice allows the seller to inflate expectations about the product's value and then extract more profits through inefficiently restrictive cancellation terms.

Section 2 introduces the model. Sections 3 and 4 analyze the benchmark case in which all buyers are wary of the seller's biased incentives at the advice stage. Section 5 considers the case in which all buyers are instead credulous, while Section 6 allows for a population of buyers with heterogeneous strategic sophistication. Section 7 concludes. Details on proofs that are not shown in the main text are contained in the Appendix.

2 Model

The key feature of our baseline model is that at the time of the initial encounter between a seller and a potential customer, the seller has better information about the suitability of the service (or product) for the customer's specific needs and preferences. The efficiency of the initial purchasing decision, thus, depends on the quality of the seller's advice. After the contract is signed, the customer learns about the product's suitability through initial usage. The contract specifies the terms on which customers can ask for a refund upon terminating the contract prematurely or returning the product. Upon early termination (synonymous with cancellation and return in our setting), the seller avoids the costs of continued service or realizes a salvage value for the product.

Timing. For concreteness, we focus on the provision of a long-term service contract offered by the seller at time $t = 0$. When encountering a customer at $t = 1$, the seller

[11] See also Milgrom and Roberts (1986) for a pioneering analysis of the impact of strategic sophistication on information disclosure, in a model where information is instead verifiable.

[12] For additional references and an insightful discussion of the scant literature on consumer protection we refer to Armstrong (2008).

observes a signal, s, and then advises the customer whether to sign the contract. We specify below how s is informative about the utility value the customer derives from the service, u. At $t = 2$, after the contract is signed, the customer observes u and may then terminate the contract according to the specified terms.[13] If the contract is not cancelled, it expires at $t = 3$, at which point the customer obtains utility u.[14]

The contract can stipulate separate payments that must be made if the contract is terminated early (at $t = 2$) and if the contract is served to maturity ($t = 3$). It is convenient to specify a payment, p, that is due for the whole contractual period and which the customer must make upon signing the contract (at $t = 1$), and a refund q that is made to the customer in the case of early termination (at $t = 2$).[15] Note that this implies a total payment of $p - q$ if the contract is terminated early. The seller bears a cost c to set up the service agreement with the customer at $t = 2$. In addition, the seller bears a cost equal to v for continuing the service up to maturity (at $t = 3$).

Thus, the seller always realizes an *upfront margin* equal to $p - q - c$, even when the contract is terminated, and a *termination margin* equal to $v - q$ if the contract is terminated rather than continued.[16] Note that this setup applies immediately to the case of return policies for physical products. In that case, the seller incurs production costs equal to $c + v$, and the product is sold at price p at $t = 1$; following a return at $t = 2$, the seller then pays a refund q to the customer and realizes a salvage value of v. In this equivalent formulation, c is equal to the difference between the product's full cost and the salvage value and, therefore, measures the loss in surplus when the product is returned.

There is no discounting, risk neutrality, and utilities of seller and customer are additively separable in money. For the purpose of our welfare analysis, the efficiency criterion

[13] To simplify the exposition, we stipulate here that the signal the customer obtains after signing the contract (at $t = 2$) is perfectly informative about u. Our results extend to the more general case in which this signal is noisy and satisfies standard signal monotonicity assumptions (cf. footnote 17 and earlier versions of this paper for an analysis of the more general model).

[14] For notational and expositional simplicity we abstract from any utility and, likewise, from any additional service costs that may arise between $t = 1$, when the contract is signed, and $t = 2$, when the buyer learns u, implying that u comprises the customer's total utility from consumption. Alternatively, we could stipulate that the buyer's utility is equal to $u/2$ for both periods of the total duration of the long-term contract, where the realization of $u/2$ from early usage also informs the buyer about his continuation value from the contract. This modification would not change the results, but would complicate the analysis by adding an additional term to subsequent expressions for profits and consumer utility.

[15] We restrict attention to this deterministic pricing mechanism for realism. See the discussion in Section 7.

[16] Either of the two margins can become negative, as we show below.

is the maximization of (expected) social surplus that is defined as the sum of the seller's (expected) profits and the (expected) consumer surplus realized by the customer.

Information. From an *ex ante* perspective, the customer's utility from the product, u, follows distribution $G(u)$ over $U := [\underline{u}, \overline{u}]$, with $0 \leq \underline{u} < \overline{u}$ and $g(u) > 0$ for all $u \in U$. We assume that initiating a contract and serving it until maturity is efficient for high utility realizations, while for utility realizations valuations it is inefficient to continue and, thus, also inefficient to initiate a contract:

$$\underline{u} < v \text{ and } \overline{u} > v + c. \tag{1}$$

The seller's privately observed signal, $s \in S := [\underline{s}, \overline{s}]$, is generated from the continuous distribution $H(s \mid u)$, which for simplicity has full support for all $s \in S$ and satisfies the Monotone Likelihood Ratio Property (MLRP): a higher signal, s, indicates a higher consumption value, u. As is well known, this implies that the seller's posterior belief distributions, $\Psi(u \mid s)$, with densities derived from Bayes' rule

$$\psi(u \mid s) = \frac{h\left(s \mid u\right) g\left(u\right)}{\int_U h(s \mid \widetilde{u}) g(\widetilde{u}) d\widetilde{u}}, \tag{2}$$

are ranked by First Order Stochastic Dominance (FOSD). From an *ex ante* perspective, the probability density of signal s is $f(s) := \int_U h(s \mid u) g(u) du$, with distribution $F(s)$.

Finally, to reduce case distinctions and to focus on the most revealing case, in what follows we will frequently use the convenient property that the signal s is perfectly informative at the boundaries, i.e., that the posterior distributions following the most extreme signals, $\Psi(u \mid \underline{s})$ and $\Psi(u \mid \overline{s})$, are then degenerate and assign probability mass one on $\underline{u}$ and $\overline{u}$, respectively. In turn, this property is ensured when the conditional signal distributions are themselves degenerate at the boundaries:

$$H(\underline{s} \mid \underline{u}) = 1 \text{ and } H(s \mid \overline{u}) = 0 \text{ for } s < \overline{s}. \tag{3}$$

3 Cancellations and Advice in Equilibrium

To characterize the equilibrium without policy intervention, we begin in Section 3.1 by analyzing the customer's termination decision at $t = 2$. In Section 3.2 we turn to the seller's advice and the customer's decision whether to sign the contract at $t = 1$. In

Section 3.3 we solve for the total price of the contract, p, for a given refund, q, in case of early cancellation. While p and q are clearly determined jointly by the seller in $t = 0$, and while they will also co-move with respect to changes in exogenous variables, this intermediate step helps clarify how the market model works. Finally, in Section 4 we derive the level of refund q set by the seller in equilibrium.

3.1 Refunds

After signing at $t = 1$, at $t = 2$ the customer optimally chooses to fulfill the contract until $t = 3$ whenever the utility is not below the level of the refund in case of early termination, i.e., whenever $u \geq q$.[17] When $\underline{u} < q < \overline{u}$ holds, then this decision rule gives rise to a unique cutoff rule: with $u^* = q$, the contract will be terminated early when $u < u^*$, while it will be served until maturity when $u \geq u^*$.[18]

Furthermore, note that the *interim* efficient decision would be to terminate early only if $u < u_{FB} := v$, as for $u = u_{FB}$ the cost savings from early cancellation are just equal to the customer's utility from continuation. Hence, the customer's privately optimal decision whether to cancel and ask for a refund is only *interim* efficient in case $q = v$. Instead, for $q > v$ the contract would be terminated too frequently ($u^* > u_{FB}$), while for $q < v$ it would be terminated too infrequently ($u^* < u_{FB}$).

3.2 Advice

Turn now to the customer's decision at $t = 1$, when the seller privately observes s. At this stage, the seller plays a game of "cheap talk" communication with the buyer. Given that the customer's decision is binary, we can restrict consideration to a binary message set for the seller, according to whether the seller advises the customer to sign or not to sign the contract. In what follows, we restrict consideration to the informative equilibrium.[19] In equilibrium, the customer follows the seller's advice.

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[17] In a previous draft, we analyzed the more general case in which the buyer observed a noisy signal b, rather than u. When b is generated from u through a family of conditional distributions satisfying MLRP, and MLRP also holds for the distributions that generate the "earlier" signal s from the "later" signal b, all the results derived in the present paper continue to hold.

[18] Note that the outcome $u = u^*$ is a zero probability event. In addition, for $q \geq \overline{u}$ the contract would always be terminated, which does not allow the seller to make positive profits. For $q \leq \underline{u}$ the contract would never be terminated. This case (ruled out below) is captured by setting $u^* = \underline{u}$.

[19] As is well known, in any cheap-talk game there is always a "babbling" equilibrium in which the seller's message has no information content.

The seller then prefers to advise the customer to sign the contract if

$$\pi(s) := (p-c) - \Psi(u^* \mid s)q - [1 - \Psi(u^* \mid s)]\, v \geq 0.$$

After the contractual payment, p, is made and initial costs of c are incurred, as captured by the first term in $\pi(s)$, the seller either loses the refund, q, upon termination or incurs the additional cost of continued service, v. Recall that $\Psi(u^* \mid s)$ denotes the probability that the customer asks for a refund, as assessed by the seller conditional on observing a signal realization equal to s.

For the following analysis it is convenient to rewrite profits as

$$\pi(s) = (p-c-v) + \Psi(u^* \mid s)(v-q). \tag{4}$$

When $v = q$ holds, which would lead to the *interim* efficient return policy with $u^* = u_{FB}$, the seller would *indiscriminately* want to advise the customer to sign the contract as long as the upfront margin is positive, $p - c - v > 0$. If, instead, the refund paid to customers following early termination lies above the seller's cost of continued service so that the termination margin is negative, $v - q < 0$, the seller is no longer fully insured (in terms of realized profits) against the risk of early termination. Given that a higher realization of u is more likely after observing a higher signal s, $\pi(s)$ is strictly increasing. Whether the seller will now advise customers *not* to sign after observing a low realization of s depends on the overall margin and on how informative the signal is at the boundaries. For the following characterization we restrict consideration to the case in which the seller's profits are strictly positive when there is no early termination, which will turn out to be the only relevant case.[20]

Proposition 1 *Suppose the customer follows the seller's advice and that $p - c - v > 0$. If the refund that the customer obtains at early termination is set below the seller's cost of continued service, $q \leq v$, then the seller always advises the customer to sign the contract. The same still holds when $q > v$, as long as*

$$(p-c-v) + \Psi(u^* \mid \underline{s})(v-q) \geq 0. \tag{5}$$

[20] This property holds for the present analysis with wary customers, but not necessarily when (some) customers are credulous. See Sections 5 and 6.

If, instead, both $q > v$ and the converse of (5) holds strictly, then there exists an interior cutoff $\underline{s} < s^* < \overline{s}$, characterized by

$$\pi(s^*) = 0, \tag{6}$$

such that the seller advises the customer to sign the contract when $s \geq s^*$ and not to sign otherwise. In addition, s^* is then strictly increasing in q and strictly decreasing in p.

As the refund q increases, the seller's expected profits from a customer decrease, whereas the seller clearly gains more when p increases. Note also that when the signal becomes perfectly informative at the boundaries, such that (3) holds, the converse of (5) becomes $q > p - c$.[21] Then, an interior cutoff s^* exists when $c + v < p < c + q$, which already implies that $q > v$: the seller realizes strictly positive profits when a contract is signed and served until maturity, but ultimately incurs a loss when a contract is instead terminated.

3.3 Pricing Equilibrium

While Proposition 1 conducts a comparative analysis for different levels of the initial price p, in equilibrium this price is chosen at $t = 0$. When determining the optimal offer (p, q), the seller's expected profits are

$$\Pi := \int_{s^*}^{\overline{s}} \pi(s) f(s) ds. \tag{7}$$

In this section, we fix the level of refund at q and solve for the resulting "pricing equilibrium," which is described by a prevailing initial payment p and a prevailing cutoff s^* applied at the advice stage—all as a function of q.

A customer is willing (weakly) to follow the seller's advice to sign the contract, whenever doing so results in non-negative consumer surplus,

$$\int_{s^*}^{\overline{s}} \left[\int_U \max\{u, q\} \, \psi(u \mid s) du \right] \left(\frac{f(s)}{1 - F(s^*)} \right) ds - p \geq 0. \tag{8}$$

This inequality defines the customer's participation constraint. Note that (8) uses the conditional beliefs held by the customer when advised to sign the contract. A fully-rational customer should be able to see through the seller's incentives at the advice stage, as captured by the applied cutoff, s^*. When choosing the product's price, p, for a given

[21] Recall here also that we can apply the restriction that $\underline{u} < u^* < \overline{u}$.

refund level, q, the seller sets p at the highest possible level consistent with the customer's participation constraint, so that (8) must be binding.

The seller's program is thus to maximize profits Π subject to the restrictions that $u^* = q$, that s^* is as characterized in Proposition 1, and that p satisfies the participation constraint (8) with equality for a given s^*. After substitution for $\pi(s)$ from (4) and p from (8) into (7), and canceling out the expected refund payments made to the customer at $t = 2$ with the corresponding increase in the customer's willingness to pay at $t = 1$, we obtain

$$\Pi = \int_{s^*}^{\overline{s}} \left[\int_{u^*}^{\overline{u}} (u - v)\psi(u \mid s)du - c \right] f(s)ds, \tag{9}$$

verifying that profits are equal to the social surplus conditional on s^* and u^*.

Uniqueness of Pricing Equilibrium. For a given refund q and a given cutoff s^*, the customer's participation constraint, (8), pins down a unique price. The cutoff s^* is, in turn, uniquely determined from Proposition 1—i.e., either $s^* = \underline{s}$ or $s^* > \underline{s}$ solves (6). When a solution p with $p > c + v$ exists for these two conditions, this solution is unique, as we now demonstrate. Note first that, holding q fixed, (8) defines a strictly increasing mapping from s^* to p. The higher is the seller's cutoff, the more the customer is willing to pay when advised to sign the contract—as depicted by the upward-sloping willingness-to-pay (WTP) curves in Figure 1 for two different levels of q. On the other hand, from condition (6) in Proposition 1, the seller's optimality condition defines a decreasing mapping from p to s^*—the willingness-to-sell (WTS) curves in Figure 1 for two levels of q. Holding fixed any given q, the equilibrium contract offered by the seller is characterized by the crossing of the corresponding WTP and WTS curves.

To streamline the exposition further, we focus on the case in which it is not possible for the seller to conclude a contract with probability one and still make profits:

$$\int_{v}^{\overline{u}} (u - v)g(u)du \leq c. \tag{10}$$

The term on the left-hand side of (10) captures the maximum (expected) social surplus, as realized when the *interim* (cancellation) decision is efficient with $u^* = u_{FB} = v$, in case the contract is initiated for *all* signals $s \in S$.

Proposition 2 *Suppose condition (10) holds. When $q < v$, then there is no trade. When $q = v$, a contract is signed with positive probability only if $p = c + v$, in which case the*

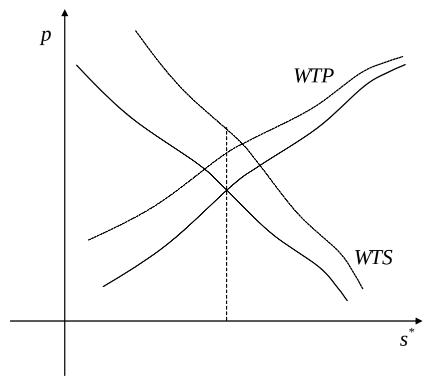

Figure 1: Pricing equilibrium and the effect of a higher refund q

seller makes zero profits. Finally, when $q > v$, there two cases. First, if

$$\int_q^{\overline{u}} (u - v)\psi(u \mid \overline{s})du > c \tag{11}$$

holds, there is a unique cutoff $\underline{s} < s^* < \overline{s}$ and a unique price $p > c + v$ at which both (6) and (8) hold as equalities: the price p corresponds to customers' willingness-to-pay given s^*, while given p the seller advises customers to sign the contract if $s \geq s^*$. Second, if, instead, (11) does not hold, there is no trade.

When $q = v$, we know that the seller would like to advise all customers to sign the contract as long as the thereby-realized total payment exceeds all subsequent costs, $p > c + v$. However, the customer would then obtain a negative expected surplus according to (10), so that this scenario is not compatible with equilibrium.[22] When both $q = v$ and $p = c + v$, the seller is indifferent between advising customers to sign or not to sign for all observed signals s. (However, this case turns out not to be relevant because the seller can realize strictly positive profits in equilibrium by choosing a different refund level, as we show below.) Note finally that condition (11) always holds if the signal is perfectly informative at the upper boundary, according to condition (3). In this case, the left-hand side of (11) converges to $\overline{u} - v$, which exceeds c by condition (1).

[22] The case with $q < v$ is even more immediate, because then the seller would gain more when the customer signs after observing a lower value s. Thus, in this case there would be no trade in equilibrium, given that the resulting expected surplus would be strictly negative by (10).

4 Refunds as Commitment

Given that at $t = 2$ the realization of u is the customer's private information, the customer's use of the right to cancel the contract early can result in an increase in surplus. As we have observed at the beginning of Section 3.1, setting $q = v$ would maximize social surplus by maximizing *interim* efficiency. When $q = v$, however, sales talk remains truly "cheap". Proposition 3 shows how the seller can use a higher refund to lend increased credibility to the ensuing sales talk, while simultaneously adjusting p to extract the higher consumer surplus that is thereby realized.

Proposition 3 *Take some refund $q > v$ that from Proposition 1 gives rise to a pricing equilibrium with an interior cutoff $\underline{s} < s^* < \overline{s}$ and a price p that satisfies (8) with equality. As the refund is now increased (marginally) to $\widetilde{q} > q$, a new, unique pricing equilibrium results, characterized by a strictly higher cutoff $\widetilde{s}^* > s^*$ and a strictly higher price $\widetilde{p} > p$ satisfying (8) again with equality.*

The higher is the refund level, q, the higher is, ceteris paribus, the customer's willingness to pay, given that the customer's option of early termination then becomes more valuable. This allows the seller to charge a higher price, p. In turn, this increase in the price induces the seller to apply a strictly lower cutoff s^*, given that selling a more expensive service agreement now becomes more profitable. As the cutoff that the seller applies is reduced, the customer's willingness to pay is also reduced. Proposition 3 claims that the *joint* effect from the increase in q, which pushes s^* up, and the increase in p, which pushes s^* down, leads unambiguously to a higher cutoff: $\widetilde{s}^* > s^*$.

The intuition for this key result is as follows. For the determination of s^* the seller takes into account the expected costs at the higher refund, computed on the basis of the information available to the seller when advising the *marginal* customer to sign up, $s = s^*$. The customer's higher willingness to pay is instead determined by the *expected* use that the customer will make of the higher refund, where this expectation is taken conditional on the information available to the customer when making a purchase, $s \geq s^*$. Recall now that following a lower signal s, lower realizations of u become more likely. Thus, the seller (with signal s^*) correctly expects the (marginal) customer to cancel more often than the (average) customer believes when advised to purchase (i.e., for signals $s \geq s^*$). When the refund is increased, the incremental cost for the seller at $s = s^*$, thus, increases by more than the customer's willingness to pay, leading ultimately to a lower cutoff s^*, even after taking into account the joint increase in p.[23]

Figure 1 depicts the resulting shifts in the willingness-to-sell and willingness-to-pay curves—the dashed curves correspond to a higher level of q than the continuous curves. After an increase in the refund, both the WTP and WTS curves shift upwards. However, the upward shift of the WTP curve is higher than the shift of the WTS curve, as explained above. The intersection of the new curves is to the northeast of the original intersection, at a higher cutoff s^* and a higher price p.

4.1 Optimal Refund Policy

Efficient Decision Rules. When the *interim* decision of whether to cancel early is efficient, such that $u^* = u_{FB} = v$, then it is efficient to initiate a contract if, given the available signal s, it holds that

$$\int_{v}^{\overline{u}} (u - v)\, \psi(u \mid s) du \geq c. \tag{12}$$

Here, the left-hand side represents the option value of the information obtained from a purchase, given that at $t = 2$ the contract will be terminated when $u < v$, while the right-hand side represents the cost of experimentation due to the setup cost for the service (or, equivalently, the difference between the product's full cost and the salvage value).

Given (1), when the signal is sufficiently informative at the boundaries (according to condition (3)), then (12) has an interior solution, $\underline{s} < s_{FB} < \overline{s}$, such that at s_{FB} the social surplus that is expected *ex ante* from a transaction is equal to zero. This cutoff property follows immediately from FOSD of $\Psi(u \mid s)$. Given (10), when no such interior cutoff exists, as the signal is still too noisy at the boundaries, positive gains from trade cannot be realized. For what follows, we assume that such gains are feasible.

While s_{FB} is determined conditional on subsequently taking the efficient *interim* decision (based on the cutoff $u_{FB} = v$), it is useful to characterize what the efficient *ex ante* cutoff would be when the *interim* cutoff is distorted from the first-best level (as it will be in equilibrium). For the purpose of our analysis, the relevant *interim* cutoff satisfies

[23] The proof of Proposition 3 reveals that there is an additional effect at work that goes in the same direction. When $q > v$ is further increased, an additional reduction in *interim* efficiency results. Holding s^* constant and adjusting p so as to make the customer indifferent, the resulting loss in surplus (for any given $s \geq s^*$) is borne by the seller, which further induces the seller to reduce s^*. (This effect, however, vanishes as $q \to v$, while the effect discussed in the main text still survives.)

$u^* > u_{FB}$. For this case, the resulting conditional surplus (given by (12), where the lower bound of integration is $q = u^*$ instead of $u_{FB} = v$), is still strictly increasing in s because the posterior distributions $\Psi(u \mid s)$ are ranked by FOSD. When interior, this equation gives rise to a unique cutoff, $s_{CFB}(u^*)$, such that, *conditional* on the subsequently applied cutoff u^*, initiation of a contract is *ex ante* efficient if and only if $s \geq s_{CFB}(u^*)$. When interior, note that $s_{CFB}(u^*)$ is strictly increasing in $u^* \geq u_{FB}$. Intuitively, the application of an inefficiently high *interim* cutoff, $u^* > u_{FB}$, implies a reduction in the social surplus that results from a sale for any s, and thus leads to an increase in the conditional efficient *ex ante* cutoff, $s_{CFB}(u^*)$.

Equilibrium Refund Policy. We are now in a position to characterize the seller's optimal offer at $t = 0$, using the efficient decision rules as benchmarks.

Proposition 4 *The optimal offer (p, q) that the seller offers in equilibrium specifies $q > v$ leads to two types of inefficiencies:*
(i) From $u^* > u_{FB}$, inefficiently too many contracts are terminated early;
(ii) From $s^* < s_{CFB}(u^*)$, inefficiently too many contracts are signed initially, given the subsequently applied cutoff u^*.

The intuition for Proposition 4 is as follows. When $q = v$ holds, we know that the seller cannot make positive profits. This is because the seller would then want to indiscriminately advise the customer to sign for any price $p > c + v$, according to Proposition 1. But in this case the customer's willingness to pay, given by the left-hand side of (10), is in fact strictly below the seller's overall costs. Instead, by setting $q > v$, the seller can commit to providing valuable advice, albeit at the cost of reducing *interim* efficiency. Using that at $q = v$ the first-order effect from a marginal increase in q is zero, we show in the proof of Proposition 4 that this allows the seller to generate strictly positive profits.

In principle, it would be possible to further raise the refund (and, consequently, also the price) until the *ex ante* cutoff reaches the conditional efficient level, s_{CFB}. At that point, the seller would advise customers to sign if and only if this is indeed efficient, $s^* = s_{CFB}(u^*)$, given the subsequently applied *interim* cutoff u^*. However, it is not optimal for the seller to raise the refund up to this level. Starting from an offer that induces $s^* = s_{CFB}(u^*)$, the seller can realize strictly higher profits by decreasing q. To see

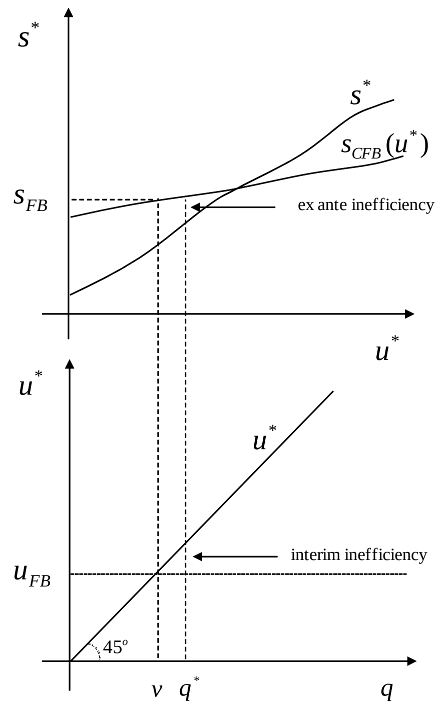

Figure 2: Tradeoff between *ex ante* and *interim* inefficiencies

why, note that now the first-order effect on total surplus from a marginal reduction in s^* is zero, while the reduction in u^* has a strictly positive effect on *interim* efficiency, given that $q > v$.

Altogether, the seller optimally trades off *interim* for *ex ante* efficiency. As remarked above, the seller's choice of contract is second-best efficient because the seller extracts all consumer surplus. Figure 2 illustrates the resulting tradeoff. As the refund increases, given the simultaneous adjustment in the price, the *ex ante* cutoff s^* increases (top panel) and the *interim* cutoff u^* increases (bottom panel). The top panel also depicts the conditional efficient cutoff $s_{CFB}(u^*)$, which is a strictly increasing function of q, as explained above. At the optimal offer (p, q), we have that both $s^* < s_{CFB}(u^*)$ and $u^* > u_{FB}$.

4.2 Second-Best Efficiency and Policy Intervention

The equilibrium offer in the baseline model results in too many early terminations for two reasons: too many customers sign up initially *and* even those customers for whom signing up is *ex ante* efficient end up cancelling too often. In this section, we show that consumer protection policies that prescribe a refund level that is different from the seller's optimal choice strictly harm the seller without benefiting the customer, resulting in an overall reduction in social surplus. Traditional competition policies remedies, instead, can be effective. (The results are reversed when there is a large fraction of credulous buyers.)

The deviation from first-best efficiency could motivate policy intervention. Turning to consumer surplus, note that with positive probability customers will regret that they have initially signed the contract. In fact, taking the equilibrium contract as given, a customer who could observe the seller's signal, s, would want to complain when realizing a negative surplus by signing—and this would be the case whenever the signal is below a threshold signal at which the associated customer's conditional surplus is equal to zero.[24] Is this failure of the market to inefficiently use pre-sale (as well as post-sale) information a justification for regulating the cancellation terms, q?

No, because any such regulation would decrease social surplus. This key result follows immediately from the fact that the seller's profits in (9) are equal to the social surplus.[25] This means that the contractual cancellation terms chosen by the seller in the "laissez-faire" equilibrium maximize social surplus, taking into account both the advice decision at $t = 1$ (which will be only privately optimal for the seller) and the cancellation decision at $t = 2$ (which will be only privately optimal for the customer). This also implies that in this setting even a benevolent social planner would be unable to increase social surplus solely by affecting q. In this sense, the equilibrium outcome is second-best efficient.

Overall, the imposition of a refund level, q, strictly above the equilibrium level may result in fewer customers who are ultimately dissatisfied with their decision.[26] However, this regulation would not be beneficial for the customer either, as long as the seller's pricing power is not curbed—the seller would adjust the price so that the customer still obtains

[24] Note that there would also be a threshold $\widehat{s} > s_{CFB}(u^*)$ such that customers would only want to sign when $s \geq \widehat{s}$: for $s \in (s_{CFB}(u^*), \widehat{s}]$ trade is socially efficient, but consumer surplus is strictly negative!

[25] Clearly, this result crucially relies on our assumption that the buyer has no preexisting private information. The addition of such information would generate a downward sloping demand and thus the traditional deadweight loss from market power. We abstract from this effect to isolate, instead, the distortions that arise from the combination of (i) the seller's inability to commit *ex ante* to a honest communication strategy of pre-sale information and (ii) the need to rely on the buyer's decision to cancel based on post-sale utility at the *interim* stage. As suggested by Jean Tirole, the deviation from the first-best that results in our setting is analogous to the one that obtains in Holmstrom's (1982) moral-hazard-in-teams problem.

[26] This observation applies equally to policies that would, for instance, require q to represent a minimum fraction of p (or, more generally, to be equal to or higher than some function $\sigma(p)$).

zero expected surplus. Social surplus would be *strictly* reduced. Instead, as we explore next, both consumer surplus and social efficiency are higher when the seller's pricing power is reduced, for example, through a tightening of competition policy.

For a given (q, p), a customer's expected utility equals

$$V := \int_{s^*}^{\bar{s}} \left[\int_U \max\{u, q\} \psi(u \mid s) du - p \right] f(s) ds. \tag{13}$$

Given that so far we assumed that the customer realized zero utility without a contract, the seller was able to extract all surplus in equilibrium, so that $V = 0$. More generally, we can now solve the seller's program with the constraint that $V \geq \overline{V}$, where $\overline{V}$ is clearly bounded by the first-best level of social surplus

$$\overline{V}_{\max} := \int_{s_{FB}}^{\bar{s}} \left[\int_U \max\{u - v, 0\} \psi(u \mid s) du - c \right] f(s) ds.$$

As we show, $V = \overline{V} = \overline{V}_{\max}$ can indeed be obtained, in which case the outcome coincides with the solution to the dual program of maximizing V.[27]

Proposition 5 *Consumer surplus as well as social efficiency are strictly higher when the seller makes the offer that maximizes the surplus of customers than when the seller makes the monopolistically optimal offer. Moreover, in the former case the refund is strictly lower and ensures interim efficiency with $q = v$, while the initial price p ensures first-best efficiency, $s^* = s_{FB}$. When the seller is more generally constrained by the requirement that customers realize $V \in [0, \overline{V}_{\max}]$, then both consumer surplus and social efficiency are everywhere strictly increasing in V.*

The higher is V, the lower is the price that the seller can charge customers, for a given refund q. That is, the WTP curve in Figure 1 shifts down. As the seller's pricing power decreases, so do the incentives to induce customers to sign a contract. Thus, the seller's commitment problem with respect to suitable advice is ameliorated, ultimately leading to a more efficient equilibrium contract. In the extreme case where all of the surplus goes to customers, the seller is made indifferent and obtains the same profits (of zero) regardless of whether the contract is signed.[28]

[27] Given that $\pi(s) \geq 0$ holds whenever the seller advises in favor of a purchase, there is no need to incorporate a participation constraint for the seller.

[28] This analysis may be seen in the spirit of contestable markets. Providing a fully-fledged model of oligopolistic competition with advice is beyond the scope of this paper.

The preceding analysis makes clear that the deviation from the first-best outcome originates from the concentration of private information and pricing power in the hands of the seller. A reduction of the latter leads to higher efficiency.[29] Instead, in this setting there is no positive role for consumer protection policies that directly interfere with the cancellation terms. This result crucially depends on the rationality of customers, as we now show.

5 Credulous Customers

Not all customers may be in a position to see through the seller's strategic incentives for sales talk. In this section, we focus on the case in which *all* customers are credulous and thus blindly believe the seller's advice, following the approach set forth by Kartik, Ottaviani, and Squintani (2007). While in our previous analysis wary customers inferred correctly that $s \geq s^*$, where they backed out s^* from the terms of the contracts, with credulous customers a seller can successfully inflate expectations by asserting that $s = \overline{s}$. While admittedly simplistic (and confined to our setting in which S has an upper bound, $\overline{s}$), this modelling specification incorporates the key distinction between the two types of customers in a tractable way. Because credulous customers base their willingness to pay on the seller's inflated claim, they purchase whenever their perceived surplus is above the price,

$$\int_U \max\{u, q\} \, \psi(u \mid \overline{s}) du \geq p. \tag{14}$$

5.1 Market Outcome

As in the baseline model with fully-rational customers, also with credulous customers it is optimal for the seller to raise the price p so as to extract their entire willingness to pay, until (14) becomes binding. When serving credulous customers, the level of the refund no longer serves as a commitment device to improve the credibility of the seller's sales talk, but becomes a key instrument of distortionary exploitation.

The seller's unsuitable advice that $s = \overline{s}$ inflates a credulous customer's perception not only of the overall value of the contract, but also of the value of the right of early termination. To see this, recall that the probability with which the contract is subsequently

[29] Note that a policy that would restrict the seller's margin ("abusive pricing") would have the same effect as in Proposition 5.

terminated, $\Psi(u^* \mid s)$, is strictly decreasing in s. Erroneously believing that $s = \overline{s}$ when advised to sign, a credulous customer assigns a probability for the occurrence of cancellation that is lower than the correct probability assigned by the seller. Thus, it is optimal for the seller to set the cancellation refund, q, below the interim efficient level, v.[30]

Proposition 6 *If sales are only to credulous customers, then the terms of early cancellation are inefficiently strict, with $\underline{u} < q < v$. When (3) holds, the seller ends up advising indiscriminately all customers to sign the contract. The true surplus (based on correct expectations) realized by credulous customers is negative.*

Note that when $\Psi(u^* \mid \overline{s}) = 0$ holds for all $u^* < \overline{u}$, the customer no longer cares about the cancellation right, given that from (3) the signal is perfectly informative at the boundaries. Still, we also have $\underline{u} < q < v$. In fact, as we show in the proof of Proposition 6, q then satisfies $v - q = G(q)/g(q)$, and is unique under the standard assumption that the reverse hazard rate, $g(u)/G(u)$, is decreasing.[31]

5.2 Consumer Protection versus Competition Policy

Recall from our preceding analysis that with wary customers there is no scope for beneficial intervention through consumer protection policies, whereas consumer surplus and social surplus increase when the seller's pricing power is reduced through competition policies. We obtain strikingly contrasting implications when all customers are credulous.

The case of consumer protection is immediate. From Proposition 6 the seller offers an inefficiently low refund and, in addition, advises all credulous customers to purchase. Therefore, a minimum refund $\overline{q}$ that lies slightly above the seller's cost of continued service, $\overline{q} > v$, will lead both to strictly higher *interim* efficiency and to higher *ex ante* efficiency, by possibly ensuring that $s^* > \underline{s}$ (which always applies when $\overline{q}$ is sufficiently large.) While the perceived surplus of credulous customers is always zero, their true surplus is always negative and strictly increasing in the minimum refund, $\overline{q}$.[32]

[30] For Proposition 6 note that when (3) does not hold, there are two cases to distinguish: the seller either advises all customers to make a purchase, or advises in favor of a purchase only after observing sufficiently *low* signals. See the proof as well as Proposition 7 for details.

[31] If, instead, the seller were to set the refund at an even lower level, with $q \leq \underline{u}$, the customer would never terminate the contract. But then the seller would always have to incur the costs v of continued service.

[32] As long as the seller has all the pricing power and is able to induce inflated expectations about the

To assess the effectiveness of competition policy, consider the effect of changes in the customer's reservation value, which now corresponds to the *perceived* consumer surplus given the inflated message, $s = \overline{s}$. When this value, denoted by V_C, becomes sufficiently high, in equilibrium the seller ends up advising customers to sign only when the observed signal is sufficiently *low*, i.e., when $s \leq s^*$ for some given cutoff $s^* < \overline{s}$. In this case the seller makes a loss when the contract is served to maturity, while making a profit when the contract is cancelled prematurely. Intuitively, when the reservation utility required by credulous customers is sufficiently high, the price is reduced so much that the seller's upfront margin for a contract that is not terminated becomes negative, $p-c-v < 0$. Given that the seller earns a positive termination margin on customers that cancel, $v - q > 0$, the seller ends up rebating part of those profits upfront to customers.

The larger is V_C, the more the seller focuses on customers who are likely to cancel early (low s). However, we cannot sign unambiguously the impact of V_C on q, as argued in the proof of the result that follows.

Proposition 7 *When customers are credulous, a consumer protection policy that imposes a binding minimum refund level strictly increases consumer surplus and social surplus. If the seller's pricing power decreases sufficiently, as expressed by a sufficiently high reservation value V_C for credulous customers, the seller ends up making profits only with customers who cancel prematurely after observing a low value of u, implying that the seller now advises customers to sign only after observing low values of s.*

The rationale for policy intervention in this model is different from that suggested by models building on buyers' projection bias (Loewenstein, O'Donoghue, and Rabin 2003). While buyers who are unaware of their own *upward biased* perception at the time of purchasing must be protected from themselves, in our model only credulous buyers must be protected from the seller. As we investigate next, the rationale for policy intervention depends on the composition of the market—for channels with a large fraction of wary buyers, credulous buyers are indirectly protected by the generous cancellation terms offered in equilibrium.

suitability of the product, the level of expected *true* consumer surplus the customer obtains is always negative. Thus, credulous customers would be best off if the market were completely shut down, which could be ensured by imposing an excessively high refund requirement so as to make a sale unprofitable for the seller. Clearly, social surplus would then also be zero.

6 Heterogeneous Customer Base

Suppose now that a fraction α of customers is credulous (as in Section 5), while the remaining fraction is wary of the seller's strategic incentives at the advice stage (as in the baseline model). Hence, when the seller advises to sign by sending the message that $s = \overline{s}$, wary customers will rationally discount this claim and correctly believe that $s \geq s^*$. To derive our main insights it is sufficient to restrict the seller to make a single offer to the customer. As we show in a Supplementary Appendix, our main results are robust to the case in which the seller screens credulous and wary customers with a menu of contracts.[33]

When the seller offers a pooling contract (p, q) that attracts both credulous and wary customers, the same outcome obtains as with only wary customers. The lower willingness to pay of wary customers constrains the seller's pricing power. When the marginal customer is wary, the seller's optimal offer solves the same tradeoff as in Section 4, irrespective of α. In this case, the outcome is unaffected by the presence of credulous customers.

Proposition 8 *When the seller offers a contract (p, q) that is directed to both credulous and wary customers, the outcome is identical to the one characterized by Proposition 4 and thus is second-best efficient.*

Note that when the price satisfies the participation constraint for wary customers, (8), credulous customers expect to realize a strictly positive expected utility according to (14). In reality, their expected consumer surplus is equal to zero, given the monopoly position enjoyed by the seller. The presence of wary customers protects credulous customers from exploitation.

While the seller's profits from serving both types of customers do not depend on the fraction of credulous customers, α, the profits from serving only credulous customers increase proportionally with α. Thus, there exists an interior cutoff for the fraction of credulous customers, α, such that the seller targets only credulous customers if and only if α does not fall below this threshold.

Interestingly, consumer protection policies now affect the seller's incentives for serving all customers or instead targeting only credulous customers. For illustration, suppose for a

[33] The analysis of that extension is related to Eliaz and Spiegler's (2006), Grubb's (2008), and Heidhues and Kőszegi's (2008) analyses of contract design when buyers are diversely naive about their own preferences.

moment that the second-best efficient refund level with wary customers is unique and given by q_{SB}. Then, by setting a minimum standard $\overline{q} \leq q_{SB}$, the seller's profits from serving all customers are unaffected, while those from serving only credulous customers are strictly lower. This makes targeting only credulous customers relatively less profitable compared to serving all customers. Thus, the imposition of a mandatory minimum standard can be effective even in cases in which the standard is not binding in equilibrium. In these cases, the policy induces the seller to switch from targeting credulous customers to targeting only wary customers and thus offer strictly more generous cancellation terms than required by the minimum standard, $q_{SB} > \overline{q}$. Together with our previous observations, we then have the following prescription for a "robust" consumer protection policy.

Proposition 9 *In the presence of both wary and credulous customers, the imposition of a minimum refund level $\overline{q} \leq v$ increases consumer surplus and social surplus through the following two channels:*
i) When the seller only targets credulous customers, a minimum refund standard reduces exploitation and increases both ex ante *and* interim *efficiency;*
ii) By reducing profits only when the seller targets credulous customers, a minimum refund standard induces the seller instead to serve all customers, which increases consumer surplus (strictly for credulous customers) and leads to the second-best efficient outcome.

This policy is robust in the sense that it cannot lead to a reduction in efficiency, even though it can be implemented by a regulator solely on the basis of information about the cost of service continuation (or salvage value of the product), v. For long-term contracts, this policy prescribes that sellers be required to refund customers who terminate the contract an amount at least equal to the costs they save this way. In case of physical products, upon returning the product the customer would receive a refund that is at least equal to the seller's salvage value.

7 Conclusion

When firms try to convey to customers their superior information about the suitability of a product or service, they face a credibility problem. In the extreme case in which the seller does not bear any cost for unsuitable advice and the customer are wary of the seller's motive, sales talk is completely uninformative. The seller can gain credibility by granting customers generous cancellation rights, which the customer has the discretion to exercise after becoming better informed through initial usage or experimentation. The margin lost from early cancellations (or returns) then disciplines the seller to initially advise on a purchase only when observing a sufficiently favorable signal about the product's suitability.

When all customers are wary of the seller's incentives, we show that the seller's optimal offer is second-best efficient, even though it still leads to excessive purchases (*ex ante inefficiency)* and excessive cancellations (*interim inefficiency).* Policy intervention that prescribes a different refund and cancellation policy would reduce social welfare, while having no effect on consumer surplus. The inefficiency that still prevails in the second-best contract is generated by the fact that the seller possess both private information and pricing power. When customers are wary, social efficiency and consumer surplus both increase when the seller's pricing power is reduced through competition policy.

A role for consumer protection policy emerges when a sufficiently large fraction of customers is credulous and, thus, takes the seller's cheap talk at face value. The seller is then tempted to either target only credulous customers, who have a higher willingness to pay (given their inflated expectations), or to make (self-selecting) discriminatory offers. In the offer that is targeted to credulous customers, cancellation terms no longer play the role of a commitment device, but they become instrumental in allowing the seller to better exploiting customers' inflated beliefs. As a result, customers are offered very restrictive terms of cancellation or return. Consumer surplus and social efficiency can then be increased by prescribing minimum statutory rights, even when these will not bind in equilibrium as the seller ends up offering more generous terms than strictly required.

Our analysis restricts attention to simple deterministic pricing mechanisms that are typically observed in reality. More generally, the seller could offer the buyer to participate in a mechanism prescribing a "menu" of contracts, from which the seller subsequently chooses a specific contract depending on the observed signal, s. Through such a menu approach, the seller should be able to improve efficiency by shifting profits towards high signals for which it is efficient to advice purchase in any case. A further way to improve efficiency would be to use stochastic mechanisms which grant customers (very high) refunds with (very small) positive probability. The seller would be disciplined by the expected penalty induced, thus reducing the need of imposing inefficient returns. However, the potentially high payments involved would create new problems of opportunistic behavior (for example, in playing the "lottery").

Our simple formulation also abstracts from the possibility that the customer may have different intensities of service usage. In a more general setting, customer types could affect the respective utility as well as the seller's cost. Through the same mechanism at work in our baseline model, in this case the seller might be able to improve credibility by using non-linear pricing schemes that subsidize for low usage (through free samples or free base capacity). When instead buyers are credulous, our analysis suggests that the seller would use quantity discounts (with relatively high prices for low consumption volumes) as a way to extract more of the consumer value, again inflated through biased advice.

While we frame the analysis in terms of the contractually stipulated level of refund, an alternative contractual variable is the length of time over which customers can cancel a contract or return a product without penalty. Extending this period allows customers to obtain more precise information about the utility, but it also deteriorates salvage value of the product. Our analysis suggests that market contracts will stipulate the second-best efficient duration when customers are wary, even in the absence of policy intervention. Firms would, instead, offer inefficiently short trial periods when targeting credulous customers, so as better to exploit the fact that these customers' expectations are inflated by unsuitable advice.

Appendix A: Proofs

Proof of Proposition 1. The characterization follows from the arguments in the text. Differentiating (6) and using $u^* = q$, for $q > v$ we have $\partial\pi/\partial s^* = (v - q)\,\Psi_{s^*}(u^* \mid s^*) > 0$ by FOSD, $\partial\pi/\partial p = 1$, and $\partial\pi/\partial q = -\Psi(u^* \mid s^*) + (v - q)\,\psi(u^* \mid s^*) < 0$. By the implicit function theorem, we conclude that $ds^*/dq > 0$ and $ds^*/dp < 0$. **Q.E.D.**

Proof of Proposition 2. The case with $q \leq v$ is immediate. Consider the case with $q > v$. The binding constraint (8) defines a continuous and strictly increasing mapping $\widehat{p}(s^*)$, with $\widehat{p}(\underline{s}) = q + \int_q^{\overline{u}}(u - q)g(u)du$ and $\widehat{p}(\overline{s}) = q + \int_q^{\overline{u}}(u - q)\psi(u \mid \overline{s})du$. Using Proposition 1, we define next a mapping $\widehat{s}^*(p)$ with $\widehat{s}^*(p) = \underline{s}$ when (5) holds, $\widehat{s}^*(p) = \overline{s}$ when $(p - c - v) + \Psi(u^* \mid \overline{s})(v - q) \leq 0$, and otherwise $\widehat{s}^*(p) = s^*$ as given by (6). Note that $\widehat{s}^*(p)$ is decreasing in p, and strictly so when $\underline{s} < \widehat{s}^*(p) < \overline{s}$. A pricing equilibrium is thus a pair (p, s^*) such that $s^* = \widehat{s}^*(p)$ and $p = \widehat{p}(s^*)$. If it exists, then by monotonicity of the two mappings it is unique. Furthermore, from (10) it follows that $s^* > \underline{s}$ must hold strictly. There are then two cases. As is easily seen from substitution of $\widehat{p}(\overline{s})$, an equilibrium with $s < \overline{s}$ exists if and only if condition (11) holds. Otherwise, we have that $s^* = \overline{s}$, so that the equilibrium involves no trade with positive probability. **Q.E.D.**

Proof of Proposition 3. For this proof it is convenient to write out the binding participation constraint (8) as

$$\gamma := \int_{s^*}^{\overline{s}} \left[\Psi(q \mid s)q + \int_q^{\overline{u}} u\psi(u \mid s)du\right]\left(\frac{f(s)}{1 - F(s^*)}\right)ds - p = 0, \tag{15}$$

using $u^* = q$. The result follows by applying the implicit function theorem on the system of equations (6) and (15) in s^*, p. Differentiating (15), for $q > v$ we have $\partial\gamma/\partial s^* = [p - [\Psi(q \mid s^*)q + \int_q^{\overline{u}} u\psi(u \mid s^*)du]]f(s^*)/[1 - F(s^*)] > 0$ because $\max\{u, q\}$ is an increasing function of u and Ψ are ranked by FOSD order, $\partial\gamma/\partial p = -1$, and $\partial\gamma/\partial q = \int_{s^*}^{\overline{s}} \Psi(q \mid s)f(s)/[1 - F(s^*)]ds > 0$. Combining the signs of these derivatives of the consumer surplus with the signs of the derivatives of profits reported in the proof of Proposition 1, we conclude that the determinant of the Jacobian of this system is negative: $(\partial\pi/\partial s^*)\,(\partial\gamma/\partial p) - (\partial\pi/\partial p)\,(\partial\gamma/\partial s^*) < 0$. Next, $(\partial\pi/\partial q)\,(\partial\gamma/\partial p) - (\partial\pi/\partial p)\,(\partial\gamma/\partial q)$ simplifies to

$$\psi(q \mid s^*)(q - v) + \left[\Psi(q \mid s^*) - \int_{s^*}^{\overline{s}} \Psi(q \mid s)\frac{f(s)}{1 - F(s^*)}ds\right] > 0,$$

where the first term is positive by $q > v$ and the second term is positive by FOSD of Ψ. The intuition for this result is that the increase in expected costs associated to the higher refund associated to the marginal customer type (corresponding to signal s^*) are higher than the increase in the willingness to pay of the average customer type (with signals $s \geq s^*$). The result that $ds^*/dq > 0$ then follows by Cramer's rule. Similarly, from $(\partial\pi/\partial s^*)(\partial\gamma/\partial q) - (\partial\pi/\partial q)(\partial\gamma/\partial s^*) > 0$ we immediately have that $dp/dq > 0$. **Q.E.D.**

Proof of Proposition 4. Define the strictly interior signal $\underline{s} < \tilde{s} < \underline{s}$ at which

$$\int_{\tilde{s}}^{\overline{s}} \left[\int_{v}^{\overline{u}} (u - v)\psi(u \mid s)du \right] f(s)ds = c$$

holds. Existence follows from (10), our assumption that the maximum social surplus that attained at the first-best solution, $u^* = u_{FB}$ and $s^* = s_{FB}$, is strictly positive. When $s^* = \tilde{s}$, setting p equal to the customer's willingness to pay results in $p = c + v$. Recall next that, after substituting for p, the seller's profits equal *ex ante* social surplus, as given by (9), so that

$$\frac{d\Pi}{dq} = -\frac{ds^*}{dq} f(s^*) \left[\int_{u^*}^{\overline{u}} (u - v)\psi(u \mid s^*)du - c \right] - \int_{s^*}^{\overline{s}} \psi(u^* \mid s)(u^* - v) f(s)ds, \qquad (16)$$

where we also used $du^*/dq = 1$. Note that using $ds^*/dq > 0$ from Proposition 3, we have that (16) is strictly positive at $q = u^* = v$ and $s^* = \tilde{s}$, so that the seller can indeed realize strictly positive profits by choosing a contract with $q > v$. Given that $u^* = q > v$ and using again that $ds^*/dq > 0$, the first-order condition $d\Pi/dq = 0$ requires that

$$\int_{u^*}^{\overline{u}} (u - v)\psi(u \mid s^*)du < c,$$

which from FOSD of Ψ implies that $s^* < s_{CFB}(u^*)$. **Q.E.D.**

Proof of Proposition 5. The generalized program for the seller is obtained by using the participation constraint $V \geq \overline{V}$, where $\overline{V} \in [0, \overline{V}_{\max}]$. Substituting for p, given that at the solution the participation constraint is binding and that customer obtains the reservation value, $\overline{V}$, the seller's obtains the social surplus minus the customer's reservation value, $\Pi = \Omega - \overline{V}$, where the social surplus is equal to

$$\Omega := \int_{s^*}^{\overline{s}} \left[\int_{u^*}^{\overline{u}} (u - v)\psi(u \mid s)du - c \right] f(s)ds.$$

For any $\overline{V}_1 < \overline{V}_{\max}$ and some (marginally) higher $\overline{V}_2 > \overline{V}_1$, now we show that the respective levels of social surplus attained in equilibrium satisfy $\Omega_1 < \Omega_2$. We argue to a contradiction by supposing, instead, that $\Omega_1 \geq \Omega_2$. Take an optimal contract (p_1, q_1), which thus leads to Ω_1. From Proposition 4 it holds that $u_1^* < u_{FB}$ and $s_1^* < s_{CFB}(u_1^*)$. Using that $\overline{V}_2$ is (marginally) higher than $\overline{V}_1$, by continuity of s^* and expected costumer surplus in the contractual variables we can find a price $p < p_1$ such that the customers' expected utility from (p, q_1) equals $\overline{V}_2$, while the new *ex ante* cutoff s_2^* satisfies $s_1^* < s_2^* < s_{CFB}(u_1^*)$. The resulting social surplus, which we denote by Ω_2', thus strictly exceeds Ω_1. With this contract, (p, q_1), the seller's profits, $\Omega_2' - \overline{V}_2$, are thus strictly higher than $\Omega_2 - \overline{V}_2$, given that by assumption $\Omega_1 \geq \Omega_2$ holds. This contradicts optimality of the original offer (p_2, q_2), which supposedly generated Ω_2.

Finally, the case with $V = \overline{V}_{\max}$ and $q = v$, while $p = v + c$, is immediate, given the unique characterization of a contract that satisfies $s^* = s_{FB}$ and $u^* = u_{FB}$ and thus maximizes social surplus. We obtain convergence $u^* \to u_{FB}$ and $s^* \to s_{FB}$ as $\overline{V} \to \overline{V}_{\max}$, given strict quasiconcavity of Ω in (s^*, u^*). **Q.E.D.**

Proof of Proposition 6. It is now convenient to more generally denote by S_A the set of signals $s \in S$ for which $\pi(s) \geq 0$ holds for a given contract. Hence, profits are given by $\Pi = \int_{S_A} \pi(s) f(s) ds$. Note next that the price resulting with credulous customers, p, as given from the binding constraint (14), does not depend on S_A (but only on $\overline{s}$). From substitution we thus obtain

$$\Pi = \int_{S_A} \left[\int_{u^*}^{\overline{u}} u\psi(u \mid \overline{s}) du - c - v + \Psi(u^* \mid \overline{s}) q + \Psi(u^* \mid s)(v - q) \right] f(s) ds,$$

where $u^* = q$. This is maximized with respect to both q and S_A. Given optimality of S_A, an interior $\underline{u} < q < \overline{u}$ must solve the first-order condition

$$\int_{S_A} [\Psi(u^* \mid \overline{s}) - \Psi(u^* \mid s)] f(s) ds + (v - q) \int_{S_A} \psi(u^* \mid s) f(s) ds = 0. \tag{17}$$

The first part of this term captures customers' "mispricing" of the option to cancel early, while the second term captures the value that the customers' exercise of the option creates for the seller, when $q < v$, by allowing to save higher continuation costs. FOSD of Ψ then implies that the first addend in (17) is negative, so that the $q < v$. Note also that from the derivative in (17) it follows immediately that indeed $\underline{u} < q < \overline{u}$.

Note next that from $q < v$ the seller now applies a threshold rule and advises the customer to purchase if $s \leq s^*$: $S_A = [\underline{s}, s^*]$, with $s^* = \overline{s}$ in case $\pi(\overline{s}) \geq 0$. Hence, $s^* = \overline{s}$ and thus $S_A = S$ apply when $p > c + v - \Psi(u^* \mid \overline{s})(v - q)$ and thus, after substitution for

p and $u^* = q$, when

$$\int_q^{\overline{u}} (u - v)\psi(u \mid \overline{s})du > c. \tag{18}$$

Condition (18) holds when (3) is satisfied, given that $\overline{u} > c + v$.

When $S_A = S$, (17) becomes

$$\int_{\underline{s}}^{\overline{s}} [\Psi(u^* \mid \overline{s}) - \Psi(u^* \mid s)] f(s)ds + (v - q) \int_{\underline{s}}^{\overline{s}} \psi(u^* \mid s) f(s)ds = 0,$$

which, using $u^* = q$ and (2), simplifies to

$$v - q = \frac{G(q) - \Psi(q \mid \overline{s})}{g(q)}. \tag{19}$$

By (3) and $q < \overline{u}$ we have $\Psi(q \mid \overline{s}) = 0$, so that $v - q = G(q)/g(q)$. **Q.E.D.**

Proof of Proposition 7. Take first the imposition of the requirement that $q \geq \overline{q}$. Denote the equilibrium choice of q that is obtained in Proposition 6 by q_C. (Assuming that this is unique does not affect the argument qualitatively.) After substitution for p, the perceived surplus of credulous customers is always zero, given that in equilibrium the participation constraint, (14), is binding, their *true* expected surplus is given by

$$\int_{S_A} \left[\int_{u^*}^{\overline{u}} (u - q) \left[\psi(u \mid s) - \psi(u \mid \overline{s})\right] \right] f(s)ds < 0. \tag{20}$$

As long as the imposition of $\overline{q}$ has no effect on S_A, note that when the actually chosen refund q is (marginally) increased by $dq > 0$, from (20) the impact on the true expected surplus is

$$\int_{S_A} [\Psi(u^* \mid s) - \Psi(u^* \mid \overline{s})] f(s)ds, \tag{21}$$

which is positive FOSD of Ψ. Now recall from the proof of Proposition 6 that when (3) holds and $q < v$, then it always holds that $S_A = S$, so that the seller always advises purchase regardless of the signal observed. (This argument also extends to the case with $v = q$.) From the derivative in (17) we also have that with $S_A = S$ fixed, $d\Pi/dq < 0$ holds for all $q > q_C$, so that $q = \overline{q}$ is optimal when $\overline{q} \leq v$ and thus $dq/d\overline{q} = 1$. Taken together, we have shown that the costumer's true surplus is strictly increasing in the imposed minimum standard, $\overline{q}$, when for $\overline{q} \leq v$. We next extend this assertion to all $\overline{q} > v$. Note first from Proposition 1 that the seller will then apply a cutoff s^* and advise to sign a contract only when $s \geq s^*$. Next, also in this case it is uniquely optimal for the seller to choose $q = \overline{q}$. This follows because we have that

$$\frac{d\Pi}{dq} = \int_{s^*}^{\overline{s}} \left[\Psi(u^* \mid \overline{s}) - \Psi(u^* \mid s)\right] f(s)ds + (v-q)\int_{s^*}^{\overline{s}} \psi(u^* \mid s) f(s)ds < 0$$

for all $q > v$. From our previous observations it then follows immediately that $ds^*/d\overline{q} > 0$, provided s^* is interior, while $s^* > \underline{s}$ indeed holds for sufficiently high values of $q = \overline{q}$. We finally show that the customer's *true* surplus is strictly increasing in $\overline{q}$ also for $\overline{q} > v$.[34] This follows because the derivative with respect to $q = \overline{q}$ satisfies

$$\int_{s^*}^{\overline{s}} \left[\Psi(u^* \mid s) - \Psi(u^* \mid \overline{s})\right] f(s)ds - f(s^*)\frac{ds^*}{d\overline{q}}\left[\int_{\overline{q}}^{\overline{u}} (u-\overline{q})\left[\psi(u \mid s^*) - \psi(u \mid \overline{s})\right] du\right] > 0,$$

using (20), (21), and the fact that the term in square brackets is negative by FOSD.

Now we turn to the second part of the assertion. As in the proof of Proposition 6, we thus stipulate that the seller maximizes Π subject to the generalized participation constraint

$$V_C := \int_U \max\{u, q\}\, \psi(u \mid \overline{s})du - p \geq \overline{V}_C.$$

Proceeding as in the proof of Proposition 6, given optimality of S_A, q must solve (17), implying again that $q < v$. Hence, we still have that $S_A = [\underline{s}, s^*]$, with $s^* = \overline{s}$ in case $\pi(\overline{s}) \geq 0$. Note also that as long as $S_A = S$, the equilibrium refund q does not depend on $\overline{V}_C$. More generally, q depends on $\overline{V}_C$ only indirectly, via the effect on S_A.

As $\overline{V}_C$ increases while still $S_A = S$, we clearly have that $\pi(\overline{s})$ strictly decreases and ultimately becomes negative. From that point on, we have that $S_A = [\underline{s}, s^*]$ with $s^* < \overline{s}$. While it is immediate that $ds^*/d\overline{V}_C < 0$ holds from then on, the comparative analysis for q is generally ambiguous.[35] **Q.E.D.**

Proof of Proposition 9. Assertion (i) follows immediately from the preceding arguments in the main text. Assertion (ii) follows from the fact that the true surplus of credulous customers is a strictly increasing function of the imposed standard $q \geq \overline{q}$, as was shown in the proof of Proposition 7. **Q.E.D.**

[34] Clearly, social efficiency will decrease at some point given that *interim* inefficiency will become sufficiently severe.

[35] This holds also when we use condition (3), for which (17) transforms to

$$v - q = \frac{\int_{\underline{s}}^{s^*} \Psi(q \mid s) f(s)ds}{\int_{\underline{s}}^{s^*} \psi(q \mid s) f(s)ds} = \frac{g(q)H(s^* \mid q)}{\int_{\underline{u}}^{q} g(u)H(s^* \mid u)du},$$

while we have that $p = \overline{u} - \overline{V}_C$ and thus that $s^* < \overline{s}$ in case $\overline{V}_C > \overline{u} - c - v$.

8 References

Anderson, Eric T., Karsten Hansen, and Duncan Simester. 2009. "The Option Value of Returns: Theory and Empirical Evidence." *Marketing Science*, 28(3), 405–423.

Armstrong, Mark. 2008. "Interactions between Competition and Consumer Protection Policies." *Competition Policy International*, 4(1), 97–147.

Bar-Isaac, Heski, Guillermo Caruana, and Vicente Cuñat. Forthcoming. "Information Gathering and Marketing." *Journal of Economics and Management Strategy*.

Bolton, Patrick, Xavier Freixas, and Joel Shapiro. 2009. "The Credit Rating Game." Mimeo, Columbia University and Universitat Pompeu Fabra.

Che, Yeon-Koo. 1996. "Customer Return Policies for Experience Goods." *Journal of Industrial Economics*, 44(1), 17–24.

Courty, Pascal, and Hao Li. 2000. "Sequential Screening." *Review of Economic Studies*, 67(4), 697–718.

Crawford, Vincent P., and Joel Sobel. 1982. "Strategic Information Transmission." *Econometrica*, 50(6), 1431–1451.

Davis, Scott, Eitan Gerstner, and Michael Hagerty. 1995. "Money Back Guarantees in Retailing: Matching Products to Consumer Tastes." *Journal of Retailing*, 71(1), 7–22.

DellaVigna, Stefano, and Ulrike Malmendier. 2004. "Contract Design and Self-Control: Theory and Evidence." *Quarterly Journal of Economics*, 119(2), 353–402.

Eliaz, Kfir, and Ran Spiegler. 2006. "Contracting with Diversely Naive Agents." *Review of Economic Studies*, 73(3), 689–714.

Ellison, Glenn. 2005. "A Model of Add-on Pricing." *Quarterly Journal of Economics*, 120(2), 585–637.

Gabaix, Xavier, and David Laibson. 2006. "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets." *Quarterly Journal of Economics*, 121(2), 505–40.

Ganuza, Juan-Josè, and Josè S. Penalva. Forthcoming. "Signal Orderings Based on Dispersion and the Supply of Private Information in Auctions." *Econometrica*.

Green, Jerry R., and Nancy L. Stokey. 2007. "A Two-Person Game of Information Transmission." *Journal of Economic Theory*, 135(1), 90–104.

Grossman, Sanford J. 1981. "The Informational Role of Warranties and Private Disclosure about Product Quality." *Journal of Law and Economics*, 24(3), 461–483.

Grubb, Michael D. 2008. "Selling to Overconfident Consumers." *American Economic Review*, forthcoming.

Heidhues, Paul, and Botond Kőszegi. 2008. "Exploiting Naivete about Self-Control in the Credit Market." Mimeo, University of Bonn and University of California at Berkeley.

Hendel, Igal, and Alessandro Lizzeri. 2002. "The Role of Leasing under Adverse Selection." *Journal of Political Economy*, 110(1), 113–143.

Holmström, Bengt. 1982. "Moral Hazard in Teams." *Bell Journal of Economics*, 13(2), 324–340.

Howells, Geraint G., and Stephen Weatherill. 2005. *Consumer Protection Law*. Aldershot: Ashgate Publishing Group.

Inderst, Roman, and Marco Ottaviani. 2009. "Misselling through Agents." *American Economic Review*, 99(3), 883–908.

Johnson, Justin P., and David P. Myatt. 2006. "On the Simple Economics of Advertising, Marketing, and Product Design." *American Economic Review*, 96(3), 756–784.

Johnson, Justin P., and Michael Waldman. 2003. "Leasing, Lemons, and Buybacks." *RAND Journal of Economics*, 34(2), 247–265.

Kandel, Eugene. 1996. "The Right to Return." *Journal of Law and Economics*, 39(1), 329–355.

Kartik, Navin, Marco Ottaviani, and Francesco Squintani. 2007. "Credulity, Lies, and Costly Talk." *Journal of Economics Theory*, 134(1), 93–116.

Loewenstein, George, Ted O'Donoghue, and Matthew Rabin. 2003. "Projection Bias in Predicting Future Utility." *Quarterly Journal of Economics*, 118(4), 1209–1248.

Mann, Duncan P., and Jennifer P. Wissink. 1990. "Money-Back Warranties vs. Replacement Warranties: A Simple Comparison." *American Economic Review Papers and Proceedings*, 80(2), 432–436.

Marvel, Howard P., and James Peck. 1995. "Demand Uncertainty and Returns Policies." *International Economic Review*, 36(3), 691–714.

Matthews, Steven A., and Nicola Persico. 2007. "Information Acquisition and Refunds for Returns." Mimeo, University of Pennsylvania.

Milgrom, Paul, and John Roberts. 1986. "Relying on the Information of Interested Parties." *Rand Journal of Economics*, 17(1), 18–32.

Office of Fair Trading. 2004. "Doorstep Selling." http://www.oft.gov.uk/shared_oft /reports/consumer_protection/oft716.pdf

Pitchik, Carolyn, and Andrew Schotter. 1987. "Honesty in a Model of Strategic Information Transmission." *American Economic Review*, 77(5), 1032–1036.

Shieh, Shiou. 1996. "Price and Money-Back Guarantees as Signals of Product Quality." *Journal of Economics and Management Strategy*, 5(3), 361–377.

Spence, Michael. 1977. "Consumer Misperceptions, Product Failure and Producer Liability." *Review of Economic Studies*, 44(3), 561–572.

Stern, Louis W., and Thomas L. Eovaldi. 1984. *Legal Aspects of Marketing Strategy: Antitrust and Consumer Protection Issues*. Englewood Cliffs: Prentice-Hall.

Omitted Appendix: Extension to Discriminatory Offers

Consider the following game with discriminatory offers. Initially, the seller designs a menu $\{(p_W, q_W), (p_C, q_C)\}$. After being advised, the customer (truthfully) picks a contract from the menu. Note again that with a heterogeneous customer base we can stipulate without loss of generality that the seller sends a message equal to $s = \overline{s}$ when wishing to make a sale.[36] We distinguish two scenarios:

Case 1. At $t = 1$ the seller observes the behavioral "type" (wary or credulous) of the customer, in addition to the suitability signal, s. Thus, in this case, the seller can then condition the advice on the customer's type. Using again the notation from Proposition 6, in this case there are thus two, potentially different sets $S_{A,W}$ and $S_{A,C}$ that denote the signals s for which the seller recommends a purchase when confronted with the respective customer type. As we shall see below, our characterization is similar to that obtained in Eliaz and Spiegler's (2006), Grubb's (2008), and Heidhues and Kőszegi's (2008) analyses of contract design with agents who are diversely naive about their preferences.

Case 2. At $t = 1$, the seller provides advice without observing the customer's type. This imposes the requirement that $S_{A,C} = S_{A,W}$.

In this extension we prove the following policy result that apply to both cases.

Proposition A1. *When the seller serves all customers, consumer surplus and social surplus are both strictly higher if the policy maker restricts the seller to make a uniform offer according to which all customers have the statutory right to cancel prematurely under the most beneficial terms that the seller offers to any customer.*

In light of the policy recommendation of Proposition 9, the imposition of a mandatory minimum right of cancellation may thus be complemented by the imposition of a nondiscriminatory requirement according to which all customers have access to the most beneficial terms for cancellation that are offered to *any* customer. Provided that the seller still serves all customers, the seller will then optimally offer the second-best efficient con-

[36] An implicit assumption is that credulous customers do not learn about their own credulity when seeing the menu. That is, they do not ask why, given the seller's advice, other customers may, instead, prefer the alternative option, (q_W, p_W). If this were not the case, then the seller would be again restricted to making a uniform offer, as analyzed in Section 6.

tract.[37] In what follows, we prove that this policy, in addition, strictly increases consumer surplus, thereby proving Proposition A1.

As a first step, we derive the constraints of the seller's contract design program. For given (measurable) sets $S_{A,\cdot} \subseteq S$ and respective measures $\Phi(S_{A,\cdot})$, the individual rationality constraints (to follow advice) are given by

$$\int_U \max\{u, q_C\}\, \psi(u \mid \overline{s}) du \geq p_C \tag{IR_C}$$

for credulous customers and by

$$\int_{S_{A,W}} \left[\int_U \max\{u, q_W\}\, \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,W})} ds \geq p_W \tag{IR_W}$$

for wary customers, while incentive compatibility is satisfied when

$$\int_U \max\{u, q_C\}\, \psi(u \mid \overline{s}) du - p_C \geq \int_U \max\{u, q_W\}\, \psi(u \mid \overline{s}) du - p_W \tag{IC_C}$$

holds for credulous customers and

$$\begin{aligned} & \int_{S_{A,W}} \left[\int_U \max\{u, q_W\}\, \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,W})} ds - p_W \\ \geq \ & \int_{S_{A,W}} \left[\int_U \max\{u, q_C\}\, \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,W})} ds - p_C \end{aligned} \tag{IC_W}$$

holds for wary customers. Observe that both incentive compatibility constraints can only be satisfied in case $q_C \leq q_W$.

Firm profits are given by

$$\begin{aligned} \Pi \ :& = \alpha \int_{S_{A,C}} \left[p_C - c - v + \Psi(q_C \mid s)(v - q_C) \right] f(s) ds \\ & +(1-\alpha) \int_{S_{A,W}} \left[p_W - c - v + \Psi(q_W \mid s)(v - q_W) \right] f(s) ds. \end{aligned}$$

Furthermore, the sets $S_{A,\cdot}$ are determined either by the respective conditions that $p_\cdot - c - v + \Psi(q_\cdot \mid s)(v - q_\cdot) \geq 0$ for $s \in S_{A,\cdot}$ in Case 1 or that

$$\alpha \left[p_C - c - v + \Psi(q_C \mid s)(v - q_C) \right] + (1-\alpha) \left[p_W - c - v + \Psi(q_W \mid s)(v - q_W) \right] \geq 0 \tag{22}$$

[37] As is well known from the large literature on price discrimination, when the imposition of a nondiscriminatory requirement leads to a change in market coverage, then even in standard models the welfare outcome is ambiguous.

for all $s \in S_A = S_{A,W} = S_{A,C}$ in Case 2. Note also that in the latter case it follows immediately from (10) that if the offer is feasible, then S_A must be characterized by some $s^* > \underline{s}$ such that a purchase is advised only when $s \geq s^*$.

Claim 1: *IR_C is slack.* We argue to a contradiction. When instead IR_C binds, then together with IC_C it follows that

$$p_W \geq \int_U \max\{u, q_W\} \psi(u \mid \overline{s}) du.$$

But for any $q_W < \overline{u}$, which must clearly hold for the seller to realize positive surplus, this implies that IR_W would then not be satisfied.

Claim 2. *IC_C binds and, when offers are different, IC_W is slack.* We argue next that IC_C must be binding by optimality for the seller. If this was not the case, then we know from Claim 1 that both constraints for credulous customers are slack.

When the seller can observe the customer's type (Case 1) such that $S_{A,W}$ and $S_{A,C}$ are determined independently, it is then immediate that the seller can increase profits by marginally raising p_C.

Instead, when the seller advises customers without knowing their type (Case 2), then p_C affects $S_{A,W} = S_{A,C}$ and, thereby, also IR_W. Recall that in this case $S_{A,\cdot}$ must be characterized by some $s^* > \underline{s}$, where (22) holds with equality. By marginally adjusting $\Delta p_C > 0$ and $\Delta q_C > 0$, such that s^* remains unchanged, note that IR_W is not affected, while from previous arguments the seller's profits with credulous customers increase (given that Ψ is decreasing in s) and, by the same logic, IC_W is relaxed.

Claim 3. *IR_W binds.* This follows immediately from Claim 1 and the observation that by optimality at least one of the two individual rationality constraints must be binding. (While, say, a joint increase in p_W and p_C would affect $S_{A,\cdot}$ and, thereby, efficiency, as the sets $S_{A,\cdot}$ are optimally chosen by the seller, the effect on Π is clearly strictly positive.)

Given Claim 3, a switch from a discriminatory to a uniform offer, that are both acceptable to all customers, does not affect the expected surplus of wary customers. We show now that the *true* surplus of credulous customers is, however, strictly higher with a uniform offer.

As IC_C and IR_W are binding, we obtain that the true expected surplus of credulous customers,

$$\int_{S_{A,C}} \left[\int_U \max\{u, q_C\} \psi(u \mid s) du - p_C \right] f(s) ds,$$

transforms to

$$\begin{aligned}
&\int_{S_{A,C}} \left[\int_U \max\{u, q_C\} \psi(u \mid s) du \right] f(s) ds \\
&-\Phi(S_{A,C}) \int_{S_{A,W}} \left[\int_U \max\{u, q_W\} \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,W})} ds \\
&-\Phi(S_{A,C}) \left[\int_U \max\{u, q_C\} \psi(u \mid \overline{s}) du - \int_U \max\{u, q_W\} \psi(u \mid \overline{s}) du \right].
\end{aligned} \tag{23}$$

To conclude the proof, we now have to treat separately the two cases. In Case 2, where $S_{A,C} = S_{A,W}$, we have from $q_W \geq q_C$ (strictly in case of discriminatory offers) and FOSD of Ψ that (23) is equal to zero when $q_W = q_C$ and, otherwise, strictly negative.

This argument also applies in Case 1, where the seller can discriminate when providing advice, provided that $S_{A,C} = S_{A,W}$. The assertion thus holds *a fortiori* also in this case if we can show that, when evaluated at the true optimal choice of $S_{A,W}$, instead of replacing $S_{A,W}$ by $S_{A,C}$, the expression (23) further decreases. This holds when

$$\begin{aligned}
&\int_{S_{A,W}} \left[\int_U \max\{u, q_W\} \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,W})} ds \\
> &\int_{S_{A,C}} \left[\int_U \max\{u, q_W\} \psi(u \mid s) du \right] \frac{f(s)}{\Phi(S_{A,C})} ds.
\end{aligned} \tag{24}$$

To see that (24) must hold under the optimal mechanism in Case 1, note that now, when the seller's choice of $S_{A,\cdot}$ only depends on the respective contract, the resulting problem is standard. Solving the (relaxed) problem where IR_W and IC_C bind, it is immediate that an optimal q_C also solves the problem of Proposition 6 with only credulous customers, implying that $q_C < v$, so that $S_{A,C} = [\underline{s}, s_C^*]$ for some value s_C^*, while an optimal q_W must strictly exceed any solution to Proposition 4, implying that $q_W > v$, so that $S_{A,C} = [s_W^*, \overline{s}]$. Combing these observations with FOSD of Ψ, we have that (24) indeed holds.