Lender Liability in the Consumer Credit Market[*]

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Abstract

In many countries consumer credit legislation provides for the extension of liability for product failure to the financial institution that advances credit to the consumer. In particular, lender liability is imposed on those credit grantors who closely operate with the supplier of the good.

This paper provides a rationale for lender-responsibility in the consumer credit market. It shows that, when judicial enforcement is inefficient or there is risk of seller liquidation, lender-liability helps to protect consumers who systematically underestimate the probability of product failure and overestimate the extent to which they can obtain compensation.

Keywords: consumer credit, lender liability, misperception, product failure.

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1 Introduction

When a consumer purchases a good on credit she enters two contractual relationships: the sale or main contract with the supplier of the good and the credit contract with the grantor of credit. An issue which has been highly debated is whether the obligations assumed by the parties under each contract should be independent of each other or rather be connected by virtue of the link between the purchase of the good and its financing. In particular, in the event of default or incomplete performance of the sale contract, should the consumer keep fulfilling her obligations with the lender and address her claim exclusively against the supplier or should she be entitled to a similar claim against the lender?

A brief examination of regulations across the United States and the European Union Member States shows that the legislator has been favorable to the extension of the liability to the lender in all situations where the credit is advanced under an *agreement* between the supplier of the good and the credit grantor. This principle was first introduced in the United Kingdom by the Consumer Credit Act 1974. The British example was then followed by other countries and its principles appear in the Federal Trade Commission Holder Rule (196) of the United States and in the European Directive EEC/102/87.[1] Notice that an "agreement" arises whenever a supplier arranges a loan for a customer and this can also include the case where the customer buys the good using a credit card.[2] In these situations, the finance company shares liability with the supplier. Instead, if a customer obtains credit independently of the supplier - through her own bank for example - the credit grantor does not bear any liability. Nor is a credit card company liable if the customer uses her credit card to obtain cash and pay for her purchases.

The main motivation for extending liability to the lender is consumer protection. As emphasized by the British legislator, *"where a transaction involves a connected loan, it would be unfair and insufficient for the consumer as debtor to have remedy only against the supplier, his obligation to continue repaying the lender remaining unaffected"*. The keys to consumer protection are essentially two. One is the possibility of approaching the

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[1] The European Directive introduces subsidiary liability when the credit is provided on the basis of a pre-existing agreement where credit is made available *"exclusively"* by that grantor of credit to customers of that supplier. However, in most countries, it is common jurisprudence to recognize lender-responsibility also for non exclusive agreements.

[2] The regulation of credit cards agreements varies across countries. In UK for example, most credit cards fall within the joint responsibility regimes.

lender when the seller is unable or refuses to satisfy the consumer's claim. The other is the accordance to the consumer of the right to suspend the repayment of the loan until the good object of the contract has been delivered. However, the effective "protection power" of this measure cannot be assessed without simultaneously considering the behavior of all the parties acting in the market. In this regard, one argument adduced against joint liability is that the higher costs inflicted on creditors will be transferred to consumers, in one of the following two forms. Either credit grantors will refuse to sign agreements with the suppliers in order to avoid the liability or they will charge higher interest rates to restore their profitability.

In this paper we investigate these issues and provide a rationale for the existence of voluntary agreements where the credit grantor accepts co-responsibility for inadequate performance of the seller. Further, we show that the present legislation has positive effects on consumer welfare when consumers are poorly informed about risk.

We consider a simple economy composed of two markets: a monopolistic good market and a perfectly competitive credit market. Consumers are risk neutral and decide whether to buy one unit of the good; the good is defective (or more generally, there is lack of conformity with the sale contract) with exogenous and positive probability and may cause damage. Depending on their initial endowment of wealth, two classes of consumers are identified: poor consumers, who must borrow money to finance their purchases and rich consumers who can buy for cash if they wish. Following a strand of literature dating back to Spence (1977) and related empirical evidence (see e.g. Eisenberg 1995), we assume that, within each class, consumers are affected by misperception, and in particular, they overestimate the expected value of the good they are purchasing.[3] In our setting optimism results from the combination of two effects: consumers both underestimate the risk of product failure and overestimate the extent to which they can obtain compensation. The latter in turn may be due to misinformation about the effectiveness of the judicial enforcement and/or the likelihood that the seller is still in business at the time the consumer addresses her claim.[4]

We argue that joint liability helps mitigate the loss that consumers suffer because of their misperceptions. Crucial to this result is that the protection granted by joint liability cannot be fully transferred by the seller into higher prices (or interest rates). This is because, as a direct consequence of their

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[3] Recent developments in marketing techniques such as internet sales, door-to-door selling and distance selling often raise a concern of competition authorities.

[4] It has been estimated that in England 95% by volume of the claims under Section 75 of the Consumer Credit Act arises from the seller going out of business.

being optimistic, consumers undervalue the benefits they obtain from joint liability.

Joint liability protects consumers in two ways. First, they have the right not to repay their debt to the lender whenever the seller does not fulfill his obligations. This reduces the loss that consumers suffer from misperceiving both the probability of product failure and the compensation they can obtain through the judicial system. Second, they are entitled to obtain remedies against the lender in case the seller goes out of business. This protects consumers against their underestimating the risk of seller bankruptcy. In both cases consumer welfare is enhanced because the price they are willing to pay for the protection is lower than its effective value.

That joint liability reduces the rent that can be extracted out of the misperception of consumers implies that joint liability *per se* would never be voluntary undertaken. However, it is undertaken when it is a condition *sine qua non* for coordination of price and interest decisions which allows the seller to price discriminate between rich and poor consumers. This argument provides a rationale for restricting joint liability to those situations involving an agreement between the seller and the lender, as is the case under the existing legislation. In this regard, joint-liability can be viewed as a means to redistribute some of the gains from coordination towards the consumers.

To our knowledge the desirability of extending the liability for product failure to the lender is an issue as yet still unexplored. On the one hand, lender liability has mainly been analyzed in the field of environmental regulation, where banks may be considered liable for the environmental damage created by the firms they finance. (See for example, Pitchford 1995, and Boyer and Laffont 1997). On the other hand, the literature on liability for product failure mainly restricts attention to seller-only responsibility regulation and focuses on the effects of different liability rules on risk distribution and on the incentives of the buyer to exert product care and of the seller to provide quality.[5] In contrast, our paper studies the effects of voluntary provision of lender and seller liability and it abstracts from risk and moral hazard considerations. Moreover, none of these papers allows for any sort of consumers' misperception. In this respect, our paper is mostly related to a strand of literature dating back to Spence (1977), who consider the loss consumers may suffer when they underestimate the probability of product failure.[6]

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[5] See for example, Green (1976), Spence (1977), Epple and Raviv (1978), Polinsky and Rogerson (1983) and Daughety and Reinganum (1995).

[6] See also Shapiro (1982) and Polinsky and Rogerson (1983).

The rest of the paper is organized as follows. Section 2 outlines the model. Section 3 presents two relevant benchmarks: the case of fully rational consumers (Section 3.1) and the case where there is consumers' misperception, but the seller and lender are free to coordinate their decisions without this implying the undertaking of joint responsibility (Section 3.2). Section 4 studies the effects of introducing joint liability, while Section 5 discusses other means of protecting consumers from their misperceptions. It shows that full protection from misperception requires liability rules that make the utility in the bad state *higher* than that in the good state. It further shows that joint liability may work as a device that induces the seller to give up the rent he can make on the irrationality of consumers in order to be able to serve also rational (and pessimistic) consumers. Section 6 concludes.

2 The model

The economy consists of a monopolistic good market and a perfectly competitive financial market. Consumers may decide to buy a unit good from the seller and have access to credit from the financial market. The good is worth B to each of them. However, with exogenous probability d, where $0 \leq d \leq 1$, the sale contract is inadequately honored: the good is defective or not delivered or it is not in conformity with the standards specified in the initial contract. In this case the value of the good to the consumers is zero if there is no damage, and $-D$ if damage occurs.

In most of the paper, we take a positive approach to liability legislation and assume that the extent of the seller liability is equal to $D + B$. Further, we assume that resorting to the legal system is costly (due to legal fees or to non-monetary unrecoverable costs of the time wasted) or, analogously, that the judicial enforcement is inefficient (lengthy trials, incompetent judges). Finally, we consider the possibility that after the good is purchased and before the consumer is able to go to court, the seller goes bankrupt. We account for the inefficiency of the judicial system by assuming that if the seller does not fulfil his obligations and the consumer goes to court, she can recover only a fraction α of her claim, where $0 \leq \alpha \leq 1$.[7] Further, we denote by ν with $0 \leq \nu \leq 1$ the probability that the seller is still in business at the time the consumer lays her claim.

There are two classes of consumers, rich and poor; all of them are risk

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[7]α could also be interpreted as the probability of winning the lawsuit. Note, that all that is required for our analysis to hold is that the consumer would always prefer not to have to go to court in order to have her claim satisfied.

neutral. Rich consumers have sufficient money to purchase the good for cash if they wish; alternatively they may purchase on credit. Poor consumers have no cash, and, therefore, if they are to purchase the good, they must use credit. The number of rich and poor consumers is given by n_r and n_p, respectively. In most of the paper we focus on consumers who are inherently optimistic for they systematically overestimate the value of the good. The assumption of optimism has been a standard feature of the literature on consumers' behavior (see e.g. Spence 1977, Polinsky and Rogerson 1983, Shapiro 1982) and is motivated by the existence of significant empirical evidence in favor of consumer optimism (see e.g. Eisenberg 1995 and references therein). In our setting, optimism results from consumers underestimating both the risk of product failure and of seller bankruptcy and overestimating the compensation they can obtain in court when the seller refuses or is unable to honor the contract. Formally, let $\widehat{d}, \widehat{\nu}$ and $\widehat{\alpha}$ denote the consumers' imprecise estimates of the probability of product failure (d), the risk of seller bankruptcy $(1 - \nu)$ and the inefficiency of the judicial enforcement $(1 - \alpha)$. We assume that $\widehat{d} \leq d$, $\widehat{\nu} \geq \nu$ and $\widehat{\alpha} \geq \alpha$, with $d\alpha \geq \widehat{d}\widehat{\alpha}$.[8]

The supplier of the good and the credit grantor may operate independently or may decide to sign an agreement in order to coordinate their price and interest rate decisions. Let $R \in \{r, i\}$ denote the interest rate on credit, where r and i are the interest rate under independence and under coordination, respectively. Thus the effective price, denote by P paid by the consumers is equal to p if the consumer buys for cash and to $(1 + R)p$ if the consumer buys on credit.

When the seller and the lender act independently, a regime of seller liability applies, where the discovery of a defective good does not affect the consumers' rights and duties with the lender. In this case, the real surplus derived from the consumption of the good is

$$
\begin{aligned}
U^S(P) &= (1 - d)(B - P) + d(-D - P + \nu\alpha(D + B)) \\
&= (1 - d(1 - \nu\alpha))B - P - d(1 - \nu\alpha)D
\end{aligned}
\tag{1}
$$

Notice that, under seller-only responsibility, when the good is defective, the consumer can pursue her remedy only against the seller. Hence, she can recoup the damage and a new unit of the good (or its money equivalent) only if the latter is still in business.[9] Moreover, due to the inefficiency of

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[8]We shall return on this assumption in Section 4.2 .

[9]That consumers receive a new unit of the good (or its money equivalent) when the seller is still active in the market involves no loss of generality. We could as well have considered the case where the consumers only recoup the price paid and the compensation for the damage.

the judicial system, only a portion α of her claim will be satisfied.

However, consumers are affected by misperception. Their perceived utility is then given by

$$\widehat{U}^S(P) = (1 - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha}))B - P - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha})D \tag{2}$$

When the seller and the lender coordinate their decisions, the latter becomes co-responsible with the seller towards those consumers to whom he has supplied credit. This joint liability has a twofold effect. First, the consumer pays $P = (1 + i)p$ only if the good is not defective or her claim is satisfied. Second, if the good is defective she can resort to the lender and obtain a fraction α of the damage inflicted to herself, if the seller has gone into liquidation.[10] Thus, under joint liability, the real utility is

$$
\begin{aligned}
U^J(P) &= (1-d)(B-P) + d(-D + \nu\alpha(D + B - P) + (1 - \nu)\alpha D) \\
&= (1 - d(1 - \nu\alpha))(B - P) - d(1 - \alpha)D
\end{aligned}
\tag{3}
$$

The perceived utility is

$$\widehat{U}^J(P) = (1 - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha}))(B - P) - \widehat{d}(1 - \widehat{\alpha})D \tag{4}$$

The monopolistic seller aims to maximize expected profits, taking into account the amount of responsibility he bears if the good is defective. Denoting by $n(P, \cdot)$ the number of consumers served, his expected profit when he acts independently is given by

$$\pi^{SI}(p) = [p - d\nu\alpha D]n - K \tag{5}$$

where for simplicity we have assumed no production costs and positive fixed cost K.

On the credit market, the supply of loans entails positive average transaction and management cost F if the seller and the lender operate independently, and F^c if they coordinate, with $F^c \leq F$. This latter assumption is meant to capture the reduction in the lender's management costs that result from the possibility of using the facilities offered by the seller to manage the supply of loans to his costumers. For simplicity we let $F^c = 0$. The credit grantor faces a perfectly elastic supply of funds at an exogenously determined interest rate, which we normalize to zero. Since perfect competition forces the credit grantor to break even on his loans, under independence, the interest rate he must charge is given by $r = F$.

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[10] Clearly, we are referring only to those consumers who seek credit from the connected lender, those who pay cash still operate in a regime of seller responsibility.

Suppose now that the seller and the lender coordinate their decisions and as a result accept co-responsibility in case of product failure. Let n^J be the number of consumers who buy on credit from the lender connected to the seller, and $n - n^J$ be the number of consumers who either buy cash or buy on credit from an independent lender. Any agreement between the seller and the lender will have the property that the price and interest rate will be set so as to maximize the total expected profits of the two agents. The contract will then specify a monetary transfer t that allocates the gains from coordination among the two parties. Given that the seller has all the bargaining power, in equilibrium the transfer will be equal to the level that maintains the lender on his reservation profit of zero. This yields $t = il + (1 - \nu)\alpha D n^J$ where $l = p n^J$ is the amount of loans and $(1 - \nu)\alpha D n^J$ is the amount of responsibility that the lender bears in case the seller goes bankrupt and for which he will have to be compensated ex ante. Hence, the expected profit of the seller is

$$\pi^J = [(1 - d(1 - \nu\alpha))p - d\alpha D]n^J + [p - d\nu\alpha D]\left(n - n^J\right) + il - K \quad (6)$$

Note that under joint responsibility, the seller receives the price p only if the consumer receives a non-defective good, which occurs with probability $(1 - d(1 - \nu\alpha))$; moreover, he bears the liability for damage with probability 1, due to the compensation he needs to offer to the lender.

Finally, notice that if coordination did not involve any change in the responsibility regime then the seller's expected profit when he cooperates with the lender would be given by

$$\pi^{SC} = [p - d\nu\alpha D]n + il - K \quad (7)$$

with $t = il$.

3 Benchmarks

3.1 No misperceptions

In this section we consider the benchmark where consumers are not affected by misperception. For simplicity we shall refer to them as "rational" consumers.

Rich consumers do not need to borrow to purchase the good. Therefore their reservation price, from (1), is given by

$$p^S = B - d(1 - \nu\alpha)(B + D) \quad (8)$$

On the contrary, poor consumers must resort to credit to finance their purchase. Since they have to borrow p, and $r = F > 0$, their reservation price is lower than their rich counterpart and equal to $\frac{p^S}{1+F}$. Therefore, the profit opportunities of a seller who relies on a independent lender to provide credit to his customers are as follows. The seller can set $p = p^S$ and sell only to the rich consumers or he can set $p = \frac{p^S}{1+F}$ and supply the entire market at a lower price. We assume that F is sufficiently high that it is optimal to sell only to the rich consumers. Then, the seller's profit, $\pi^{SI}\left(p^S\right)$, is given by

$$\pi^{SI}\left(p^S\right) = \Pi n_r - K \tag{9}$$

where $\Pi \equiv [(1 - d\left(1 - \nu\alpha\right))B - dD]$.

Now suppose that the seller can coordinate his decisions with the lender without this implying any changes in the responsibility regime (i.e. there is seller-only responsibility). Coordination increases the profit opportunities for the seller since he can choose the price and interest rate that maximize his profits (net of a transfer to the lender). In particular, by charging p^S and setting $i = 0$, the seller can attract the poor consumers without having to reduce the price below the willingness to pay of the rich ones. This is clearly the optimal strategy since it allows the seller to extract the entire consumer surplus. Substituting for p^S, $i = 0$, $n = (n_r + n_p)$ and $l = n_p$ into (7), yields

$$\pi^{SC}\left(p^S, i = 0\right) = \Pi\left(n_r + n_p\right) - K \tag{10}$$

Notice that $\pi^{SC}\left(p^S, i = 0\right) > \pi^{SI}\left(p^S\right)$, that is, it is always in the interest of the seller to coordinate his decisions with the lender, since he can attract the poor consumers without reducing the profits he can make on the rich ones.[11]

Let us assume now that a regime of joint liability applies to any agreement between the seller and the lender.

Proposition 1 *When all consumers are rational, joint liability is ineffective.*

This result is not surprising. The rationality of consumers, coupled with their neutrality towards risk implies that additional protection is irrelevant. This is because, when consumers are rational the seller can always replicate the same situation as with coordination and seller-only liability by

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[11]More generally, coordination is optimal for F^c sufficiently low.

transferring the additional liability into higher prices. In particular, the seller charges a price equal to the willingness to pay of the rich consumers, $p^J = B - \frac{d(1-\nu\alpha)}{(1-d(1-\alpha))}D$, and sets $i = 0$. This yields: $\pi^J \left(p^J, i = 0\right) = \pi^{SC} \left(p^S\right)$ and $U^J \left(p^J, i = 0\right) = U^S \left(p^S\right) = 0$.

3.2 Misperceptions and seller-only responsibility

We now allow for consumers' misperception and analyze the seller's choice when a regime of seller-only responsibility applies. The effects of introducing joint liability legislation will be investigated in Section 4.

The willingness to pay for the good of a rich and optimistic consumer, from (2), is given by

$$\widehat{p}^S = B - P - \widehat{d}\left(1 - \widehat{\nu}\widehat{\alpha}\right)(B + D) \tag{11}$$

At this price the real utility of the consumer is

$$U^S \left(\widehat{p}^S\right) = \left[\widehat{d}\left(1 - \widehat{\nu}\widehat{\alpha}\right) - d\left(1 - \nu\alpha\right)\right](B + D) < 0 \tag{12}$$

That is, when consumers are affected by misperception and the seller sets the price equal to their willingness to pay, they suffer a loss in real terms. The reason for this is that $\widehat{p}^S$ is greater than the real expected value of the good, which is given by what rational consumers would be willing to pay, i.e. p^S. Assuming again that under no coordination it is never optimal to sell to poor consumers (F sufficiently high), the seller will charge $\widehat{p}^S$ and his expected profit will be

$$\pi^{SI} \left(\widehat{p}^S\right) = \left[\Pi - U^S \left(\widehat{p}^s\right)\right] n_r - K \tag{13}$$

Note that the loss that consumers make due to their misperception, $U^S \left(\widehat{p}^s\right)$, becomes additional profits to the seller. Conversely, when the seller and the lender coordinate their decisions, the following results obtains.

Lemma 2 *When seller-only responsibility applies to coordination, the seller always prefers to coordinate and $i = 0$. Moreover, he sells to all consumers and his profit is given by*

$$\pi^{SC} \left(\widehat{p}^S, i = 0\right) = \left[\Pi - U^S \left(\widehat{p}^S\right)\right](n_r + n_p) - K$$

Consumers are fooled by their misperception: $U^S \left(\widehat{p}^S\right) < 0$ from (12).

As in Section 3.1, the optimal strategy under coordination is to fully subsidize credit, i.e., to set $i = 0$ and sell to both the rich and poor consumers. Moreover, coordination is always desirable for it allows full extraction of consumers' surplus by discrimination between the two classes.

4 Joint Liability

In this section we consider the case of a legislation that imposes a joint liability regime to those sale contracts where the consumer obtains credit from a lender connected to the seller.

A measure of the extent by which consumers can be harmed by their misperception is given by the difference between their perceived utility and their real utility, for the greater this difference the more a consumer will be incorrectly evaluating the benefits from consumption. Under seller-only responsibility, $\widehat{U}^s(\cdot) - U^s(\cdot)$, as given respectively by (2) and (1), amounts to

$$\widehat{U}^S(\cdot) - U^S(\cdot) = \left[d(1 - \nu\alpha) - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha})\right](B + D) > 0.$$

whereas, under joint liability, from (4) and (3), we obtain

$$\widehat{U}^J(\cdot) - U^J(\cdot) = \left[d(1 - \nu\alpha) - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha})\right](B - (1 + i)p)$$
$$+ \left[d(1 - \alpha) - \widehat{d}(1 - \widehat{\alpha})\right]D \geq 0$$

Straightforward calculations show that, for any given p and i such that $\widehat{U}^J(\cdot) \geq 0$

$$\widehat{U}^s(\cdot) - U^s(\cdot) > \widehat{U}^J(\cdot) - U^J(\cdot) \tag{14}$$

Two main implications follow from expression (14). First, the seller cannot fully transfer the additional liability into higher prices, that is, he can never replicate the same situation as with coordination and seller-only liability. This is because optimistic consumers underestimate the value of the additional protection given by joint liability and therefore are not willing to pay the price that reflects the true value of the benefits they obtain.[12] Thus, if the seller increases the price and/or the interest rate so as to leave them indifferent between the two liability regimes ($\widehat{U}^s = \widehat{U}^J = 0$), their real utility increases ($U^J > U^S$). This is a crucial point for it suggests that joint liability may help protect consumers from their misperception and that Proposition 1 does not extend to the case where consumers are irrational.

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[12] In fact, since $d > \widehat{d}$ consumers underestimate the probability that the bad state occurs. Other things equal, this implies that they underestimate the value of protection. However, the assumption that $\widehat{\alpha} > \alpha$ works in the opposite direction, for consumers overestimate the amount they can recoup in court. Our assumption that $d\alpha - \widehat{d}\widehat{\alpha} > 0$ implies that the first effect prevails and overall consumers underestimate the value of additional protection. As we discuss in Section 4.2, if this were not the case, then seller liability should be zero.

A second implication of expression (14), which is strictly related to the previous point, is that it is in the interest of the seller to minimize the number of consumers who borrow from a connected lender. This means that the beneficial effects of joint liability to the poor consumers may not extend to the rich ones. Indeed, as we shall see, the seller will use joint liability as a market-segmentation technique: by appropriately choosing the price and the interest rate, he will continue to extract a rent from the rich consumers by giving them incentives not to switch to credit.

To illustrate both points, as a first step, take the case where consumers incur no loss for damage when they purchase from a connected seller under a regime of joint liability. This can happen either when $D = 0$ or when the judicial system works efficiently and the consumers know it: $\widehat{\alpha} = \alpha = 1$. Indeed, from (3), when $\widehat{\alpha} = \alpha = 1$ the misperception on the risk of seller bankruptcy plays no role under joint liability, since consumers can resort to the lender. As an example of a situation where $D = 0$ one can think of the case where the seller does not deliver the good or delivers a good which is of no use to the consumer. The assumption $\widehat{\alpha} = \alpha = 1$ works well for countries with a well established tradition for protecting consumers' interests or where consumers associations are strong enough to ensure that consumers are fully compensated for the damages they suffer.

> From expressions (3) and (4), when $D = 0$ or $\widehat{\alpha} = \alpha = 1$, the real and perceived utility of a consumer who purchases the good seeking credit from a connected lender are respectively given by

$$
\begin{aligned}
U^J(\cdot) &= (1 - d(1 - \nu\alpha))(B - (1 + i)p) \\
\widehat{U}^J(\cdot) &= (1 - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha}))(B - (1 + i)p)
\end{aligned}
$$

These expressions suggest that when consumers suffers no loss for damage under joint liability, there does not exist a couple (p, i) such that they receive a negative real utility, since for any p, i such that $U^J \geq 0$, we have $\widehat{U}^J \geq 0$. The intuition lies in the fact that consumers pay for the good if and only if they receive B, and enjoy zero utility otherwise. Since consumers will never buy if the effective price is greater than the value of the good, B, the real utility can never be negative. This leads us to the following result.

Proposition 3 *When product failure entails no damage ($D = 0$) or judicial enforcement is efficient ($\widehat{\alpha} = \alpha = 1$), joint liability fully protects the poor consumers from their misperceptions, while the rich ones are unaffected. In particular, the seller signs the agreement with a lender; all consumers are*

*served; the poor ask for credit to the connected lender and obtain zero utility;
the rich buy for cash and are fooled.*

Proposition 2 can be understood as follows. The optimal policy for a seller who signs the agreement with a lender is to charge $\widehat{p}^S$ as defined in (11) and $i^J = \frac{\widehat{d}(1-\widehat{\alpha}\widehat{\nu})}{1-\widehat{d}(1-\widehat{\alpha}\widehat{\nu})}$. This ensures $\widehat{U}^S(\widehat{p}^S) = \widehat{U}^J(\widehat{p}^S, i^J) = 0$. Thus, all consumers are willing to enter the market: poor consumers ask for credit to the connected lender while the rich ones buy for cash. Moreover, since joint liability enables the seller to price discriminate among poor and rich consumers, it is always in his interest to sign the agreement. The seller's profit under this policy is given by

$$\pi^J\left(\widehat{p}^S, i^J\right) = \left(\Pi - U^S\left(\widehat{p}^S\right)\right) n_r + \Pi n_p - K$$

The effect of joint liability on consumer welfare is positive. More precisely, joint liability fully protects poor consumers ($U^J(\widehat{p}^S, i^J) = 0$) and has no effect on the welfare of the rich ones who still receive $U^S\left(\widehat{p}^S\right) < 0$.

Comparing $\pi^{SC}\left(\widehat{p}^S\right)$ and $\pi^J\left(\widehat{p}^S, i^J\right)$, an immediate consequence of Proposition 2 is as follows.

Corollary 4 *When product failure entails no damage ($D = 0$) or judicial enforcement is efficient ($\widehat{\alpha} = \alpha = 1$), joint liability hurts the seller, for it redistributes some of his profits to the consumers.*

The above corollary suggests that sellers and lenders would never voluntarily offer joint liability, because it reduces their gains from coordination ($\pi^J\left(\widehat{p}^S, i^J\right) < \pi^{SC}\left(\widehat{p}^S\right)$). However they do undertake joint responsibility when this is a condition *sine qua non* for coordination, i.e. to price discriminate between rich and poor consumers. In fact $\pi^J\left(\widehat{p}^S, i^J\right) > \pi^{SI}\left(\widehat{p}^S\right)$. In this respect, joint liability can be viewed as a means to redistribute some of the gains from coordination to the consumers.

Now, let us turn to the case where product failure leads to damage, $D > 0$ and $\widehat{\alpha} > \alpha$. In this setting, while the inequality in (14) still holds, it is no longer true that consumers under joint liability can never suffer a negative real utility. Indeed, from (4), the willingness to pay for the good, inclusive of interest (i.e. $(1+i)p$), under joint responsibility is

$$\widehat{P}^J = B - \frac{\widehat{d}(1-\widehat{\alpha})}{\left(1 - \widehat{d}(1-\widehat{\alpha}\widehat{\nu})\right)}D \tag{15}$$

with associated real utility equal to (from (3))

$$U^J(\widehat{P}^J) = \frac{\left[\widehat{d}(1-\widehat{\alpha}) - d(1-\alpha)\right]}{\left(1 - \widehat{d}(1-\widehat{\alpha}\widehat{\nu})\right)}D < 0 \qquad (16)$$

where

$$U^S(\widehat{p}^S) < U^J(\widehat{P}^J) < 0 \qquad (17)$$

Hence, consumers can still be fooled by their misperception. This is because when $D > 0$, and $\widehat{\alpha} > \alpha$ consumers overestimate the level of protection given by the judicial system and their utility in the bad state will be negative. However, $U^S(\widehat{p}^S) < U^J(\widehat{P}^J)$ implies that the extra rent that the seller can make on irrational consumers is lower than under seller-only responsibility. This underlies the following Proposition.

Proposition 5 *When product failure entails damage ($D > 0$) and judicial enforcement is inefficient ($\widehat{\alpha} > \alpha$), joint liability redistributes the gains of coordination from the seller to the poor irrational consumers. However, poor consumers are not fully protected from their misperceptions.*

Notice that the seller can still price discriminate between the two classes of consumers. It suffices that he chooses $\widehat{p}^S$ and adjusts the interest rate so as to obtain $\widehat{P}^J = (1 + i^J)\widehat{p}^S$ as given by (15). This yields $\widehat{U}^S(\widehat{p}^S) = \widehat{U}^J(\widehat{P}^J) = 0$. Thus rich consumers buy for cash while poor consumers buy on credit from the connected lender. Consequently, as in Proposition 2, rich consumers receive no benefit from joint liability. Poor consumers are better off since the extra rent that the seller can make on irrational consumers is lower under joint liability (from (17)). However, contrary to Proposition 2, they are not fully protected (from (16)). More precisely, the seller obtains

$$\pi^J(\widehat{p}^S, i^J) = n_r(\Pi - U^S(\widehat{p}^s)) + n_p(\Pi - U^J(\widehat{P}^J)) - K \qquad (18)$$

where $i^J = \frac{\widehat{d}(1-\widehat{\alpha}\widehat{\nu})}{1-\widehat{d}(1-\widehat{\alpha}\widehat{\nu})}$.

In the next section we shall discuss other factors that may help to deal with consumers' misperceptions.

5 Other means to deal with misperception

5.1 The extent of liability

So far we have taken a positive approach and assumed that when the good is defective the consumer is allowed to claim $B + D$. This was proven to always

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increase consumer welfare, but not to ensure full protection when there is damage and the judicial system does not work perfectly. This conclusion raises the question of whether consumers could be made better-off by a different choice of the extent of liability. To answer this question, consider the perceived and real utility of a consumer for a given liability L, under seller-responsibility (similar results are obtained under joint responsibility)

$$
\begin{aligned}
\widehat{U}^S(p, L) &= B - P - \widehat{d}(B + D - \widehat{\nu}\widehat{\alpha}L) \\
U^S(p, L) &= B - P - d(B + D - \nu\alpha L)
\end{aligned}
$$

It follows that at the price $\widehat{P}$ such that $\widehat{U}(\widehat{P}, L) = 0$, the real utility of the consumers is given by

$$
U^S(\widehat{P}, L) = -(d - \widehat{d})(B + D) + (d\nu\alpha - \widehat{d}\widehat{\nu}\widehat{\alpha})L
$$

which is increasing in L since $d\alpha - \widehat{d}\widehat{\alpha} > 0$ (which implies $d\nu\alpha - \widehat{d}\widehat{\nu}\widehat{\alpha} > 0$), and is equal to zero for[13]

$$
L^* = \frac{(d - \widehat{d})(B + D)}{d\nu\alpha - \widehat{d}\widehat{\nu}\widehat{\alpha}}.
$$

Thus, the optimal extent of liability is larger than $B + D$. The intuition is that optimistic consumers always benefit from an increase in the level of protection since the price they are willing to pay for the protection is lower than its effective value. Notice also that L^* is greater than the value of L that equates utilities across states, which is given by $\frac{(B+D)}{\nu\alpha}$. Equal real utilities across states results in the consumer overestimating the value of the good since the perceived utility in the bad state is greater than the real utility. Therefore, in order to fully protect consumers from their misperceptions, the utility in the bad state needs to be higher than that in the good state.[14] Unfortunately, such a solution would be difficult to implement as it would require the regulator to possess information on the extent of consumers' misperception which may be rather expensive to acquire.

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[13] Notice that if $d\alpha - \widehat{d}\widehat{\alpha}$ (respectively $d\nu\alpha - \widehat{d}\widehat{\nu}\widehat{\alpha}$) were negative, then under seller-only responsibility (respectively joint responsibility) consumer protection would be ensured by setting the seller liability equal to zero.

[14] This result differs from that obtained by Spence (1977) where a liability rule that equalizes the real utilities across states is sufficient to ensure full protection when consumers are irrational and risk neutral. This is because in Spence's model consumers underestimate the probability of product failure but not the probability of seeing their claims satisfied. Hence the consumers' perceived and real utilities in the bad state coincide.

5.2 The presence of well informed consumers

Contrary to the previous sections, let us assume that, within each class (the rich and the poor) a fraction μ of consumers is not affected by misperception. For simplicity we shall refer to these consumers as 'rational' and to those affected by misperception as 'irrational'. Rational consumers value the good correctly and their willingness to pay under seller-only responsibility is given by p^S from (8) with $p^S < \widehat{p}^S$. The profit opportunities for the seller under seller-only responsibility are the following. Either he sets $\widehat{p}^S$ and serves only the irrational consumers, or he sets p^S and attracts both rational and irrational ones. In the former case, he gains the extra rent $U^S\left(\widehat{p}^S\right)$ on each of them. In the latter, he serves a higher segment of the market but cannot extract the rent $U^S\left(\widehat{p}^S\right)$ from the irrational consumers. This reasoning suggests that the presence of rational consumers may work as a protection device that gives incentives to the seller to give up the rent on misperception in order to increase the market demand. Clearly, whether the seller finds this profitable depends on how large the proportion of rational consumers is.

Let μ^S and μ^J be the cut-off value such that the seller prefers to keep rational consumers out if and only if $\mu \leq \mu^S$ under seller-only responsibility and $\mu \leq \mu^J$ under joint liability when $D > 0$ and $\widehat{\alpha} > \alpha$.

Proposition 6 *When product failure entails damage $(D > 0)$ and judicial enforcement is inefficient $(\widehat{\alpha} > \alpha)$, $\mu^J < \mu^S$: joint liability increases the welfare of all irrational consumers, where the poor ones are fully protected by their misperception.*

P roof. See Appendix. ∎

Proposition 4 suggests that under joint liability the number of rational consumers that is needed in order to induce the seller to supply the entire market is lower than under seller-only responsibility. This is because joint liability reduces the rent that can be extracted from the irrational consumers (Proposition 3) and thus increases the seller's incentives to serve the rational ones. Note that serving the (poor) rational consumers requires $U^J(.) = 0$. Hence, once the rational consumers are served, the poor irrational ones are fully protected. Moreover, price discrimination between rich and poor consumers becomes more difficult. Indeed, deterring irrational rich consumers from switching to credit implies $\widehat{U}^S(.) = \widehat{U}^J(.)$, which is always positive given that $U^J(.) = 0$. Hence, the perceived utility of the rich irrational consumers is higher than under seller-only responsibility $(\widehat{U}^S(\widehat{p}^S) = 0)$. The

seller charges $p^S < p_R < \widehat{p}^S$ which still enables him to extract some rent but leaves the rich irrational consumers better off.

Remark 1 *For the presence of rational consumers to act as a protection device, it is necessary to monitor the behavior of the seller and impede practices that may allow the seller to price discriminate among the different degrees of rationality. Indeed, the seller can try to offer different types of contracts in order to induce the consumers to self-select. One way to achieve this is through optional warranties. Suppose that the seller charges a price for the good equal to the reservation price of the irrational consumers and offers an optional warranty at a price that leaves the rational consumers with zero utility. Contrary to rational consumers, irrational consumers have no incentive to buy the warranty, since their willingness to pay for the protection is lower than the willingness to pay of the rational consumers $\left(\text{since } d\alpha > \widehat{d\alpha}\right)$. This self-selection mechanism allows the seller to attract rational consumers without losing the rent that can be extracted from the irrational ones.*

The above considerations can easily extend to the case where some consumers are pessimistic. Indeed, pessimistic consumers underestimate the value of the good and, in the absence of price discrimination devices, their entry can be beneficial to the optimistic consumers. Further, they suggest that government policy devoted to increase the proportion of informed consumers can be effective even if not all consumers are made informed.

6   Conclusion

That consumers' misperception my result in wrong purchasing decisions is now well known and underlies widespread government policies devoted to increase consumers' awareness of the risk of product failure. In UK the Office of Fair Trading constantly publishes statistics as to the extent of consumers' complaints for the quality of the good or service received. Clearly, if consumers could be made perfectly informed, the risk of product failure would be a problem of a minor concern, since prices would adjust and consumers could correctly estimate the value of warranties or insurance packages. Similarly, if regulators were aware of the extent of consumers' misperception, they could be in a position to impose the right level of seller liability even case by case. In practice this is difficult and costly to implement and it seems reasonable to think of some more indirect ways to protect consumers.

In this paper we have studied a widespread legislation in the consumer credit market that extends the liability for product failure to financial in-

stitutions connected with suppliers of goods and services. We have shown that lender liability is an effective, though not perfect, device to increase consumer protection and to redistribute some of the gains that result from the coordination of price and interest rate decisions away from the seller (lender) toward the consumers. Specifically, joint liability yields the full protection of those consumers who buy on credit in each of the following situations: (i) product failure entails no damage (ii) the judicial enforcement is efficient, (iii) the proportion of informed consumers is sufficiently high. In the remaining cases, it helps but is not sufficient; neither does joint liability fully protect those consumers who can afford to buy for cash and do not understand the benefit of buying on credit from a connected lender.

We have considered a perfectly competitive financial market and a monopolistic product market. Our results extend to more general settings provided that on either market there exists some degree of monopoly power that makes advantageous the coordination of price and interest rate decisions .[15]

This paper has taken a positive approach to joint liability rules, rather than a normative one, although some suggestions have been provided as to how to design the optimal liability rule. In particular, we have shown that when consumers not only underestimate the probability of product failure but also overestimate the probability of seeing their claim satisfied, then liability rules need to ensure a utility in the bad state that is higher than that in the good state. A more detailed normative analysis could constitute an interesting objective for further research. Similarly, new insights could be gained by endogenizing the probability of product failure.

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[15]Spence (1977) shows that misperception may raise an issue of consumer protection even when the market is perfectly competitive.

7 Appendix

Proof of Proposition 4. Suppose that $\mu\Pi \leq -(1-\mu)U^S\left(\widehat{p}^S\right)$, which holds for $\mu \leq \mu^s$ where

$$\mu^S = \frac{-U^S\left(\widehat{p}^S\right)}{\Pi - U^S\left(\widehat{p}^S\right)}$$

This implies that under seller-only responsibility, the seller prefers to set $\widehat{p}^S > p^S$; his profits, under independence and coordination, will be respectively

$$\pi^{SI}\left(\widehat{p}^S\right) = \left[\Pi - U^S\left(\widehat{p}^S\right)\right](1-\mu)n_r - K$$
$$\pi^{SC}\left(\widehat{p}^S, i = 0\right) = \left[\Pi - U^S\left(\widehat{p}^S\right)\right](1-\mu)\left(n_r + n_p\right) - K$$

where $U^S\left(\widehat{p}^S\right) < 0$ is given by (12).

Now consider the case where joint liability is imposed on seller-lender agreements. If the seller chooses to serve all consumers, profit maximization is achieved when the cash price and interest rate charged are such that $\widehat{U}^J\left(\cdot\right) = \widehat{U}^S\left(\cdot\right)$ and $U^J\left(\cdot\right) = 0$. Notice that $U^J(.) = 0$ is necessary to induce the poor and the rich rational consumers to enter the market, whereas $\widehat{U}^J\left(.\right) = \widehat{U}^S\left(.\right)$ is required to deter rich irrational consumers from switching to credit. Simple algebra shows that this yields: $p_R = \left(1 - \widehat{d}\left(1-\widehat{\alpha}\right)\right)\left(B - \frac{d(1-\alpha)}{1-d(1-\alpha)}D\right)$ and $i^J = \frac{\widehat{d}(1-\widehat{\alpha})}{1-\widehat{d}(1-\widehat{\alpha})}$ where $0 < p^S < p_R < \widehat{p}^S$ and $0 > U^S\left(p_R\right) > U^S\left(\widehat{p}^S\right)$: the rich and irrational consumers are also better off than under no coordination. In this case, the seller's profit is given by

$$\pi^J\left(p_R^J, i^J\right) = (1-\mu)n_r(\Pi - U^S\left(p_R\right)) + (\mu n_r + n_p)\Pi - K \qquad (19)$$

By contrast, if the seller decides to supply only irrational consumers, profit maximization entails $\widehat{p}^S$ and $i^J = \frac{\widehat{d}(1-\widehat{\alpha})}{1-\widehat{d}(1-\widehat{\alpha})}$ such that $\widehat{U}^S\left(\widehat{p}^S\right) = 0$ and $\widehat{U}^J(\widehat{p}^S, i^J) = 0$, with $(1+i^J)\widehat{p}^S = \widehat{P}^J$. Rich consumers buy for cash while poor consumers buy on credit from the connected lender. Both groups are fooled. Under this policy, the seller only supplies a fraction of the market, but extracts an extra rent from both the rich and poor irrational consumers. This yields

$$\pi^J\left(\widehat{p}^S, i^J\right) = (1-\mu)n_r(\Pi - U^S\left(\widehat{p}^S\right)) + (1-\mu)n_p(\Pi - U^J(\widehat{p}^S, i^J) - K \qquad (20)$$

Comparing (20) with (19) the seller will supply the entire market iff $\mu < \mu^J$ where

$$\mu^J = \frac{-n_r(U^S\left(\widehat{p}^S\right) - U^S\left(p_R\right)) - n_p U^J(\widehat{p}^S, i^J)}{-n_r(U^S\left(\widehat{p}^S\right) - U^S\left(p_R\right)) - n_p U^J(\widehat{p}^S, i^J) + (n_r + n_p)\Pi} \qquad (21)$$

Note that μ^J from (21) can be rewritten as $\mu^j(A) = \frac{-(n_r+n_p)U^s(\widehat{p}^s)+A}{(n_r+n_p)(\Pi-U^s(\widehat{p}^s))+A}$, with $A = n_r U^S\left(p_R\right) + n_p \left(U^s\left(\widehat{p}^S\right) - U^J(\widehat{p}^S, i^J)\right) < 0$. Since $-\frac{\partial\mu^J(A)}{\partial A} < 0$ and $\mu^J(0) = \mu^S$, it follows that $\mu^J < \mu^S$. ∎

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