BANCA D'ITALIA

Temi di discussione

del Servizio Studi

Overoptimism and lender liability in the consumer credit market

by Elisabetta Iossa and Giuliana Palumbo

Number 598 - September 2006

The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

OVEROPTIMISM AND LENDER LIABILITY IN THE CONSUMER CREDIT MARKET

Elisabetta Iossa[*] and Giuliana Palumbo[**]

Abstract

Credit purchases of consumer goods are commonly made upon terms governed by an agreement between the lender and the seller. This type of purchase is generally subject to a legal principle of joint responsibility under which the lender and the seller are jointly liable to the consumer for breach of the sale contract by the seller. We study the rationale for this principle in situations where market failure arises because consumers underestimate the risk of product failure - for example due to seller misrepresentation - and it is difficult to enforce seller responsibility. We show that joint responsibility increases welfare and reduces the incentives of sellers to misrepresent the quality of their products.

Keywords: consumer credit, lender liability, misrepresentation, overoptimism, product failure.
J.E.L. classification: D18, G28, K13.

Contents

[*] Economics and Finance Section, Brunel Business School, Brunel University.
[**] Bank of Italy, Law and Economics Research Department.

1. Introduction[1]

When a consumer makes a purchase on credit she enters two contractual relationships: the sale contract with the seller and the credit contract with the lender. An issue much debated by policy makers is whether in the context of such credit purchases the lender should be jointly liable with the seller for breach of the sale contract by the seller.

In most industrialized countries, including members of the EU and in the US, credit purchases are regulated by a principle of joint responsibility (JR) whenever credit is advanced by a lender pursuant to an agreement with the seller (referred to as 'linked credit'). This is the case for example when the seller and the lender are part of a joint venture or when the seller acts as a credit intermediary.[2] Under JR, the seller and the lender are jointly liable to the consumer for defective products or misrepresentation by the seller. Instead, when credit is provided by a lender with no commercial links to the seller (referred to as 'independent credit'), the more usual regime of seller responsibility (SR) applies. Under SR, the seller is the only party liable for breaching the sale contract.

The JR principle was first introduced in the UK 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 (1976) of the United States, and in the European Directive EEC/102/87. The principle is currently being reviewed and discussed for the drafting of the new European Directive.[3]

---

[1] For helpful comments, we wish to thank Ugo Albertazzi, John Bennett, Giuseppe Bertola, Philip Davis, David De Meza, Julian Greenhill, Patrick Legros, Marco Pagano, Monica Paiella, Osiris Parcero, Bruno Parigi, Jean Charles Rochet, seminar participants at Birbeck College, Brunel University, Ente Luigi Einaudi, European University Institute, London School of Economics, University of Helsinki, University of Salerno, Warwick Business School and various conference participants. We also wish to thank Neil Weinstein for providing us with extensive references on studies of optimism bias.
Financial support from Findomestic S.p.A and Cetelem and Brunel University (Brief Award) is gratefully acknowledged.

[2] In some countries (e.g. the UK) credit-card agreements are also regulated by the joint-responsibility principle.

[3] In the proposal for a new Directive on consumer credit (COM/2002/443 final), currently under examination, art. 19 reads "The proposal is to adopt comprehensively the joint and several liability solution when the credit supplier and the supplier of the goods or services are joint market operators".

The reasoning behind the adoption of the JR principle in the UK can be found in the Crowther Report[4]. It is argued that JR can help to overcome the difficulties of enforcing seller responsibility, which arise because litigation is costly and because the seller can go bankrupt before the consumer is able to obtain redress. In particular the Report states (paras. 6.6.24):

> "If [...] the seller seeks to boost sales by making false representations, or supplies good which are defective, is it right that the lender should be able to disclaim all responsibility and insist on repayment of the loan being punctually maintained? We do not think so. [...] we do not consider that it is sufficient to leave the borrower with his remedy against the seller [...].
>
> "There are many reasons why in practice a legal right which the buyer may have against the seller is not sufficient protection. [...] in some cases the seller's financial position is so poor that it is doubtful whether he will be able to meet the judgement even if the buyer is successful. The buyer's difficulty in pursuing a claim against the seller are enhanced if, whilst wrestling with the financial problems of litigation, he has to go on paying the lender under the loan agreement. Problems of this kind are particularly prevalent in relation to agreements for the installation of central heating. There have been many cases where the supplier has either not delivered at all or has provided an ineffective heating systems, and has then gone into liquidation before the consumer has been able to obtain redress[...].

Empirical research confirms the concerns voiced in the Report. According to the Office of Fair Trading (OFT, 2004), the largest cause of consumer complaints in the UK is 'defective products and substandard services', which accounts for nearly 50% of the total complaints. In about 20% of these cases, consumers encountered problems in obtaining adequate redress, or there was an attempt by the seller to restrict his liability. In about 25% of cases, consumers claimed that there was seller misrepresentation or lack of adequate information.

When the lender is jointly responsible for product failure and for misrepresentation by the seller, consumer protection is increased for two main reasons. First, consumers who buy through linked credit can use the deep pockets of the lender to obtain redress when the seller has gone bankrupt. It has indeed been estimated that in the UK 95% by volume of the claims under JR arise from the seller going out of business (OFT, 1995). Second, the consumers can

---

[4] Report of the Committee on Consumer Credit, under the presidency of Lord Crowther, March 1971.

withhold disputed repayments of the loan pending a final court decision, which saves them some of the loss associated with an inefficient judicial system. This is particularly relevant in countries like Italy where the duration of ordinary civil proceedings is 70% longer than the EU average and where legal interest rates often fail to compensate consumers for such a long wait (see Marchesi, 2003).

In this paper we investigate the desirability of the JR principle given the difficulties of enforcing SR. We discuss the impact that the JR principle has on the incentives of sellers and lenders to make linked-credit agreements, on the efficiency of these agreements, and, crucially, on social welfare.

We build a model with a monopolistic product market and a perfectly competitive credit market. Consumers decide whether to buy one unit of product; they are risk neutral and alike in their preferences. Depending on their initial endowment of wealth, two classes of consumers are identified: the poor, who must borrow to finance their purchases, and the rich, who can buy for cash if they wish. Whether a consumer is rich or poor is unobservable and borrowing is costly. Product failure occurs with positive probability and it is verifiable ex post but the seller escapes liability with positive probability. Credit supply can take two forms: independent credit and linked credit. Under independent credit, the seller and the lender operate independently and each maximizes its own profit; under linked credit, they operate as a joint venture and maximize joint profits. We derive endogenously the conditions under which a linked-credit agreement is formed.

We focus on the possibility that consumers misperceive, and in particular underestimate, the risk of product failure. This assumption can be justified on two separate grounds. First, as we show in the paper, the seller has incentives to manipulate consumers' perceptions of product risk by misrepresenting the quality of his product. This possibility has also been suggested by legal scholars (see e.g. Hanson and Kysar, 1999a) and by industry regulators (OFT, 1997); empirical research also confirms this prediction. Hanson and Kysar (1999b, 2000), for example, provide evidence of misrepresentation in the food and pharmaceutical sectors, and for products marketed as environmentally friendly.[5] They show that although consumers may be aware of manipulative practices and approaches, they appear to be generally unaware of the

[5] Examples include the case of Pizzeria Uno, an American restaurant chain, that advertised its thin crusty pizza as "low fat" when in fact the pizza contained up to thirty-six grams of fat per serving, an amount well above the Federal trade Commission guidelines for "low fat" (Whitt, 1997).

extent to which those tactics succeed.[6] Second, an extensive literature in psychology shows that people systematically underestimate the probability that adverse events will occur to them. This 'overoptimism' is viewed as inherent to human nature and its pervasiveness is shown in a relation to a wide range of events, including health risks, injuries in car accidents, mugging and divorce. See for example Weinstein (1980), Perloff and Fetzer (1986), Baker and Emery (1993), and Harris and Middleton (1994).[7] This exogenous view of consumer misperceptions has been applied by economists and legal scholars to the study of market performance in a number of fields.[8] Mostly importantly in the present context, it has been used to support the need for product-liability legislation; see for example the seminal papers by Spence (1977) and Polinsky and Rogerson (1983). However, these studies have neither discussed lender liability in the presence of consumer misperceptions nor have they endogenized the degree of overoptimism by considering the incentives of the seller to misrepresent product risk.

We start by considering the benchmark case where consumers do not misperceive product risk. We emphasize two points. First, with rational consumers linked-credit agreements help to achieve market efficiency. Through linked-credit the seller price discriminates between the rich and the poor, which makes it profitable to induce poor consumers to enter the market when their utility is positive. The idea that linked credit is a price discrimination device was first proposed by Brennan, Maksimovic and Zechner (1988) and it has recently found empirical support in Bertola, Hochguertel and Koeniger (2003).[9] The second point that we emphasize is that when consumers do not misperceive the risk of product

---

[6] A related paper is Boyer, Kihlstrom and Laffont (1984) who assume that sellers can engage in misleading advertising to raise consumers' subjective probability of high product quality. Their paper investigates the conditions on market characteristics under which misleading advertising arises.

[7] The consent on consumers being inherently overoptimistic is however not unanimous and empirical justifications supporting the opposite argument have also been provided (see e.g. Viscusi, 1996 and Schwarts, 1992). We note that consumers often buy extended warranties (generally for their electronic appliances) that are typically overpriced. In these cases consumers would also appear to exhibit overpessimism rather than overoptimism. In fact, the endogeneous view of overoptimism explains this only apparent contradition by pointing out that sellers have incentives to undertake hard sale practices and make misleading claims in order to convince consumers to overestimate the value of an extended warranty.

[8] For example, Eisenberg (1995) points out how overoptimism by parties in a contract can explain why courts do not always fully enforce contractual terms. De Meza and Suthey (1996) discuss how overoptimism may explain the high failure rates of small businesses.

[9] Alternative reasons for credit to be packaged with sales to consumers have also been suggested, including promoting purchases and reducing transaction costs (e.g., Wertenbroch, 2003). The main insights of our paper would continue to hold also under this alternative framework.

failure there is no rationale for the JR principle. This is because JR yields the same level of welfare as SR.

Compared to the above benchmark, we show that overoptimism about the probability of product failure hurts consumers and benefits the seller. By underestimating the risk of product failure, consumers overestimate the expected value of the product and this enables the seller to raise the price and appropriate a 'misperception rent'. More importantly, linked-credit agreements can now be welfare reducing. This can occur because through price discrimination the seller may now induce entry from the poor when their utility is negative.

When we allow for overoptimism we also show that SR and JR are no longer equivalent: under JR welfare is greater. This stems from the other facet of overoptimism: consumers underestimate the value of the additional protection brought by JR because they underestimate the risk of product failure. The additional protection brought by JR has then the effect of reducing the misperception rent that the seller can extract out of consumer misperceptions. This in turn has a positive effect on welfare for two reasons. First linked-credit agreement may become again welfare enhancing. This is because it becomes less profitable for the seller to use price discrimination to induce entry from the poor when their utility is negative. Second, JR increases welfare also because it reduces the incentives of the seller to misrepresent the quality of his products.

In most of the paper we assume that consumers are homogeneous and product failure causes no other loss than the foregone benefit of consumption. For this case we show that JR provides full protection and eliminates market failure. We then extend our analysis to the case where product failure results in damages and to the case where consumers are heterogeneous. We show that in these cases market failure is reduced by JR but not necessarily eliminated.

Overall, our results support the JR principle. If consumers do not suffer from misperceptions, then JR is no worse than SR. But if misperceptions may indeed arise, then JR is better. Legislation is then needed because JR reduces the profitability of linked-credit agreements and therefore it is a form of consumer protection that sellers and lenders have no interest in offering voluntarily. Consistent with this result, we find that the JR principle has been opposed by financial companies in various countries (see OFT, 1995).

The desirability of lender liability for product failure is an issue almost unexplored by the economics literature. One important exception is Iossa and Palumbo (2004) where we consider a private-information setting in which lender liability is used as a device for signalling the reliability of the seller. In that context, and contrary to the case analyzed here, the lender undertakes liability for product failure voluntarily. In both contexts, JR is welfare enhancing because of informational problems. A similar insight is informally discussed in Shavell (1987). Lender liability has instead been extensively analyzed in the field of environmental regulation where the lender can be liable for the environmental damage caused by the firm that it finances. Pitchford (1995) and Boyer and Laffont (1997) show that full lender liability can induce the firm to underinvest in accident prevention and the lender to restrict lending. A group of comments by Balkenborg (2001) and Lewis and Sappington (2001), and a reply by Pitchford (2001) discuss respectively the role of the damage technology and of the distribution of bargaining power in the 1995 paper by Pitchford.

The rest of the paper is organized as follows. In Section 2 we present the basic model. We discuss the benchmark case of rational consumers in section 3, and analyze the effect of overoptimism under SR and under JR in section 4. We study the incentives for linked credit in section 5. In section 6 we endogenize the level of overoptimism by studying the incentives of sellers to engage in misrepresentation. Section 7 discusses some extensions, while section 8 concludes. All proofs missing from the text are relegated to an appendix.

1.1 *The basic model*

We consider a perfectly competitive credit market and a monopolistic durable-product market. In the product market, the product is produced at a constant marginal cost, for simplicity normalized to zero, and it is offered for sale at a price p. A proportion $d \in (0, 1]$ of the goods is revealed defective after sale; product failure can be verified by third parties such as courts.[10]

Consumers derive utility from only one unit of the good and are alike in their preferences: they attach value $B > 0$ to the good if it is not defective and zero otherwise. There are two classes of consumers, the rich and the poor, all of whom are risk neutral; the size of each class is given by n_R and n_P, respectively. Rich consumers have sufficient money to purchase

[10] The term "defective" will be used throughout to represent also situations where the good is not delivered, it is delivered with delay or it is not in conformity with the standards specified in the sale contract.

the good for cash if they wish, whilst poor consumers must always resort to the credit market. Class membership is unobservable. For simplicity, we assume that access to credit is unlimited and that consumers never default on their loans.

The credit market faces a perfectly elastic supply of funds at an exogenously determined interest rate, which we take as zero. However, the supply of loans entails positive transaction costs t. The interest rate charged to consumers is denoted by i.

Credit supply can take two forms. A lender may operate independently of the seller and due to perfect competition charge an interest rate satisfying $ip = t$. Alternatively, he may sign an agreement with the seller in order to coordinate price and interest rate decisions. In this case the seller and the lender act as a joint venture and share the same information. We shall refer to the first scenario as 'independent credit' and to the second one as 'linked credit'. We assume that the seller is unable to sell on credit without the financial support of a lender. This seems realistic: in practice sellers may be unable to offer credit directly for they lack the technology to screen consumers appropriately and/or to diversify default risk. In any case, our results would be qualitatively unchanged if we assumed that the seller could offer credit directly; in this case, the linked-credit agreement of our model would simply represent a situation where the seller is offering credit himself.

In practice linked credit and independent credit are different. Under linked credit, the seller acts as an intermediary for the lender: he arranges credit for his customers and receives the cash price directly from the lender. Thus, the consumer bears no expenditure at the time of the purchase, that is, when the quality of the product is still unknown. Instead, under independent credit, the lender hands over the cash to the consumer. The payment to the seller is then made by the consumer at the time she makes the purchase.

We assume prohibitive transaction cost associated with the consumer proving to the seller that she has received a loan from an independent lender and is indeed using that loan to finance her purchase. Thus, the seller is unable to observe whether a consumer obtained credit from an independent lender or is using her own wealth to finance her purchase. This implies that the seller cannot price discriminate between the rich and the poor through the price only. Our results would continue to hold if we assumed that the seller were able to distinguish whether the consumer is using cash or independent credit, but were forced by law to charge a uniform price.

The liability regime depends on the form of credit. Under independent credit, the consumer is subject to a regime of seller responsibility (SR) where only the seller is responsible for breach of the sale contract. Of course, SR also applies to cash purchases. We take a positive approach to the liability legislation and assume that the legal liability of the seller is equal to the cash price p, which the seller must return to the consumer upon discovery that the product is defective.[11] Furthermore, we assume that enforcing SR is difficult, and this results in the seller bearing only a proportion $\gamma < 1$ of his legal liability (or equivalently meeting his obligations with probability $\gamma < 1$). There are various reasons why in practice sellers may evade their responsibilities. First, judicial enforcement may be inefficient and result in lengthy trials or long waiting times for trials to go before the court. In this case γ captures the possibility that the legal interest rate fails to compensate the consumer for the wait. Second, the seller may go out of business before the consumer obtains redress; here γ represents the likelihood that the seller is still in business.

Instead, when the consumer finances her purchase through credit provided by a linked lender, joint responsibility (JR) applies: the lender becomes jointly liable with the seller for product failure. Under JR, an aggrieved consumer acquires the right to stop repaying her loan to the lender pending a court decision and if the product is discovered defective she does not need to repay the lender . This simple fact implies that JR increases consumer protection since it ensures that the consumer pays for the product only if it is not defective. Going back to our previous examples, the consumer is not affected by the risk that the seller goes bankrupt before he fulfils his obligations. Also, she does not suffer from the sluggishness of the judicial system, for she keeps the money in her pocket during the dispute.[12]

Let u_h^i be a utility function representing consumers' preferences, where $i = S, J$ denotes the liability regime and, with some abuse of notation, $h = R, P$ indicates whether cash or credit is used to purchase the good.[13] In light of the above discussion, and assuming a unitary

---

[11] In a previous version we assumed that the liability of the seller was given by B. This had no effect on the quality of our results.

[12] Given our specification of the seller legal liability, JR also offers the advantage that it covers interest repayments. While we recognize that this introduces an asymmetry into the model, the quality of our results would not change if we assumed that the liability of the seller were equal to $p(1 + i)$ rather than p.

[13] The subscripts P and R reflect the fact that poor consumers must use credit and, as we shall see, in equilibrium rich consumers always purchase on cash.

discount factor, when the consumer purchases the good for cash, her (net) expected utility is

$$u_R^S(p) = (1-d)B - (1-d\gamma)p \tag{1}$$

while, if she obtains credit from an independent lender, her net surplus is

$$u_P^S(p,i) = (1-d)B - (1-d\gamma)p - ip \tag{2}$$

Instead, when credit is provided by the linked lender, the consumer obtains

$$u_P^J(p,i) = (1-d)(B-(1+i)p) \tag{3}$$

We assume that consumers are overoptimistic: either because it is in their nature or because they are susceptible to seller's manipulation, they underestimate the risk of product failure. We also allow for the possibility, but this is not crucial in what follows, that consumers overestimate the compensation they receive from the seller under SR (or the likelihood of obtaining it). Up to Section 6 the degree of consumers optimism is treated as exogenous and given by $d-\widehat{d}>0$ and $\gamma-\widehat{\gamma}\leq 0$, where $\widehat{d}$ and $\widehat{\gamma}$ denote the consumers' beliefs about d and γ. We assume throughout that $d\gamma-\widehat{d\gamma}>0$: misperception of the probability of product failure is more severe than that of the likelihood of obtaining compensation. Consequently, consumers underestimate the value of legal protection. This is the other facet of overoptimism, and, as we shall see, it plays an important role in what follows.

Overoptimism implies that consumers have an incorrect perception of their surplus from consumption. The 'perceived (net) utilities' corresponding to (1), (2), (3), are given by

$$\widehat{u}_R^S(p) = (1-\widehat{d})B - (1-\widehat{d\gamma})p \tag{4}$$

$$\widehat{u}_P^S(p,i) = (1-\widehat{d})B - (1-\widehat{d\gamma})p - ip \tag{5}$$

$$\widehat{u}_P^J(p,i) = (1-\widehat{d})(B-(1+i)p) \tag{6}$$

The unit profit of the seller on those transactions where SR applies (i.e. either cash or independent-credit transactions) is

$$\omega^S(p) = (1 - d\gamma)p \tag{7}$$

JR regulates linked-credit purchases. Under linked credit the seller and lender set the price and the interest rate so as to maximize joint profits and then distribute these joint profits between themselves through a monetary transfer. In our setting, the monopolistic seller has all the bargaining power and therefore appropriates the entire surplus. The unit profit that the seller makes on a linked-credit purchase is therefore

$$\pi^J(p, i) = p - d(1 + i)p + ip - t \tag{8}$$

As a benchmark, consider the case where SR also applies to linked-credit purchases. In this case, the unit profit of the seller would be

$$\pi^S(p, i) = p(1 - d\gamma) + ip - t \tag{9}$$

Finally, while the surplus from selling to a consumer who buys for cash is always positive

$$w_R \equiv (1 - d)B > 0$$

we assume that the surplus from selling to a consumer who buys on credit may be either positive or negative, depending on the transaction cost of credit.

Assumption 1. *(A1a):* $w_P \equiv (1 - d)B - t > 0$
(A1b): $w_P \equiv (1 - d)B - t < 0$

Thus, under (A1a) welfare is maximized when both the rich and the poor purchase the product, with the rich buying for cash and the poor on credit. Under (A1b), only cash transactions are efficient: the poor should not buy. Denoting by W^* the first best level of welfare, we have

$$W^* = \begin{cases} w_R n_R + w_P n_P & \text{if } (A1a) \text{ holds} \\ w_R n_R & \text{if } (A1b) \text{ holds} \end{cases} \tag{10}$$

1.2 *Rational consumers and linked credit*

This section briefly illustrates the benchmark where consumers are rational. We highlight three things, which are important when considering the desirability of the JR principle. First, linked credit is a device that makes it possible for the seller to price discriminate between rich and poor consumers. Second, in the absence of overoptimism, allowing for price discrimination, and thus for linked credit, is welfare enhancing. Third, in the absence of overoptimism, SR and JR are equivalent.

To see this, consider the case where SR applies to linked credit. Under independent credit, from (1) and (2), the reservation price of the rich is higher than that of the poor because the poor can only buy on credit and credit costs $ip = t$. Since the seller cannot distinguish between rich and poor consumers, he has two relevant options. Either he sets the price equal to the reservation price of the rich and thus sells only to them, or he lowers the price up to the reservation price of the poor, in which case he can serve the whole market. Let p_R^S denote the reservation price of the rich, that is p_R^S solves: $u_R^S(p_R^S) = 0$, where $u_R^S(p)$ is given by (1). Substituting for p_R^S in (7) and multiplying the resulting expression for n_R, the total profit of the seller when he chooses $p = p_R^S$ is given by $w_R n_R$. A similar procedure shows that the total profit of the seller when he chooses a price equal to the reservation price of the poor is $w_P (n_P + n_R)$. Comparing $w_R n_R$ with $w_P (n_P + n_R)$, it follows that under independent credit the seller's profit is given by

$$\Omega^S = \begin{cases} w_P (n_P + n_R) & \text{under} \quad (A1a) \text{ if } w_P (n_P + n_R) \geq w_R n_R \\ w_R n_R & \text{under} \quad (A1a) \text{ if } w_P (n_P + n_R) \leq w_R n_R \\ w_R n_R & \text{under} \quad (A1b) \end{cases} \tag{11}$$

With uniform monopoly pricing it can then occur that the pricing choice of the seller results in market failure. In particular, this occurs when (A1a) holds but $w_P (n_P + n_R) \leq w_R n_R$: entry from the poor is efficient from a welfare point of view but unprofitable for the seller. The seller sets the price equal to the reservation price of the rich, the poor do not buy and market failure arises.

Linked credit can correct this inefficiency. This is because linked credit allows coordination of price and interest rate decisions, which in turn allows the seller to price discriminate between rich and poor consumers. By setting $i = i^S = 0$ and $p = p_R^S$, the seller can induce rich and poor consumers to separate: the rich buy for cash whilst the poor buy on

credit.[14] The seller can then extract the whole social surplus and earn profits $w_R n_R + w_P n_P$. It follows that under linked-credit the seller's profit is given by

$$\Pi^S = \begin{cases} w_R n_R + w_P n_P & \text{under} \quad (A1a) \\ w_R n_R & \text{under} \quad (A1b) \end{cases} \tag{12}$$

implying $\Pi^S = W^*$ (from (10) and (12)). When consumers are rational, welfare is maximized by allowing for linked credit and linked-credit agreements will always arise if price discrimination is welfare enhancing, as is the case under (A1a).

In this setting, imposing JR on linked-credit agreements has no impact on welfare or on the choice of the seller as to whether to make a linked-credit agreement. Since rational consumers correctly assess the value of the additional protection that JR brings to them, the seller can fully transfer the additional liability cost of the lender into a higher interest rate, and thus replicate the equilibrium that arises under SR. In particular, under JR the seller charges $p = p_R^S$ and then sets $i = i^J$ where i^J is such that: $u_P^J(p_R^S, i^J) = 0$, with $u_P^J(p, i)$ given by (3). This yields: $u_P^J\left(p_P^J, i^J\right) = u_P^S\left(p_R^S, i^S\right) = u_R^S\left(p_R^S\right) = 0$, and $\Pi^J = \Pi^S$, where Π^J denotes the seller's profit under JR. The consumers are as well off under JR as they are under SR, and so is the seller.

We summarize the results of this section in the following proposition.

Proposition 1 *When consumers are rational, linked-credit agreements have a positive impact on welfare, and the joint responsibility principle is ineffective.*

In the next section, we consider the case of consumer misperception. We define a measure of the extent to which consumers can be harmed by their overoptimism, compared to the benchmark of rational consumers. This measure will be useful to consider how overoptimism affects the pricing behaviour of the seller and lender, and their incentives to enter into a linked-credit agreement. We shall show that, contrary to the case of rational consumers, linked-credit agreements can have a negative impact on welfare and thus reduce market efficiency.

---

[14] Note that at $p = p_R^S$ and $i = i^S = 0$, rich consumers do not gain from switching to credit since $u_R^S(p_R^S) = u_P^S(p_R^S, i^S)$.

1.3 *Overoptimism*

Overoptimistic consumers are lead by incorrect beliefs and this affects their willingness to pay. A measure of the extent to which overoptimism can hurt consumers is given by the difference between perceived and real utility, as denoted by $\Delta u_P^i \equiv \widehat{u}_P^i(.) - u_P^i(.)$ for $i = S, J$, and $\Delta u_R^S \equiv \widehat{u}_R^S(.) - u_R^S(.)$.

Under SR, from (1) and (4), (2) and (5), we have

$$\Delta u_P^S = \Delta u_R^S \tag{13}$$

$$\Delta u_P^S = (d - \widehat{d})B - (d\gamma - \widehat{d}\widehat{\gamma})p \tag{14}$$

According to expression (13) under SR the effect of overoptimism is the same for cash and credit consumers. This holds because credit consumers must repay their debt to the lender regardless of whether the product is defective. Expression (14) captures the effect of misperception on consumers' willingness to pay. Since overoptimistic consumers underestimate the risk of product failure, the first term in (14) is positive. The second term is negative and represents the difference between the real and perceived value of consumer protection, given the liability of the seller p. The difference between these two terms is non-negative, i.e. $\Delta u_P^S \geq 0$, for any price and interest rate that induce consumers to buy, that is for any p and i such that $\widehat{u}_P^S(p, i) \geq 0$. This can be easily seen by equating expression (5) to zero, solve for p, and then substitute into (14) for the value of p thus found.

$\Delta u_P^S \geq 0$ implies that overoptimism increases the willingness to pay. Consumers can suffer from their misperception because the seller can exploit their misperception in order to charge a higher price.

Furthermore, the extent to which consumers can be hurt by their misperception, given by Δu_P^S, decreases with the size of the seller liability. Indeed, it is easy to show that by increasing the liability from p to $L \equiv \frac{d-\widehat{d}}{d\gamma-\widehat{d}\widehat{\gamma}}B > p$, full protection, i.e. $\Delta u_P^S = \Delta u_R^S = 0$, could be achieved.[15,16] This is a crucial point: increasing protection when consumers are

---

[15] Note that only if $\gamma = \widehat{\gamma} = 1$ will L equate utilities across states (as in Spence, 1977; and Polinsky and Rogerson, 1983). If $\widehat{\gamma} > \gamma$ the perceived utility in the bad state is greater than the real utility. Therefore, L must be greater than the loss (B) suffered by consumers in the event of product failure.

[16] Note that if $d\gamma$ were lower than $\widehat{d}\widehat{\gamma}$, consumers would overestimate protection and imposing a positive

overoptimistic is always beneficial for consumers. This is because overoptimistic consumers underestimate the value of the additional protection and therefore are not willing to fully pay for it. Consequently, the seller cannot fully transfer the cost of an increase in liability into a higher price (or interest rate).

Two considerations follow. First, our assumption that the legal liability of the seller is given by p rather than L reflects the difficulty for policy makers in computing L because of lack of information on the relevant parameters. Overoptimism would not be an issue if the optimal level of liability could be placed upon the seller. The second and more important consideration is that, since JR increases consumer protection, the extent to which consumers can be hurt by their overoptimism is lower under JR than under SR. We emphasize this results in the following lemma.

Lemma 2 $\Delta u_P^S > \Delta u_P^J$ *for any* p *and* i *such that* $\widehat{u}_P^i(p,i) \geq 0$, $i = S, J$.

Lemma 1 follows by comparing (14) and Δu_P^J where (from (3) and (6))

$$\Delta u_P^J = (d - \widehat{d})\,(B - p(1+i)) \tag{15}$$

which is positive for any feasible p and i (i.e. for any p and i such that $\widehat{u}_P^J(p,i) \geq 0$). Intuitively, under JR the level of consumer protection is greater than under SR because consumers are not affected by the possibility that the seller escapes his responsibility with probability γ. Indeed, by buying on credit and by being entitled not to repay the loan if the product is defective, the consumer never pays for the product when it is defective. The greater protection under JR, together with the fact that consumers are overoptimistic, implies that consumers can never be worse off under JR than under SR, since they obtain additional protection without fully paying for it.

In the following sections we show how overoptimism can yield market failure by affecting the pricing behaviour of the seller and his incentives to make linked-credit agreements. We shall then see how the result Lemma 1 implies that JR helps to reduce the market failure.

1.4 *Incentives to make linked-credit agreements*

---

liability on the seller would not be optimal.

1.4.1 *Independent credit*

Consider the case where consumers are overoptimistic and the seller operates in a regime of independent credit. As in the case of rational consumers, under independent credit, the seller has two relevant choices: either he sets the price equal to the reservation price of the rich and sells only to them or he sets the price equal to the reservation price of the poor and sells to both the rich and the poor. The difference with the case of rational consumers is that now the reservation prices are calculated from the perceived utilities rather than from the real utilities.

In light of the above, let $\widehat{p}_R^S$ denote the reservation price of the rich and $\widehat{p}_P^S$ denote the reservation price of the poor in the presence of overoptimism where $\widehat{p}_R^S$ and $\widehat{p}_P^S$ solve respectively: $\widehat{u}_R^S\left(\widehat{p}_R^S\right) = 0$ and $\widehat{u}_P^S\left(\widehat{p}_P^S, i\widehat{p}_P^S = t\right) = 0$, and where $\widehat{p}_P^S < \widehat{p}_R^S$. If the seller sets $p = \widehat{p}_R^S$, and thus sells only to the rich, his profit is (from (1) and (7))

$$\Omega^S(\widehat{p}_R^S) = [w_R - u_R^S(\widehat{p}_R^S)]n_R \tag{16}$$

where $-u_R^S\left(\widehat{p}_R^S\right) > 0$. Compared to the case of rational consumers (expression (11)) we note that, now, by charging the reservation price of the rich, the seller obtains greater profits. This 'misperception rent', given by $-u_R^S\left(\widehat{p}_R^S\right) n_R > 0$, arises because overoptimism allows the seller to charge a higher price, $\widehat{p}_R^S > p_R^S$.

If instead the seller sets $\widehat{p}_P^S$, and thus sells to both the rich and the poor, he obtains (from (2) and (7))

$$\Omega(\widehat{p}_P^S) = \left[w_R - u_R^S(\widehat{p}_P^S)\right](n_R + n_P) \tag{17}$$

and the misperception rent is given by $-u_R^S(\widehat{p}_P^S)\,(n_R + n_P) > 0$.

For simplicity, in the rest of the paper we shall restrict our attention to the case where $\Omega(\widehat{p}_R^S) > \Omega(\widehat{p}_P^S)$, so that under independent credit the seller prefers to set $p = \widehat{p}_R^S$ and sell only to the rich than to set $\widehat{p}_P^S$ and sell to both the rich and the poor. Comparing (16) with (17), this occurs if n_R is sufficiently higher than n_P, that is if

$$n_R \geq \frac{\left[w_R - u_R^S(\widehat{p}_P^S)\right]}{\left[-u_R^S(\widehat{p}_R^S) + u_R^S(\widehat{p}_P^S)\right]} n_P \tag{18}$$

where $-u_R^S(\widehat{p}_R^S) + u_R^S(\widehat{p}_P^S) > 0$ since $\widehat{p}_R^S > \widehat{p}_P^S$. We shall discuss the case where (18) does not hold at the end of section 5.

In light of this, the level of welfare under independent credit is given by

$$W^S = \Omega(\widehat{p}_R^S) + u_R^S(\widehat{p}_R^S)n_R = w_R n_R \tag{19}$$

From (19) and (10), when (A1a) holds under independent credit there is a welfare loss: entry from the poor is efficient from a welfare point of view but it does not occur because it is unprofitable for the seller. Instead, when (A1b) holds under independent credit welfare is maximized: entry from the poor is inefficient from a welfare point of view and it does not occur. In light of this, the next section analyzes the incentives of the seller to enter a linked-credit agreement and the effect of linked-credit agreements on welfare, under both SR and JR.

1.4.2 *Linked credit*

1.4.2.1 *Seller Responsibility*

Let us consider the case where SR applies to linked credit. As in the case of rational consumers, linked credit allows the seller to price discriminate between the rich and the poor. However, as we show below, contrary to the case of rational consumers linked credit may now cause inefficiencies because of consumer overoptimism.

Under linked credit, the seller can perfectly price discriminate and induce entry from the poor by setting $i = \widehat{i}^S = 0$ and $p = \widehat{p}_R^S$ so that

$$\widehat{u}_R^S(\widehat{p}_R^S) = \widehat{u}_P^S(\widehat{p}_R^S, \widehat{i}^S) = 0$$

When (A1a) holds, this is profitable for the seller since entry from the poor generates a positive surplus ($w_P > 0$) which the seller can extract. In fact, the seller can now appropriate even more than the whole social surplus because of the misperception rent that he can extract from both classes of consumers. Indeed, the seller's profit is

$$\Pi^S(\widehat{p}_R^S, \widehat{i}^S) = [w_R - u_R^S(\widehat{p}_R^S)]n_R + \left[w_P - u_R^S(\widehat{p}_R^S)\right] n_P \tag{20}$$

Under (A1b), entry from the poor is detrimental to welfare ($w_P < 0$). However, because of the misperception rent, inducing the poor to buy may now be profitable for the seller. In

particular, when $w_P - u_R^S(\widehat{p}_R^S) > 0$, the seller induces poor consumers to buy in spite of their utility being negative.

Assuming w.l.g. that linked credit occurs only if the seller makes profits strictly greater than under independent credit, we obtain the following proposition.

Proposition 3 *With seller responsibility, linked credit can have a positive or a negative impact on welfare. In particular, under (A1a) linked credit is welfare enhancing, whilst under (A1b) it creates a welfare loss if*

$$w_P - u_R^S(\widehat{p}_R^S) > 0 \tag{21}$$

and has no effect otherwise.

Proposition 2 emphasizes the effect of linked credit in the presence of overoptimism when SR applies to linked-credit agreements. As in the case of rational consumers (Proposition 1), under SR, linked credit can be welfare enhancing. This occurs when (A1a) holds. However, contrary to the case of rational consumers, under SR, linked credit can be socially harmful. This occurs in case (A1b) when (21) holds. The reason why linked credit can reduce welfare is that with overoptimism the seller manages to induce poor consumers to buy the product even if their utility is a negative.

Denoting by W^S the level of welfare under SR and taking into account the conditions under which linked credit occurs, we have

$$W^S = \begin{cases} \Pi^S(\widehat{p}_R^S, \widehat{i}^S) + u_R^S(\widehat{p}_R^S)\,(n_R + n_P) = w_R n_R + w_P n_P & \text{under} \quad (A1a) \\ \Pi^S(\widehat{p}_R^S, \widehat{i}^S) + u_R^S(\widehat{p}_R^S)\,(n_R + n_P) = w_R n_R + w_P n_P & \text{under} \quad (A1b) \text{ if } w_P - u_R^S(\widehat{p}_R^S) > 0 \\ \Omega^S(\widehat{p}_R^S) + u_R^S(\widehat{p}_R^S) n_R = w_R n_R & \text{under} \quad (A1b) \text{ if } w_P - u_R^S(\widehat{p}_R^S) < 0 \end{cases} \tag{22}$$

Comparing (22) with (10), and in light of Proposition 4, we obtain the following corollary, which emphasizes the market inefficiency created by linked credit when consumer are overoptimistic.

Corollary 4 *With seller responsibility, a welfare loss arises when (A1b) and condition (*21*) hold.*

1.4.2.2 *Joint responsibility*

We know from Lemma that JR reduces the extent to which overoptimism can hurt consumers. We also know from Corollary 1 that under SR overoptimism can create market failure. We now show that JR fully protects consumers from their overoptimism and it ensures that overoptimism does not lead to market failure.

Proposition 5 *Joint responsibility increases welfare when both (A1b) and condition (*21*) hold. In the remaining cases joint responsibility has no impact on welfare.*

Proposition stems for the fact that under JR consumer protection is greater than under SR, which, as suggested in Lemma 1, implies that the consumer who benefits from JR is better off under JR than under SR. In fact JR ensures full consumer protection. This occurs because under JR the consumer pays for the product only if the product is not defective, and thus misperception over the probability that the product is defective does not matter. Because of this the seller's incentives to enter a linked-credit agreement are aligned with social-welfare maximization: linked credit (and therefore entry from the poor) is profitable as well as socially optimal if (A1a) holds, whilst it is neither profitable nor socially optimal if (A1b) holds. In light of Proposition 2 and Corollary 1, this suggests that JR helps to correct the market failure that arises under SR because of overoptimism, and therefore it increases welfare compared to SR.

Formally, Proposition 3 stems from the fact that under JR, when (A1a) holds, the seller maximizes his profit by setting p and i such that (i) the perceived utility of consumers under JR is zero and (ii) the poor buy on credit whilst the rich buy for cash. This leads to $p = \widehat{p}_R^S$ and $i = \widehat{i}^J$, where $\widehat{i}^J$ solves

$$\widehat{u}_R^S(\widehat{p}_R^S) = \widehat{u}_P^J(\widehat{p}_R^S, \widehat{i}^J) = 0$$

Two things then follow. First, $\widehat{u}_P^J(\widehat{p}_R^S, \widehat{i}^J) = 0$ calls for $p\,(1+i) = B$, which, from (3), ensures that the real utility of the poor under JR is also zero: $u_P^J(p, i) = 0$ at $p\,(1+i) = B$. This shows that with JR the seller cannot extract any misperception rent out of those consumers who buy the product under linked credit. Second, rich consumers are not protected by JR. This is because the seller loses from JR, compared to SR, and thus he has incentives to dissuade them from switching to credit. The seller achieves this by setting $p = \widehat{p}_R^S$ and $i = \widehat{i}^J$.

In light of this, under (A1a), the seller's profit is given by

$$\Pi^J(\widehat{p}_R^S, \widehat{i}^J) = [w_R - u_R^S(\widehat{p}_R^S)]n_R + w_P n_P \tag{23}$$

Under (A1b), instead, the seller does not make a linked-credit agreement, since there is no gain from using price discrimination to induce entry from the poor. This is because $w_P < 0$ and the seller can no longer extract the misperception rent from those who buy on credit. It follows that under (A1b) the seller's profit is given by (16).

Denoting by W^J the level of welfare under JR and taking into account the conditions under which linked credit occurs, we have

$$W^J = \begin{cases} \Pi^J(\widehat{p}_R^S, \widehat{i}^J) + u_R^S(\widehat{p}_R^S)n_R = w_R n_R + w_P n_P & \text{under} \quad (A1a) \\ \Omega^S(\widehat{p}_R^S) + u_R^S(\widehat{p}_R^S)n_R = w_R n_R & \text{under} \quad (A1b) \end{cases} \tag{24}$$

Comparing (22) with (24) yields Proposition 4. The corollary below then emphasizes another important consequence of Proposition 4. We have seen that linked credit is a device through which the seller price discriminates. We have also seen that price discrimination can be either welfare enhancing (as in case (A1a) when consumers are rational) or welfare reducing (as in case (A1b) when consumers are overoptimistic). The following corollary then emphasizes that JR is also a device to ensure that price discrimination and therefore linked credit occurs only when it is welfare enhancing.

Corollary 6 *In the presence of overoptimism, joint responsibility helps to ensure that linked-credit agreements are welfare enhancing.*

Finally, since JR helps to protect consumers from their misperceptions and hurts the seller it is clear that leaving the choice of the liability regime to the sellers or to the lenders would not lead to efficient self-regulation. Indeed, the following corollary provides a rationale for the existing legislation on JR.

Corollary 7 *With overoptimism, the seller and the lender would never offer joint responsibility voluntarily.*

Proof. See the appendix. ■

Before concluding this section, recall that in section 5.1 we assumed that n_R is sufficiently high that, under (A1a), with independent credit the seller prefers to set the price equal to the reservation price of the rich and sell only to them rather than lower the price and serve the whole market. It should be apparent now that if we relaxed this assumption linked credit would have no effect on welfare in case (A1a). However, Proposition 3, and Corollaries 1,2, and 3 would continue to hold.

1.5 *Endogenous overoptimism: seller misrepresentation*

Until now we have treated the degree of consumer overoptimism as exogenous. In this section, we briefly relax this assumption and analyze the incentives of sellers to generate overoptimism through misrepresentation. Seller misrepresentation is a well known concern of legislators who have long since put in place legislation aimed at dealing with it. The Misrepresentation Act 1967 in the UK and the fact that under JR the linked lender is also liable for misrepresentation by the seller provide an example.

We assume that the seller chooses the level of misrepresentation before knowing how a potential buyer would pay for the product. This seems realistic. We model seller misrepresentation as the undertaking of unverifiable actions (or the making of statements) that affect consumers' estimate of the probability of product failure $\widehat{d}$ so as to increase or generate overoptimism. In particular, for any true probability d, the more the seller engages in misrepresentation the lower is $\widehat{d}$. For simplicity, and without loss of generality, we let $\gamma = \widehat{\gamma} = 0$. Formally, let $g(\widehat{d})$ denote the total cost (e.g. intensity of the hard-sale practice) for the seller of inducing a level of misperception $d - \widehat{d}$, with $\widehat{d} = [0, d]$, we assume that $g(d) = 0$, $g'(\widehat{d}) < 0$, $g''(\widehat{d}) > 0$, and $\lim_{\widehat{d} \to 0} g(\widehat{d}) = \infty$.[17]

In this setting, it is easy to show that, given the level of $\widehat{d}$, the seller's choice of p and i still follows the analysis in section 5. Now consider the optimal choice of $\widehat{d}$ for the seller; the following result is then obtained.

Proposition 8 *The joint-responsibility principle lowers the incentives of the seller to misrepresent product quality, which generates a non-negative impact on welfare.*

---

[17] An alternative modelling choice could be to assume that misrepresentation is verifiable, although imprecisely and at some costs. In this case, $g(\widehat{d})$ would represent the expected fine incurred by the seller. We believe that our simple formulation suffices to to capture the idea that seller misrepresentation can be beneficial to the seller for it generates overoptimism, but it is costly.

Proof. See the appendix. ■

According to Proposition 4, the level of overoptimism under JR is lower than under SR, because JR reduces the incentives of the seller to misrepresent product quality. This in turn stems from the fact that JR decreases the misperception rent that the seller can extract out of consumer overoptimism. Since engaging in misrepresentation constitutes a wasteful activity from a social point of view, a lower level of misrepresentation raises welfare.

Note that this beneficial effect of JR does not affect the poor consumers only, but it extends also to the rich who, as we have seen, always buy for cash. Since misrepresentation is lower under JR than under SR, the misperception rent of the seller is smaller, and all consumers are better off.

The results of this section show how JR is good for providing incentives to reduce seller misrepresentation. This is important since previous results in the contest of environmental regulation have suggested that lender liability may reduce the incentives of the seller to invest in product care. In particular, Pitchford (1995) and Balkenborg (2001) have shown how the effect of lender liability on incentives for product care depends on the distribution of the bargaining power between the firm and the lender. The distribution of bargaining power between the seller and the lender instead plays no role in our context.[18]

1.6 *Extensions*

1.6.1 *Damage*

In the basic model we have assumed that product failure causes no other loss to consumers than the foregone benefit of consumption. In practice, however, product failure may result in injuries or other types of damage. In this section we extend the basic model so as to highlight how JR works in this case.

Assume that product failure inflicts a loss D to the consumer and that the legal liability of the seller is given by $p + D$, and let for simplicity restrict the attention to the case where

---

[18] In particular, when the seller has all the bargaining power lender liability reduces the incentives for product care. This is because the higher the liability cost of the lender when the accident occurs (and the firm lacks sufficient funding to compensate victims), the greater the compensating payment which the firm will have to give to the lender in the event of no accident. This implies that the firm has less to gain from reducing d. Instead, the choice of $\widehat{d}$ under JR does not depend on the distribution of the bargaining power between the lender and the seller. This is because the endogenous variable is $\widehat{d}$ and not d; thus, it does not matter whether the transfer is paid in the good or bad state.

overoptimism is exogenous. Furthermore, suppose that $\gamma \equiv \alpha\nu$ where $\alpha < 1$ measures the delays in judicial enforcement and $\nu < 1$ is the probability that the seller is still in business at the time the consumer seeks redress. Let $\widehat{\alpha}$ and $\widehat{\nu}$ denote the consumers' beliefs about α and ν, with $\widehat{\gamma} \equiv \widehat{\alpha}\widehat{\nu}$. Finally, assume that consumers underestimate the risk of seller bankruptcy $\widehat{\nu} > \nu$, and overestimate judicial efficiency $\widehat{\alpha} > \alpha$. Expression (1) becomes

$$u_R^S(p, D) = (1-d)B - d(1-\nu\alpha)D - (1-d\nu\alpha)p \tag{25}$$

reflecting the fact that under SR the consumer can recoup a fraction α of the damage D (and of the price) only if the seller is still in business.

When product failure causes damage, the effect of JR is twofold. As before, consumers are allowed not to repay their debt when the good turns out to be defective. In addition, they can ask the lender to pay D when the seller goes bankrupt. This yields

$$u_P^J(p, i, D) = (1-d)\left(B - (1+i)p\right) - d(1-\alpha)D \tag{26}$$

However, now consumers need to obtain compensation for damages and therefore they still suffer (although to a lesser extent) from the inefficiency of the judicial system and their misperception of it ($1 \geq \widehat{\alpha} > \alpha$). As Proposition 5 below highlights, this suggests that now JR may not fully protect consumers.

Proposition 9 *Let $\widehat{\alpha} \in (\alpha, 1]$ and $\alpha < 1$.When product failure entails damage, the joint-responsibility principle is welfare enhancing if (A1b) holds and*

$$w_P - u_P^J(\widehat{p}_R^S, \widehat{i}^J, D) < 0 < w_P - u_R^S(\widehat{p}_R^S, D)$$

Otherwise it has no effect on welfare.

Proof. See the appendix. ■

By introducing the deep pocket of the lender, JR protects consumers against the risk of not obtaining compensation for damages when the seller goes bankrupt.[19] This benefits

[19] We have assumed that the lender remains in business with probability one. This assumption is meant to capture the circumstance that financial institutions are subject to extensive and strict regulations. While not making them immune from the risk of bankruptcy, regulation contributes to make financial firms more long lived

the consumers. However, since consumers still suffer from the inefficiency of the judicial system, the seller can extract a misperception rent. This implies that JR reduces but does not eliminate the inefficiency that can arise under SR, where negative-value trades may take place. In particular, under (A1a), the joint-responsibility principle helps to redistribute the gains of linked credit from the seller to the poor. However, the poor are not fully protected from their misperceptions. Under (A1b), if the condition in Proposition 5 holds, the joint-responsibility principle is welfare enhancing. Otherwise it has no effect on welfare.

From Proposition 5 we obtain the following corollary.

Corollary 10 *If* $\widehat{\alpha} = \alpha = 1$*, joint responsibility fully protects poor consumers from misperceptions, also when product failure entails damage.*

Corollary 2 suggests that when the only factor that may prevent consumers from obtaining redress is the possibility of seller bankruptcy, JR fully protect consumers from their misperceive the probability of product failure. The assumption $\widehat{\alpha} = \alpha = 1$ works well for countries with an 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.

1.6.2 *Heterogeneous consumers*

In this section we relax the assumption that consumers have homogeneous tastes. Specifically, we assume that the rich value the product $B_R > 0$, while the poor value the product $B_P > 0$, with $\Delta B \equiv B_R - B_P > 0$.

We have seen that when consumers are rational and have homogeneous tastes, monopoly pricing does not create a welfare loss: all and only trades with positive value take place (Proposition 1). This is no longer true when consumers differ in their valuation of the product because full price discrimination through credit subsidization is no longer feasible. For sufficiently high ΔB or $\frac{n_R}{n_P}$ or for low w_P, the seller may choose to supply only rich consumers also under (A1a).

---

than their non financial counterparts. It is clear, however, that were we to assume a positive probability that the lender goes out of business, JR would still protect consumers from the risk of seller bankruptcy, although not fully so.

What are the implications of this on the desirability of JR? As in the case of homogeneous consumers, JR reduces the seller's incentives to make linked-credit agreement since it reduces the misperception rent. Consequently, when (A1b) holds, JR is still welfare enhancing. However, it may now have a negative effect on welfare under (A1a). When (A1a) holds it may be socially optimal to let the seller take advantage of consumer misperception in order to mitigate the monopoly inefficiency. In this case, JR will continue to be desirable provided that it does not prevent welfare-enhancing linked credit (and hence entry from the poor) from taking place.[20] In the Appendix we show that a sufficient condition for this to occur is

$$w_P > \frac{(1-\widehat{d})\Delta B}{1-\widehat{d\gamma}}(1-d\gamma)\frac{n_R}{n_P}$$

which always holds for ΔB and or for $\frac{n_R}{n_P}$ sufficiently low and/ or for w_P sufficiently high.

1.7 *Conclusions*

We have studied the impact of a legal principle that makes the seller and the lender jointly liable to the debtor for breach of the sale contract by the seller under linked credit. We have shown that joint responsibility helps to correct the market failure that can arise because of overoptimism and seller misrepresentation, and it helps to ensure that linked-credit agreements are welfare enhancing. We have also shown that joint responsibility reduces the incentives of sellers to engage in misrepresentation. The rationale for the legal principle stems from the fact that joint responsibility reduces market failure due to overoptimism but it would not be voluntarily offered.

We have ruled out the possibility that some consumers remain rational. Clearly, the presence of rational consumers (the argument extends to overpessimism consumers) may work as a protection device for the overoptimistic ones. Since rational consumers are willing to pay less for the product than the overoptimistic ones, if the seller does not manage to price discriminate between the different types of consumers, he might prefer to give up the misperception rent in order to serve all types.

We have considered a situation where incentives to make linked-credit agreements stem from the possibility to engage in price discrimination. However, there may be reasons other

---

[20] This result is related to Polinsky and Rogerson (1983), who show that, in the presence of consumer misperception, shifting liability form the seller to the consumers may help mitigate the inefficiency that results from underprovision of output by a monopolistic seller.

than price discrimination to justify linked credit. For example, coordination can be a way to reduce the cost of lending, by using the facilities of the seller to supply credit (Wertenbroch, 2003). Some of our results extend to this setting. In particular, joint responsibility will still help to reduce the misperception rent of the seller and the incentives of the seller to misrepresent the quality of its product.

Finally, we have assumed that the product market is monopolistic and capital market is perfectly competitive. Our results do not extend to the case of perfect competition in both markets. The reason is twofold. First, with competitive markets there is no scope for price discrimination (and hence for linked credit).[21] Second, overoptimistic consumers would perceive themselves as worse off under joint responsibility because perfect competition forces sellers (lenders) to fully transfer the cost of additional liability into higher prices (interest rates).[22] Therefore, linked credit would not arise in equilibrium. However, it is also the case that under perfect competition sellers have no incentives to engage in costly misrepresentation, and therefore overoptimism may not be an issue there.

---

[21] Note that the discussion in Section 5 does not rely on the seller pricing behavior. Thus, also under perfect competition in the product market, i) overoptimism hurts consumers (unless the seller liability is equal to L) and ii) JR benefits consumers by reducing the difference between their perceived and real utilities.

[22] Indeed, Spence (1977) shows that under perfect competition the voluntary level of liability offered by sellers is zero.

Appendix

Proof of Corollary 3 Under (A1a), the seller earns $\Pi^J(\widehat{p}_R^S, \widehat{i}^J)$ under JR, and $\Pi^S\left(\widehat{p}_R^S, \widehat{i}^S\right)$ under SR, where, from (20) and (23): $\Pi^S\left(\widehat{p}_R^S, \widehat{i}^S\right) > \Pi^J(\widehat{p}_R^S, \widehat{i}^J)$.Under (A1b), the seller earns $\Omega^S(\widehat{p}_R^S)$ under JR and $\max[\Pi^S(\widehat{p}_R^S, \widehat{i}^S), \Omega^S(\widehat{p}_R^S)]$, under SR. ■

Proof of Proposition 4 From the analysis in section 5, when (A1a) holds, the seller makes a linked-credit agreement under both SR and JR. Let $\widehat{d}^S$ and $\widehat{d}^J$ be the level of $\widehat{d}$ that maximize respectively $\Pi^S(\widehat{p}_R^S, \widehat{i}^S)$ and $\Pi^J(\widehat{p}_R^S, \widehat{i}^J)$, as given by expressions (20) and (23). We have

$$\begin{aligned} \frac{-\partial u_R^S(\widehat{p}_R^S(\widehat{d}^S))}{\partial \widehat{d}}(n_R + n_P) &= g'(\widehat{d}^S) \\ \frac{-\partial u_R^S(\widehat{p}_R^S(\widehat{d}^J))}{\partial \widehat{d}} n_R &= g'(\widehat{d}^J) \end{aligned}$$

implying $d > \widehat{d}^J > \widehat{d}^S$. Thus, welfare increases under JR. When (A1b) holds, the seller may make a linked-credit agreement under SR whilst he will never make it under JR. The effect of JR on welfare then follows by noting that the level of $\widehat{d}$ that maximizes $\Omega^S(\widehat{p}_R^S, \widehat{i}^S)$, as given by expressions (16), is $\widehat{d} = \widehat{d}^J > \widehat{d}^S$. ■

Proof of Proposition 5 Under SR

$$\Delta u_R^S = \Delta u_P^S = (d - \widehat{d})(B + D) - (d\nu\alpha - \widehat{d}\widehat{\nu}\widehat{\alpha})(D + p) \tag{27}$$

while under JR

$$\Delta u_P^J = (d - \widehat{d})(B + D - (1 + i)p) - (d\alpha - \widehat{d}\widehat{\alpha})D \tag{28}$$

A comparison of (27) and (28) shows that Lemma still holds. However, $\Delta u_P^J > 0$ for any couple $\{i, p\}$ such that $\widehat{u}_P^J(p, i, D) = (1 - \widehat{d})(B - (1 + i)p) - \widehat{d}(1 - \widehat{\alpha})D \geq 0$. Thus, JR protects consumers but not fully so.

The optimal policy for the seller is to charge a price $\widehat{p}_R^S$ such that $\widehat{u}_R^S(\widehat{p}_R^S, D) = 0$ where $\widehat{u}_R^S(p, D) = (1 - \widehat{d})B - \widehat{d}(1 - \widehat{\nu}\widehat{\alpha})D - (1 - \widehat{d}\widehat{\nu}\widehat{\alpha})p$ and to set the interest rate so that the rich have nothing to gain from switching to credit. That is now $\widehat{i}^J$ solves: $\widehat{u}_P^J(\widehat{i}^J, \widehat{p}_R^S, D) =$

$\widehat{u}_R^S(\widehat{p}_R^S, D) = 0$. This policy enables the seller to extract a misperception rent from the poor given by $-u_P^J(\widehat{i}^J, \widehat{p}_R^S, D)$ (from (26)) where $0 < -u_P^J(\widehat{i}^J, \widehat{p}_R^S, D) < -u_R^S(\widehat{p}_R^S, D)$. ■

Heterogeneous consumers Let now $w_R \equiv (1-d)B_R$ and $w_P \equiv (1-d)B_P - t$. Utilities and profits are defined as before, though we now use small letters to refer to reach consumers and capital letters to refer to poor consumers. Let $\widehat{p}_R^S : \widehat{u}_R^S(\widehat{p}_R^S) = 0$ and $\widehat{P}_P^S : \widehat{U}_P^S(\widehat{P}_P^S, \widehat{i}^S) = 0$ respectively denote the reservation prices of the rich and of the poor at $i = \widehat{i}^S = 0$. Under SR, linked credit arises if

$$\left[w_P - U_P^S(\widehat{P}_P^S, \widehat{i}^S)\right] n_P > \left[\widehat{p}_R^S - \widehat{P}_P^S\right] (1 - d\gamma) n_R$$

where the left-hand side is the increase in profit due to sales to the poor and the right-hand side is the lost profit on sales to the rich, and where $\widehat{p}_R^S - \widehat{P}_P^S = \frac{(1-\widehat{d})\Delta B}{1-\widehat{d}\widehat{\gamma}} > 0$. Since full price discrimination is not feasible, now the seller may prefer not to sell to the poor also when (A1a) holds.

Now take JR. Under linked credit, the seller chooses the price and the interest rate $(\widehat{p}^J, \widehat{i}^J)$ that satisfy the following conditions

$$\widehat{u}_R^S(\widehat{p}^J) = \widehat{u}_P^J(\widehat{p}^J, \widehat{i}^J) \tag{29}$$

$$\widehat{U}_P^J(\widehat{p}^J, \widehat{i}^J) = 0 \tag{30}$$

Condition (29) ensures that the rich do not switch to credit; condition (30) guarantees that the poor are willing to buy. Note that for any pair $\{p, i\}$, we have $\widehat{u}_P^J(p, i) - \widehat{U}_P^J(p, i) = (1 - \widehat{d})\Delta B$. Thus, using (30), we can rewrite (29) as

$$\widehat{u}_R^S(\widehat{p}^J) = (1 - \widehat{d})\Delta B$$

which requires $\widehat{p}^J = \widehat{P}_P^S$. The interest rate i^J is then adjusted so that $\widehat{U}_P^J(\widehat{P}_P^S, \widehat{i}^J) = 0$. This yields $U_P^J(\widehat{P}_P^S, \widehat{i}^J) = 0$ and it implies that under JR linked credit never occurs under (A1b); whilst under (A1a) it occurs if $w_P n_P > \left[\widehat{p}_R^S - \widehat{P}_P^S\right](1 - d\gamma)n_R = \frac{(1-\widehat{d})\Delta B}{1-\widehat{d}\widehat{\gamma}}(1 - d\gamma)n_R$ which is a sufficient condition for JR never to be welfare reducing. ■

References

Baker, L.A. and R.E. Emery (1993). When Every Relationship is above Average: Perceptions and Expectations of Divorce at the Time of Marriage, Law and Human Behaviour, 17.

Balkenborg, D. (2001). How Liable Should a Lender Be? The Case of Judgment-Proof Firms and Environmental Risk: Comment, American Economic Review, 91(3): 731-38.

Bertola, G., Hochguertel, S. and W. Koeniger (2003). Dealer Pricing of Consumer Credit, International Economic Review, forthcoming.

Boyer, M. and J.J. Laffont (1997). Environmental Risk and Bank Liability. European Economic Review, 41(8): 1427-59.

Boyer, M., R.E. Kihlstrom and J.J. Laffont (1984). Market Determinants of Misleading Advertising, in M. Boyer and R.E. Kihlstrom, eds, Bayesian Models in Economic Theory, New York: North-Holland.

Brennan, M.J., Maksimovic, V. and J. Zechner (1988). Vendor Financing, The Journal of Finance, 43: 1127-41.

De Meza, D. and C. Suthey (1996). The Borrower's Course: Optimism, Finance and Entrepreneurship, Economic Journal, 106(435): 375-86.

Eisenberg, M. A. (1995). The Limits of Cognition and the Limits of Contracts. Stanford Law Review, 47: 211-59.

Hanson, J.D. and D.A. Kysar (1999a). Taking Behavioralism Seriously: the Problem of Market Manipulation, New York University Law Review, 74: 630-745.

Hanson, J.D. and D.A. Kysar (1999b). Taking behavioralism seriously: some evidence of market manipulation. Harvard Law Review, 112(7):1420-572.

Hanson, J.D. and D.A. Kysar (2000). Taking Behavioralism Seriously: A Response to Market Manipulation, Roger Williams University Law Review, 6: 259-376.

Harris, P. R., and W. Middleton (1994). The Illusion of Control and Overoptimism about Health: On Being Less at Risk but no More in Control than Others, British Journal of Social Psychology, 33: 369-86.

Iossa, E. and G. Palumbo (2004). Product Quality, Lender Liability and Consumer Credit, Oxford Economic Papers, 56: 331-343.

Lewis, T.R. and D. Sappington (2001). How Liable a Lender Should Be? The Case of Judgment-Proof Firms and Environmental Risk: Comment, American Economic Review, 91(3): 724-30.

Marchesi, D. (2003). Litiganti, avvocati e magistrati. Diritto ed Economia del Processo Civile, Il Mulino, Bologna.

Office of Fair Trading (OFT), (1997). 'Consumer detriment under conditions of imperfect information'. Research Paper n.11.

Office of Fair Trading (OFT), (1995). 'Connected Lender Liability. A Second Report by the Director General of Fair Trading on Section 75 of The Consumer Credit Act 1974'.

Office of Fair Trading (2004). 'Trends in Consumer Complaints'.

Perloff, L. S., and B. K. Fetzer (1986). Self-Other Judgments and Perceived Vulnerability to Victimization, Journal of Personality and Social Psychology, 50: 502-11.

Pitchford, R (1995). How Liable Should a Lender Be? The Case of Judgement-Proof Firms and Environmental Risk, American Economic Review, 85(5): 1171-1186.

Pitchford, R. (2001). How Liable Should a Lender Be? The Case of Judgement-Proof Firms and Environmental Risk: Reply, American Economic Review, 91(3): 739-45.

Polinsky, A M. and W.P. Rogerson (1983). Products Liability, Consumer Misperceptions, and Market Power, Bell Journal of Economics, 14(2): 581-589.

Schwartz, A. (1992). The Case Against Strict Liability, Fordham Law Review, 60: 819-832.

Shavell, S. (1987) Economic Analysis of Accident Law, Harvard University Press, Cambridge, MA.

Spence, A. (1977). Consumer Misperceptions, Product Failure and Product Liability, Review of Economics and Statistics, 44: 561-72.

Weinstein, N. D. (1980). Unrealistic optimism about future life events, Journal of Personality and Social Psychology, 39: 806-20.

Wertenbroch, K. (2003). Self-Rationing: Self-Control in Consumer Choice, in Loewenstein, G., R. Baumeister and D. Read (eds) Time and Decision: Economic & Psychological Perspectives on Intertemporal Choice, New York, NY: Russell Sage Foundation.

Whitt, C. R. (1997). Pizzeria Uno Restaurant Chain Settles FTC Charges of Misleading "Low Fat" Thin Crust Pizza Ads, 9 Loy. Consumer L. Rep. 2, 2-3.

Viscusi, W. K. (1996). Individual Rationality, Hazard Warnings, and the Foundations of Tort Law, Rutgers Law Review, 48: 625-636.

RECENTLY PUBLISHED "TEMI" (*).

N. 573 – *Le rimesse dei lavoratori emigrati e le crisi di conto corrente,* by M. Bugamelli and F. Paternò (January 2006).

N. 574 – *Debt maturity of Italian firms,* by Silvia Magri (January 2006).

N. 575 – *Convergence of prices and rates of inflation,* by F. Busetti, S. Fabiani and A. Harvey (February 2006).

N. 576 – *Stock market fluctuations and money demand in Italy, 1913-2003,* by Massimo Caruso (February 2006).

N. 577 – *Skill dispersion and firm productivity: an analysis with employer-employee matched data,* by S. Iranzo, F. Schivardi and E. Tosetti (February 2006).

N. 578 – *Produttività e concorrenza estera,* by M. Bugamelli and A. Rosolia (February 2006).

N. 579 – *Is foreign exchange intervention effective? Some micro-analytical evidence from the Czech Republic,* by Antonio Scalia (February 2006).

N. 580 – *Canonical term-structure models with observable factors and the dynamics of bond risk premiums*, by M. Pericoli and M. Taboga (February 2006).

N. 581 – *Did inflation really soar after the euro cash changeover? Indirect evidence from ATM withdrawals,* by P. Angelini and F. Lippi (March 2006).

N. 582 – *Qual è l'effetto degli incentivi agli investimenti? Una valutazione della legge 488/92*, by R. Bronzini and G. de Blasio (March 2006).

N. 583 – *The value of flexible contracts: evidence from an Italian panel of industrial firms,* by P. Cipollone and A. Guelfi (March 2006).

N. 584 – *The causes and consequences of venture capital financing. An analysis based on a sample of Italian firms*, by D. M. Del Colle, P. Finaldi Russo and A. Generale (March 2006).

N. 585 – *Risk-adjusted forecasts of oil prices*, by P. Pagano and M. Pisani (March 2006).

N. 586 – *The CAPM and the risk appetite index: theoretical differences and empirical similarities*, by M. Pericoli and M. Sbracia (March 2006).

N. 587 – *Efficiency vs. agency motivations for bank takeovers: some empirical evidence*, by A. De Vincenzo, C. Doria and C. Salleo (March 2006).

N. 588 – *A multinomial approach to early warning system for debt crises,* by A. Ciarlone and G. Trebeschi (May 2006).

N. 589 – *An empirical analysis of national differences in the retail bank interest rates of the euro area*, by M. Affinito and F. Farabullini (May 2006).

N. 590 – *Imperfect knowledge, adaptive learning and the bias against activist monetary policies*, by Alberto Locarno (May 2006).

N. 591 – *The legacy of history for economic development: the case of Putnam's social capital,* by G. de Blasio and G. Nuzzo (May 2006).

N. 592 – *L'internazionalizzazione produttiva italiana e i distretti industriali: un'analisi degli investimenti diretti all'estero,* by Stefano Federico (May 2006).

N. 593 – *Do market-based indicators anticipate rating agencies? Evidence for international banks,* by Antonio Di Cesare (May 2006).

N. 594 – *Entry regulations and labor market outcomes: Evidence from the Italian retail trade sector,* by Eliana Viviano (May 2006).

N. 595 – *Revisiting the empirical evidence on firms' money demand,* by Francesca Lotti and Juri Marcucci (May 2006).

N. 596 – *Social interactions in high school: Lesson from an earthquake*, by Piero Cipollone and Alfonso Rosolia (September 2006).

N. 597 – *Determinants of long-run regional productivity: The role of R&D, human capital and public infrastructure*, by Raffaello Bronzini and Paolo Piselli (September 2006).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi – Divisione Biblioteca e pubblicazioni – Via Nazionale, 91 – 00184 Rome (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

1999

L. GUISO and G. PARIGI, *Investment and demand uncertainty*, Quarterly Journal of Economics, Vol. 114 (1), pp. 185-228, **TD No. 289 (November 1996)**.

A. F. POZZOLO, *Gli effetti della liberalizzazione valutaria sulle transazioni finanziarie dell'Italia con l'estero*, Rivista di Politica Economica, Vol. 89 (3), pp. 45-76, **TD No. 296 (February 1997)**.

A. CUKIERMAN and F. LIPPI, *Central bank independence, centralization of wage bargaining, inflation and unemployment: theory and evidence*, European Economic Review, Vol. 43 (7), pp. 1395-1434, **TD No. 332 (April 1998)**.

P. CASELLI and R. RINALDI, *La politica fiscale nei paesi dell'Unione europea negli anni novanta*, Studi e note di economia, (1), pp. 71-109, **TD No. 334 (July 1998)**.

A. BRANDOLINI, *The distribution of personal income in post-war Italy: Source description, data quality, and the time pattern of income inequality*, Giornale degli economisti e Annali di economia, Vol. 58 (2), pp. 183-239, **TD No. 350 (April 1999)**.

L. GUISO, A. K. KASHYAP, F. PANETTA and D. TERLIZZESE, *Will a common European monetary policy have asymmetric effects?*, Economic Perspectives, Federal Reserve Bank of Chicago, Vol. 23 (4), pp. 56-75, **TD No. 384 (October 2000)**.

2000

P. ANGELINI, *Are banks risk-averse? Timing of the operations in the interbank market*, Journal of Money, Credit and Banking, Vol. 32 (1), pp. 54-73, **TD No. 266 (April 1996).**

F. DRUDI and R. GIORDANO, *Default Risk and optimal debt management*, Journal of Banking and Finance, Vol. 24 (6), pp. 861-892, **TD No. 278 (September 1996)**.

F. DRUDI and R. GIORDANO, *Wage indexation, employment and inflation*, Scandinavian Journal of Economics, Vol. 102 (4), pp. 645-668, **TD No. 292 (December 1996)**.

F. DRUDI and A. PRATI, *Signaling fiscal regime sustainability*, European Economic Review, Vol. 44 (10), pp. 1897-1930, **TD No. 335 (September 1998)**.

F. FORNARI and R. VIOLI, *The probability density function of interest rates implied in the price of options*, in: R. Violi, (ed.) , Mercati dei derivati, controllo monetario e stabilità finanziaria, Il Mulino, Bologna, **TD No. 339 (October 1998)**.

D. J. MARCHETTI and G. PARIGI, *Energy consumption, survey data and the prediction of industrial production in Italy*, Journal of Forecasting, Vol. 19 (5), pp. 419-440, **TD No. 342 (December 1998)**.

A. BAFFIGI, M. PAGNINI and F. QUINTILIANI, *Localismo bancario e distretti industriali: assetto dei mercati del credito e finanziamento degli investimenti*, in: L.F. Signorini (ed.), Lo sviluppo locale: un'indagine della Banca d'Italia sui distretti industriali, Donzelli, **TD No. 347** (**March 1999)**.

A. SCALIA and V. VACCA, *Does market transparency matter? A case study*, in: Market Liquidity: Research Findings and Selected Policy Implications, Basel, Bank for International Settlements, **TD No. 359 (October 1999)**.

F. SCHIVARDI, *Rigidità nel mercato del lavoro, disoccupazione e crescita*, Giornale degli economisti e Annali di economia, Vol. 59 (1), pp. 117-143, **TD No. 364 (December 1999)**.

G. BODO, R. GOLINELLI and G. PARIGI, *Forecasting industrial production in the euro area*, Empirical Economics, Vol. 25 (4), pp. 541-561, **TD No. 370 (March 2000)**.

F. ALTISSIMO, D. J. MARCHETTI and G. P. ONETO, *The Italian business cycle: Coincident and leading indicators and some stylized facts*, Giornale degli economisti e Annali di economia, Vol. 60 (2), pp. 147-220, **TD No. 377 (October 2000)**.

C. MICHELACCI and P. ZAFFARONI, *(Fractional) Beta convergence*, Journal of Monetary Economics, Vol. 45, pp. 129-153, **TD No. 383 (October 2000)**.

R. DE BONIS and A. FERRANDO, *The Italian banking structure in the nineties: testing the multimarket contact hypothesis*, Economic Notes, Vol. 29 (2), pp. 215-241, **TD No. 387 (October 2000)**.

2001

M. CARUSO, *Stock prices and money velocity: A multi-country analysis,* Empirical Economics, Vol. 26 (4), pp. 651-72, **TD No. 264 (February 1996)**.

P. CIPOLLONE and D. J. MARCHETTI, *Bottlenecks and limits to growth: A multisectoral analysis of Italian industry*, Journal of Policy Modeling, Vol. 23 (6), pp. 601-620, **TD No. 314 (August 1997)**.

P. CASELLI, *Fiscal consolidations under fixed exchange rates,* European Economic Review, Vol. 45 (3), pp. 425-450, **TD No. 336 (October 1998)**.

F. ALTISSIMO and G. L. VIOLANTE, *Nonlinear VAR: Some theory and an application to US GNP and unemployment*, Journal of Applied Econometrics, Vol. 16 (4), pp. 461-486, **TD No. 338 (October 1998)**.

F. NUCCI and A. F. POZZOLO, *Investment and the exchange rate*, European Economic Review, Vol. 45 (2), pp. 259-283, **TD No. 344 (December 1998)**.

L. GAMBACORTA, *On the institutional design of the European monetary union: Conservatism, stability pact and economic shocks,* Economic Notes, Vol. 30 (1), pp. 109-143, **TD No. 356 (June 1999)**.

P. FINALDI RUSSO and P. ROSSI, *Credit costraints in italian industrial districts,* Applied Economics, Vol. 33 (11), pp. 1469-1477, **TD No. 360 (December 1999)**.

A. CUKIERMAN and F. LIPPI, *Labor markets and monetary union: A strategic analysis,* Economic Journal, Vol. 111 (473), pp. 541-565, **TD No. 365 (February 2000)**.

G. PARIGI and S. SIVIERO, *An investment-function-based measure of capacity utilisation, potential output and utilised capacity in the Bank of Italy's quarterly model*, Economic Modelling, Vol. 18 (4), pp. 525-550, **TD No. 367 (February 2000)**.

F. BALASSONE and D. MONACELLI, *Emu fiscal rules: Is there a gap?*, in: M. Bordignon and D. Da Empoli (eds.), Politica fiscale, flessibilità dei mercati e crescita, Milano, Franco Angeli, **TD No. 375 (July 2000)**.

A. B. ATKINSON and A. BRANDOLINI, *Promise and pitfalls in the use of "secondary" data-sets: Income inequality in OECD countries*, Journal of Economic Literature, Vol. 39 (3), pp. 771-799, **TD No. 379 (October 2000)**.

D. FOCARELLI and A. F. POZZOLO, *The determinants of cross-border bank shareholdings: An analysis with bank-level data from OECD countries*, Journal of Banking and Finance, Vol. 25 (12), pp. 2305-2337, **TD No. 381 (October 2000)**.

M. SBRACIA and A. ZAGHINI, *Expectations and information in second generation currency crises models*, Economic Modelling, Vol. 18 (2), pp. 203-222, **TD No. 391 (December 2000)**.

F. FORNARI and A. MELE, *Recovering the probability density function of asset prices using GARCH as diffusion approximations,* Journal of Empirical Finance, Vol. 8 (1), pp. 83-110**, TD No. 396 (February 2001)**.

P. CIPOLLONE, *La convergenza dei salari manifatturieri in Europa,* Politica economica, Vol. 17 (1), pp. 97-125, **TD No. 398 (February 2001)**.

E. BONACCORSI DI PATTI and G. GOBBI, *The changing structure of local credit markets: Are small businesses special?*, Journal of Banking and Finance, Vol. 25 (12), pp. 2209-2237, **TD No. 404 (June 2001)**.

CORSETTI G., PERICOLI M., SBRACIA M., *Some contagion, some interdependence: more pitfalls in tests of financial contagion*, Journal of International Money and Finance, 24, 1177-1199, **TD No. 408 (June 2001)**.

G. MESSINA, *Decentramento fiscale e perequazione regionale. Efficienza e redistribuzione nel nuovo sistema di finanziamento delle regioni a statuto ordinario*, Studi economici, Vol. 56 (73), pp. 131-148, **TD No. 416 (August 2001)**.

2002

R. CESARI and F. PANETTA, *Style, fees and performance of Italian equity funds*, Journal of Banking and Finance, Vol. 26 (1), **TD No. 325 (January 1998)**.

L. GAMBACORTA, *Asymmetric bank lending channels and ECB monetary policy*, Economic Modelling, Vol. 20 (1), pp. 25-46, **TD No. 340 (October 1998)**.

C. GIANNINI, *"Enemy of none but a common friend of all"? An international perspective on the lender-of-last-resort function*, Essay in International Finance, Vol. 214, Princeton, N. J., Princeton University Press, **TD No. 341 (December 1998)**.

A. ZAGHINI, *Fiscal adjustments and economic performing: A comparative study*, Applied Economics, Vol. 33 (5), pp. 613-624, **TD No. 355 (June 1999)**.

F. ALTISSIMO, S. SIVIERO and D. TERLIZZESE, *How deep are the deep parameters?*, Annales d'Economie et de Statistique,.(67/68), pp. 207-226, **TD No. 354 (June 1999)**.

F. FORNARI, C. MONTICELLI, M. PERICOLI and M. TIVEGNA, *The impact of news on the exchange rate of the lira and long-term interest rates*, Economic Modelling, Vol. 19 (4), pp. 611-639, **TD No. 358 (October 1999**).

D. FOCARELLI, F. PANETTA and C. SALLEO, *Why do banks merge?*, Journal of Money, Credit and Banking, Vol. 34 (4), pp. 1047-1066, **TD No. 361 (December 1999)**.

D. J. MARCHETTI, *Markup and the business cycle: Evidence from Italian manufacturing branches*, Open Economies Review, Vol. 13 (1), pp. 87-103, **TD No. 362 (December 1999**).

F. BUSETTI, *Testing for stochastic trends in series with structural breaks*, Journal of Forecasting, Vol. 21 (2), pp. 81-105, **TD No. 385 (October 2000)**.

F. LIPPI, *Revisiting the Case for a Populist Central Banker*, European Economic Review, Vol. 46 (3), pp. 601-612, **TD No. 386 (October 2000)**.

F. PANETTA, *The stability of the relation between the stock market and macroeconomic forces*, Economic Notes, Vol. 31 (3), **TD No. 393 (February 2001)**.

G. GRANDE and L. VENTURA, *Labor income and risky assets under market incompleteness: Evidence from Italian data*, Journal of Banking and Finance, Vol. 26 (2-3), pp. 597-620, **TD No. 399 (March 2001)**.

A. BRANDOLINI, P. CIPOLLONE and P. SESTITO, *Earnings dispersion, low pay and household poverty in Italy, 1977-1998*, in D. Cohen, T. Piketty and G. Saint-Paul (eds.), The Economics of Rising Inequalities, pp. 225-264, Oxford, Oxford University Press, **TD No. 427 (November 2001)**.

L. CANNARI and G. D'ALESSIO, *La distribuzione del reddito e della ricchezza nelle regioni italiane*, Rivista Economica del Mezzogiorno (Trimestrale della SVIMEZ), Vol. XVI (4), pp. 809-847, Il Mulino, **TD No. 482 (June 2003)**.

2003

F. SCHIVARDI, *Reallocation and learning over the business cycle*, European Economic Review, , Vol. 47 (1), pp. 95-111, **TD No. 345 (December 1998)**.

P. CASELLI, P. PAGANO and F. SCHIVARDI, *Uncertainty and slowdown of capital accumulation in Europe*, Applied Economics, Vol. 35 (1), pp. 79-89, **TD No. 372 (March 2000).**

P. ANGELINI and N. CETORELLI, *The effect of regulatory reform on competition in the banking industry*, Federal Reserve Bank of Chicago**,** Journal of Money, Credit and Banking, Vol. 35, pp. 663-684, **TD No. 380 (October 2000)**.

P. PAGANO and G. FERRAGUTO, Endogenous growth with intertemporally dependent preferences, Contribution to Macroeconomics, Vol. 3 (1), pp. 1-38, **TD No. 382 (October 2000).**

P. PAGANO and F. SCHIVARDI, *Firm size distribution and growth*, Scandinavian Journal of Economics, Vol. 105 (2), pp. 255-274, **TD No. 394 (February 2001)**.

M. PERICOLI and M. SBRACIA, *A Primer on Financial Contagion*, Journal of Economic Surveys, Vol. 17 (4), pp. 571-608, **TD No. 407 (June 2001)**.

M. SBRACIA and A. ZAGHINI, *The role of the banking system in the international transmission of shocks*, World Economy, Vol. 26 (5), pp. 727-754, **TD No. 409 (June 2001)**.

E. GAIOTTI and A. GENERALE, *Does monetary policy have asymmetric effects? A look at the investment decisions of Italian firms*, Giornale degli Economisti e Annali di Economia, Vol. 61 (1), pp. 29-59, **TD No**. **429 (December 2001)**.

L. GAMBACORTA, *The Italian banking system and monetary policy transmission: evidence from bank level data*, in: I. Angeloni, A. Kashyap and B. Mojon (eds.), Monetary Policy Transmission in the Euro Area, Cambridge, Cambridge University Press, **TD No. 430 (December 2001).**

M. EHRMANN, L. GAMBACORTA, J. MARTÍNEZ PAGÉS, P. SEVESTRE and A. WORMS, *Financial systems and the role of banks in monetary policy transmission in the euro area,* in: I. Angeloni, A. Kashyap and B. Mojon (eds.), Monetary Policy Transmission in the Euro Area, Cambridge, Cambridge University Press, **TD No. 432 (December 2001)**.

F. SPADAFORA, *Financial crises, moral hazard and the speciality of the international market: further evidence from the pricing of syndicated bank loans to emerging markets*, Emerging Markets Review, Vol. 4 (2), pp. 167-198, **TD No. 438 (March 2002)**.

D. FOCARELLI and F. PANETTA, *Are mergers beneficial to consumers? Evidence from the market for bank deposits*, American Economic Review, Vol. 93 (4), pp. 1152-1172, **TD No. 448 (July 2002)**.

E.VIVIANO, *Un'analisi critica delle definizioni di disoccupazione e partecipazione in Italia*, Politica Economica, Vol. 19 (1), pp. 161-190, **TD No. 450 (July 2002)**.

M. PAGNINI**,** *Misura e Determinanti dell'Agglomerazione Spaziale nei Comparti Industriali in Italia*, Rivista di Politica Economica, Vol. 3 (4), pp. 149-196, **TD No. 452 (October 2002)**.

F. BUSETTI and A. M. ROBERT TAYLOR, *Testing against stochastic trend and seasonality in the presence of unattended breaks and unit roots*, Journal of Econometrics, Vol. 117 (1), pp. 21-53, **TD No. 470 (February 2003)**.

2004

F. LIPPI, *Strategic monetary policy with non-atomistic wage-setters*, Review of Economic Studies, Vol. 70 (4), pp. 909-919, **TD No. 374 (June 2000)**.

P. CHIADES and L. GAMBACORTA, *The Bernanke and Blinder model in an open economy: The Italian case*, German Economic Review, Vol. 5 (1), pp. 1-34, **TD No. 388 (December 2000)**.

M. BUGAMELLI and P. PAGANO, *Barriers to Investment in ICT*, Applied Economics, Vol. 36 (20), pp. 2275-2286, **TD No. 420 (October 2001)**.

A. BAFFIGI, R. GOLINELLI and G. PARIGI, *Bridge models to forecast the euro area GDP*, International Journal of Forecasting, Vol. 20 (3), pp. 447-460,**TD No. 456 (December 2002)**.

D. AMEL, C. BARNES, F. PANETTA and C. SALLEO, *Consolidation and Efficiency in the Financial Sector: A Review of the International Evidence*, Journal of Banking and Finance, Vol. 28 (10), pp. 2493-2519, **TD No. 464 (December 2002)**.

M. PAIELLA, *Heterogeneity in financial market participation: appraising its implications for the C-CAPM*, Review of Finance, Vol. 8, pp. 1-36, **TD No. 473 (June 2003)**.

E. BARUCCI, C. IMPENNA and R. RENÒ, *Monetary integration, markets and regulation*, Research in Banking and Finance, (4), pp. 319-360, **TD No. 475 (June 2003)**.

G. ARDIZZI, *Cost efficiency in the retail payment networks: first evidence from the Italian credit card system*, Rivista di Politica Economica, Vol. 94, (3), pp. 51-82, **TD No. 480 (June 2003)**.

E. BONACCORSI DI PATTI and G. DELL'ARICCIA, *Bank competition and firm creation*, Journal of Money Credit and Banking, Vol. 36 (2), pp. 225-251, **TD No. 481 (June 2003)**.

R. GOLINELLI and G. PARIGI, *Consumer sentiment and economic activity: a cross country comparison*, Journal of Business Cycle Measurement and Analysis, Vol. 1 (2), pp. 147-172, **TD No. 484 (September 2003)**.

L. GAMBACORTA and P. E. MISTRULLI, *Does bank capital affect lending behavior?*, Journal of Financial Intermediation, Vol. 13 (4), pp. 436-457, **TD No. 486 (September 2003)**.

G. GOBBI and F. LOTTI, *Entry decisions and adverse selection: an empirical analysis of local credit markets*, Journal of Financial services Research, Vol. 26 (3), pp. 225-244, **TD No. 535 (December 2004)**.

F. CINGANO and F. SCHIVARDI, *Identifying the sources of local productivity growth*, Journal of the European Economic Association, Vol. 2 (4), pp. 720-742, **TD No. 474 (June 2003)**.

C. BENTIVOGLI and F. QUINTILIANI, *Tecnologia e dinamica dei vantaggi comparati: un confronto fra quattro regioni italiane*, in C. Conigliani (a cura di), *Tra sviluppo e stagnazione: l'economia dell'Emilia-Romagna*, Bologna, Il Mulino, **TD No. 522 (October 2004)**.

E. GAIOTTI and F. LIPPI, *Pricing behavior and the introduction of the euro:evidence from a panel of restaurants*, Giornale degli Economisti e Annali di Economia, 2004, Vol. 63(3/4):491-526, **TD No. 541 (February 2005)**.

2005

L. DEDOLA and F. LIPPI, *The monetary transmission mechanism: evidence from the industries of 5 OECD countries*, European Economic Review, 2005, Vol. 49(6): 1543-69, **TD No. 389 (December 2000)**.

G. DE BLASIO and S. DI ADDARIO, *Do workers benefit from industrial agglomeration?* Journal of regional Science, Vol. 45 n.4, pp. 797-827, **TD No. 453 (October 2002).**

M. OMICCIOLI, *Il credito commerciale: problemi e teorie*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 494 (June 2004)**.

L. CANNARI, S. CHIRI and M. OMICCIOLI, *Condizioni del credito commerciale e differenzizione della clientela*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 495 (June 2004)**.

P. FINALDI RUSSO and L. LEVA, *Il debito commerciale in Italia: quanto contano le motivazioni finanziarie?*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 496 (June 2004)**.

A. CARMIGNANI, *Funzionamento della giustizia civile e struttura finanziaria delle imprese: il ruolo del credito commerciale*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 497 (June 2004)**.

G. DE BLASIO, *Credito commerciale e politica monetaria: una verifica basata sull'investimento in scorte*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 498 (June 2004)**.

G. DE BLASIO, *Does trade credit substitute bank credit? Evidence from firm-level data.* Economic notes, Vol. 34 n.1, pp. 85-112, **TD No. 498 (June 2004).**

A. DI CESARE, *Estimating Expectations of Shocks Using Option Prices*, The ICFAI Journal of Derivatives Markets, Vol. II (1), pp. 42-53, **TD No. 506 (July 2004).**

M. BENVENUTI and M. GALLO, P*erché le imprese ricorrono al factoring? Il caso dell'Italia*, in L. Cannari, S. Chiri e M. Omiccioli (a cura di), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 518 (October 2004)**.

P. DEL GIOVANE and R. SABBATINI, *L'euro e l'inflazione. Percezioni, fatti e analisi*, Bologna, Il Mulino, **TD No. 532 (December 2004).**

2006

R. BRONZINI and G. DE BLASIO, *Evaluating the impact of investment incentives: The case of Italy's Law 488/92.* Journal of Urban Economics, vol. 60, n. 2, pag. 327-349, **TD No. 582 (March 2006).**

A. DI CESARE, *Do market-based indicators anticipate rating agencies? Evidence for international banks*, Economic Notes, No. 35, pp. 121-150, **TD No. 593 (May 2006).**