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Role and Effects of Credit Information Sharing

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Abstract

Information sharing about borrowers' characteristics and their indebtedness can have important effects on credit markets activity. First, it improves the banks' knowledge of applicants' characteristics and permits a more accurate prediction of their repayment probabilities. Second, it reduces the informational rents that banks could otherwise extract from their customers. Third, it can operate as a borrower discipline device. Finally, it eliminates borrowers' incentive to become over-indebted by drawing credit simultaneously from many banks without any of them realizing. This chapter provides a brief account of models that capture these four effects of information sharing on credit market performance, as well as of the growing body of empirical studies that have attempted to investigate the various dimensions and effects of credit reporting activity. Understanding the effects of information sharing also helps to shed light on some key issues in the design of a credit information system, such as the relationship between public and private mechanisms, the dosage between black and white information sharing, and the "memory" of the system. Merging the insights from theoretical models with the lessons of experience, one can avoid serious pitfalls in the design of credit information systems.

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1. Introduction

In many countries, lenders routinely share information on the creditworthiness of their borrowers. This can happen either on a voluntary basis through credit bureaus, which are set up by the lenders themselves or operated independently by a third party, or on a mandatory basis, through public credit registers (PCRs) operated by central banks.

Private credit bureaus receive data about borrowers from the respective lenders. They collate this information with data from other sources (courts, public registers, tax authorities, etc.) and compile a file on each borrower. Lenders can obtain a return flow of consolidated data about a credit applicant by requesting a “credit report” from the bureau.

Lenders who provide their private information to credit bureaus are granted access to the common database insofar as the data provided are timely and accurate. Credit bureaus are exposed to a potential conflict of interest, especially when they are owned by the lenders themselves: each lender would like to exploit the information provided by other lenders without disclosing his own. This explains why sanctions are invariably threatened to any credit granter who fails to supply data or provides inaccurate information. Sanctions range from fines to loss of membership and hence denial of access to the bureau’s files. In other words, credit bureaus are based on the principle of reciprocity, which is generally stated in the contractual agreement between the bureau and credit grantors.

A private credit bureau can issue several kinds of credit reports, depending on the information gathered, the type of credit application (consumer credit, house mortgage, business loan, etc.) and, most importantly, the amount of detail requested by the lender. Reports range from simple statements of past defaults or arrears – “negative” data – to detailed reports on the applicant's assets and liabilities, guarantees, debt maturity structure, pattern of repayments, employment and family history – “positive” data. The more sophisticated credit bureaus also use statistical models to produce and sell “credit scoring” services, by which they rate borrowers according to their characteristics and credit history. Such scores were initially developed by credit grantors mainly for assessing credit applications. Where positive information is also available, the models are now intensively also used to promote financial instruments, price loans, and set and manage credit limits.

In several countries, government authorities have taken an active role in fostering the exchange of information among lenders, creating public credit registers (PCRs), which

operate in many respects like credit bureaus. The PCRs are generally managed by central banks, and access is granted only to authorized central bank staff (mainly for surveillance reasons and under tight confidentiality rules) and to the reporting financial institutions. This creates a two-way flow of data between credit grantors and the PCR, as in the case of private credit bureaus.

The key difference is that participation in a PCR is compulsory, and its rules are not contracted, but imposed by regulation. This implies a second important difference, namely that PCRs have universal coverage (all loans above a threshold amount must be reported at specified intervals), but the information consists mainly of credit data and is disseminated in consolidated form (giving the total loan exposure of each borrower, but no details on individual loans). Credit bureaus are less complete in their coverage but offer details on individual loans and merge credit information with other data.

The reporting threshold of PCRs varies considerably. Clearly, the higher the threshold, the fewer the number of borrowers covered and credit reports issued. The threshold also demarcates the segment in which private credit bureaus operate without competition from the PCR: above the threshold, credit bureaus have to take into account that lenders can also turn to the public register's reports. The data reported by PCRs also varies considerably across countries. For instance, in Argentina lenders are required to report data on defaults, arrears, loan exposure, interest rates and guarantees. In Germany, only loan exposure and guarantees are reported; in Belgium, only defaults and arrears.

Given the lack of official statistics that exists on credit bureaus and PCRs, the only cross-country information is based on specially designed surveys. Two such surveys have been carried out in recent years. The first was conducted by Jappelli and Pagano (2002) on a sample of 49 countries, and concerns both private credit bureaus as well as PCRs. The second, a large-scale World Bank project described in Miller (2003), assembled data for 77 countries, with extremely detailed statistics on the operation of PCRs.

Both surveys document the impressive growth and international diffusion of information sharing among lenders. Figure 1 shows the fraction of countries in which either a PCR or a private credit bureau operated in each decade, based on data drawn from Jappelli and Pagano (2002) for private credit bureaus and from Miller (2003) for PCRs. Less than 20 percent of the countries featured a private credit bureau before 1950 and less than 5 percent had a PCR. By contrast, by the turn of the century 50 percent of the countries surveyed by

Miller (2003) had a PCR and over 60 percent of the countries surveyed by Jappelli and Pagano (2002) had a private credit bureau.

This impressive overall growth in credit reporting activity, fostered both by market forces and regulatory intervention alike, hides considerable heterogeneity in the operating rules, data collected and feedback to financial intermediaries. The surveys just mentioned provide detailed information on several of these dimensions.

The spread of information sharing in credit markets begs important positive and normative questions: what is the effect of information sharing on credit market performance? Why and under which circumstances lenders are willing to share private credit data? Should the government intervene in this activity and how? If it does, how should the rules of a PCR be designed? Do special issues arise in the case of developing countries, where informal credit is widespread?

2. The role of credit information systems

In this section, we elucidate the various roles that information sharing can have in credit markets, bring out the predictions that can be drawn from models which have formalized them, and compare these predictions with the available evidence. We then turn to examine the empirical evidence, bringing it to bear on the theories' predictions.

2.1. Theoretical issues and empirical predictions

In principle, exchanging information about borrowers can have four effects: (i) improve banks' knowledge of applicants' characteristics, easing adverse selection problems; (ii) reduce the "informational rents" that banks could otherwise extract from their customers; (iii) act as a borrower discipline device, by cutting insolvent debtors off from credit; (iv) eliminate or reduce the borrowers' incentive to become "over-indebted" by drawing credit simultaneously from many banks without any of them realizing.

Pagano and Jappelli (1993) show that information sharing *reduces adverse selection* by improving the pool of borrowers. In their model, each bank has private information about

local credit applicants but has no information about non-local credit applicants. The latter therefore face adverse selection. However, if banks exchange their information about their clients' quality, they can assess also the quality of non-local credit seekers, and lend to them as safely as they do with local clients.¹ As a result, the default rate decreases. In contrast, the effect on lending is ambiguous, because when banks exchange information about borrowers' types, the implied increase in lending to safe borrowers may fail to compensate for the reduction in lending to risky types. Banking competition strengthens the positive effect of information sharing on lending: when credit markets are contestable, information sharing reduces informational rents and increases banking competition, which in turn leads to greater lending.

The exchange of information between banks may also *reduce the informational rents* that banks can extract from their clients within lending relationships, as shown by Padilla and Pagano (1997) in the context of a two-period model where banks have private information about their borrowers. This informational advantage confers to banks some market power over their customers, and generates a hold-up problem: anticipating that banks will charge predatory rates in the future, borrowers exert low effort to perform, resulting in high default and interest rates, and possibly market collapse. If they commit themselves to exchange information about borrowers' types, however, banks restrain their own future ability to extract informational rents, leaving a larger portion of the surplus to entrepreneurs. As a result, these will invest greater effort in their project, resulting in a lower default probability, lower interest rates and greater lending relative to the regime without information sharing.²

An effect on incentives exists even when there is no hold-up problem, if banks communicate to each other data about past defaults, rather than information about borrowers' quality. Padilla and Pagano (2000) show that this creates a disciplinary effect. When banks share default information, default becomes a signal of bad quality for outside banks and

¹ Kalberg and Udell (2003) also point out that information exchange from multiple sources improves the precision of the signal about the quality of the borrower.

² Gehrig and Stenbacka (2005) consider a similar model but assume that banks compete *ex ante* for clients and that that customers face switching costs. Under these assumptions, future informational rents are a stimulus to competition. Since information sharing reduces these rents, in their model it reduces competition, in contrast with what is predicted by Padilla and Pagano (1997). This shows that under some assumptions, information sharing can act as an anti-competitive device, a point that we shall return to in Section 3.

carries the penalty of higher interest rates. To avoid this penalty, borrowers exert more effort, leading to lower default and interest rates and to more lending.³ In contrast with the result of Padilla and Pagano (1997), disclosing information about borrowers' quality has no effect on default or interest rates in this model. Ex-ante competition is assumed to eliminate the informational rents of banks, so that their customers' overall interest burden cannot be reduced further. As a result, when information about their quality is shared, borrowers have no reason to change their effort level, and equilibrium default and interest rates remain unchanged. And since lending to risky borrowers is a costly investment in useful quality information, lending can be reduced when such information is shared: banks that cannot offset the costs of default by low-quality borrowers by earning informational rents on future lending to high-quality borrowers require a higher probability of repayment to be willing to lend, and the credit market may collapse in situations in which it would be viable without information sharing.

This suggests that communicating default data and disclosing borrowers' characteristics can have quite different effects on the probability of default. The disciplinary effect arises only from the exchange of default information. If banks also share data on borrowers' characteristics, they actually reduce the disciplinary effect of information sharing: a high-quality borrower will not be concerned about his default being reported to outside banks if they are also told that he is a high-quality client. But, as discussed above, exchanging information about borrowers' characteristics may reduce adverse selection or temper hold-up problems in credit markets, and thereby reduce default rates.

The previous three effects arise even if households and firms apply for credit with only one lender at any time. Exclusive lending is a maintained assumption in all the models mentioned so far. But in practice credit seekers may apply for credit from several lenders at the same time, and this is often granted. For instance, a consumer may simultaneously draw on several credit cards and/or credit lines at different financial intermediaries. It also common among companies, especially large ones (Ongena and Smith, 1998).

³ In this model there is no holdup problem because initially banks have no private information about credit seekers, and ex ante competition dissipates any rents from information acquired in the lending relation.

Maintaining multiple lending relationships creates informational problems for lenders if each potential lender has no clear information about how much credit the borrower has already obtained or will be able to obtain from other lenders. A borrower's default risk, from the viewpoint of a given lender, depends on the overall indebtedness of the borrower when his obligation towards that lender will mature. If this information is unavailable to the lender, however, the borrower has the incentive to over-borrow. To understand why, consider a consumer seeking credit from a credit card company and from a bank, who do not tell each other how much the consumer borrows from each. Assume that the probability of default is an increasing function of total debt. When the consumer applies for a loan from the bank, each additional dollar he borrows reduces the probability of repayment of the capital and interest to the credit card company. Thus, the consumer's expected repayment per dollar of debt is a decreasing function of his total debt and he has the incentive to over-borrow. Anticipating this moral hazard, both lenders will ration the amount of credit supplied and/or require a higher interest rate, or even deny credit unless assisted by collateral or covenants restricting total debt.⁴ This moral hazard problem disappears if the bank and the credit card company agree to reveal to each other the magnitude of the credit extended to the client. So, when lenders share information about outstanding loans they can be expected to increase the supply of lending and/or improve the interest rates offered to credit seekers.

The models mentioned so far show that by exchanging different types of information, lenders may control different informational problems. Exchanging information about borrower characteristics relieves adverse selection and hold-up problems. Pooling default information tends to correct moral hazard problems, and its ability to do so is actually reduced if borrower characteristics are also disclosed. Finally, exchanging information about borrowers' debt exposure removes the particular form of moral hazard deriving from borrowers' ability to borrow from multiple lenders.

Despite the variety of the informational problems considered, overall some of the predicted effects of information sharing are similar. All the models predict that information sharing (in one form or another) reduces default rates, whereas the prediction concerning its effect on lending is less clear-cut. However, the prediction about default is unambiguous only if referred to the probability of default of an individual borrower. When one considers the

⁴ A lender is not only threatened by the borrower's prior debt commitments, but also by those

average default rate, composition effects may overturn the prediction. Suppose that information sharing gives lower-grade borrowers access to credit. Even if each borrower's probability of default is reduced, the aggregate default rate may increase because the relative weight of lower-grade borrowers increases in the total pool. If empirical tests rely on aggregate measures of the default rate, this composition effect may introduce a bias against the models' prediction.

2.2. Macroeconomic evidence

The predictions about the effects of information sharing are tested in Jappelli and Pagano (2002) on cross-country data. As shown by the regression results reported in the first two columns of Table 1, the breadth of credit markets is associated with information sharing. Total bank lending to the private sector scaled by GNP is indeed larger in countries where information sharing is more solidly established and extensive. This relation persists even controlling for other economic and institutional determinants of bank lending, such as country size and growth rate, and variables capturing respect for the law and protection of creditor rights. The third and fourth columns of Table 1 show that public and private information sharing also mitigates credit risk, in accordance with the theory.

The literature also sheds light on the incentives to create private and public information sharing arrangements. As for private credit bureaus, Pagano and Jappelli (1993) show that lenders should have a greater incentive to share information when the mobility of credit seekers is high. Intuitively, a society where borrowers are very mobile is one where banks must often assess the credit risk of non-local credit applicants, on which some other bank possesses private information. Indeed, Figure 2 shows that countries that feature greater residential mobility (such as Canada, Australia, Sweden and the U.S.) have comparatively extensive private credit reporting activity, as measured by the number of credit reports per capita.

As for PCRs, the incentive to establish them should be stronger where similar private arrangements have not yet arisen, and where creditor rights are poorly protected. Table 2 shows that indeed PCRs were more often established in countries without pre-existing private credit bureaus and in countries where the legal system is based on the Napoleonic code, which

that he may contract in the future, as shown by Bizer and DeMarzo (1992).

is associated with poorer creditor protection. In the first column, the probability of finding a PCR is negatively associated to the preexistence of a private credit bureau; in the second, the PCR's reporting threshold is positively associated to the preexistence of private credit bureaus, implying that where credit bureaus already exist the PCR's coverage is restricted to large loans. This indicates that not only the existence, but also the design of PCRs responds to the presence of credit bureaus. The association between the presence of a PCR and the legal origin dummies suggests that PCRs are introduced to compensate, at least partly, for the weak protection that the state offered to creditors' interests, and thus to remedy heightened moral hazard in lending.

2.3. Microeconomic evidence

Recent studies based on individual-level data on consumers or banks have shed further light on several interesting effects of information sharing arrangements in credit markets. Contributions have been especially produced as part of two international research projects by the Inter-American Development Bank (IADB) and the World Bank, see Pagano (2001) and Miller (2003). However, this work is still piecemeal: a systematic analysis of the impact of these arrangements on lending activity, defaults, and interest rates is still missing.

Some papers analyze the effectiveness of credit bureaus, and generally find that credit reports are an important tool to assess consumer credit risk (Chandler and Parker, 1992; Barron and Staten, 2003). This is confirmed by Kalberg and Udell (2003), who document that trade credit history in Dun & Bradstreet's reports improves default predictions relative to financial statements alone. Also Cowan and De Gregorio (2003) find that in Chile positive and negative information in credit reports contributes to predict defaults.

This improved assessment of credit risk appears to translate into higher lending. Galindo and Miller (2001) find a positive relation between access to finance (debt) and an index of information sharing in the Worldscope database, using the firm-level sensitivity of investment to cash flow as a proxy of credit constraints. They find that well-performing credit reporting systems reduce the sensitivity of investment to cash flows. Love and Mylenko (2003) combine firm-level data from the World Bank Business Environment Survey with aggregate data on private and public registers collected in Miller (2003) and find that private credit bureaus are associated with lower perceived financing constraints and a higher share of

bank financing. However, the existence of public credit registers does not have a significant effect on financing constraints.

In addition, the individual country studies of the IADB and World Bank projects brim with interesting evidence on the effect of information sharing on specific credit markets, highlighting particularly its “disciplinary role”. Castelar Pinheiro and Cabral (2001) report that in Brazil the whole postdated check market (whose size is of the same order of magnitude as the stock of household credit) operates without collateral, without personal guarantees, and without legal sanctions of any type. Its only foundation is its information-sharing mechanism: a “black list” of people issuing checks without funds. This mechanism alone also explains why the interest rate charged by factoring companies that operate in this market is much lower than that charged by credit card companies. Similar evidence is reported for Chile, where department stores seeking to collect an unpaid loan send the relevant information both to a collection agency and to the main Chilean credit bureau, DICOM. Apparently, notifying DICOM is a very effective way of securing immediate repayment, since delinquent customers see their credit dry up with all the stores that they patronize.

Moreover, the degree and sophistication of information sharing arrangements appear to be synchronized with those of the financial system as a whole. For instance, Costa Rica, which has one of the most sophisticated credit markets in the region, also has an impressive and keenly competing set of private credit bureaus covering the majority of the population of the country, with different bureaus specializing in different services. The development of information sharing mechanisms appears in turn to prompt lenders to move towards more refined screening and monitoring practices. This is witnessed by the central role that information-sharing systems have taken in borrower selection in Peru, especially after the development of a public rating register in that country. As explained by Trivelli, Alvarado and Galarza (2001), this has encouraged lenders to shift away from exclusive reliance on collateral towards information-based lending.

3. Issues and pitfalls in the architecture of credit information systems

Under which circumstances should public policy create a credit reporting system, by mandating banks to disclose their private information? And if so, which information should be pooled and which should be kept confidential? For how long should information remain available in a credit reporting system? These are just some of the many policy issues that arise in the creation, design and regulation of information exchange in credit markets. In this section we take up the most salient of such issues, building on the above discussion of the effects of information sharing on the performance of credit markets.

3.1. Relationship between private and public systems

Information sharing arrangements are often created spontaneously by groups of lenders or individual entrepreneurs, in the form of credit bureaus or of rating agencies. The design of a public credit registry cannot disregard how much information sharing the private sector is already exchanging spontaneously. Clearly, the case for the introduction of a PCR is comparatively stronger in countries where private information sharing arrangements among lenders do not exist, or are primitive and limited in coverage and scope. In fact, as mentioned in Section 2.2, empirically the probability that a PCR is introduced is lower in countries with pre-existing private information-sharing arrangements. Private and public arrangements are substitutes in this area.

By the same token, however, public arrangements can “crowd out” private ones. The introduction of a cost-effective PCR can put existing credit bureaus out of business or discourage the creation of new ones. In this sense, the crucial parameter in the design of a PCR is the minimum reporting threshold, since it effectively delimits the market segment left to the operation of private credit bureaus. In countries where an effective PCR operates, credit bureaus tend to specialize in loans to households and to small businesses, whose size is typically below the reporting threshold of the PCR. The higher this threshold, the larger the scope for private initiative in the industry.

The substitutability between public and private information sharing arrangements,

however, should not be exaggerated. There are also reasons why the two sources of information may be complements. For instance, credit bureaus may provide a greater degree of detail than PCRs, may merge other types of information with banking records or may provide credit-scoring services to lenders. Therefore, a lender may obtain a clearer assessment of a credit applicant's solvency by accessing both the relevant PCR and a credit bureau than by confining himself to only one of these two sources of information.

3.2. Dosage of negative and positive information

The type of data reported is another key element in the design of a credit information system. The simplest and most inexpensive systems are "black lists", which contain information only on defaulters. These are most effective in correcting moral hazard problems in the credit market, owing to their disciplinary effect via reputational mechanisms.

Intermediate systems also include reporting of loan amounts, so that lenders may form a more precise estimate of the total indebtedness of credit seekers. Such information helps to correct the moral hazard problems that may arise if loan contracts are non-exclusive, as explained in Section 2.1.

The most sophisticated systems also include other forms of positive information about borrowers' characteristics, such as demographic information for households and accounting information for firms. As explained in Section 2.1, however, in this area "more" is not always "better". A system that provides much information about borrowers' characteristics may lead banks to identify high-quality borrowers more easily, but by the same token such borrowers will be less worried to be reported as defaulters, trusting that their reputation will not be stained by such an event. As a result, they may exert less effort to avoid default.

3.3. Memory of the system

The number of years a credit information system "remembers" default or arrears by a given borrower is another important parameter in the design of a credit information system. More specifically, in setting the memory of the system, one has to ask two distinct but related questions. First, how long are default records kept? Second, are they removed after (late) repayment? Both of these features impinge on what we will call the "forgiveness" (or

forgetfulness) of the system.

At one extreme, a system with infinite memory, where borrowers have no chance to exit from the “black list” even after late repayment, may create a high incentive to repay on time, but may *ex ante* deter the decision to take any debt. The risk of being eternally black listed in case of default may be so large as to deter from borrowing even individuals with relatively solid prospects. *Ex post*, a black list with extremely long memory may prevent defaulted debtors from ever making a comeback. Upon default, entrepreneurs may never have a chance to get new loans and start a new business, and therefore to repay their past debts. Furthermore, even if a borrower has the money to repay a defaulted loan, he may have little incentive to do so because in any event his reputation is permanently marred. In this sense, a black list with very long memory can contribute to the well-known problem of “debt overhang”, by which defaulted debt becomes a permanent obstacle to the resumption of subsequent economic activity. At the other extreme, a system where records are kept for a very short time and immediately erased upon late repayment would exert very little discipline on borrowers and correspondingly provide very little information on their track record to lenders.

The desirable degree of memory and “forgiveness” of the system lies between these two extremes. The system should trade off the need to discipline borrowers and the need to give them a “second chance”. The optimal degree of forgiveness depends on many features of reality, including for example the persistence of default-inducing shocks, and generally differs from country to country. Where creditor rights are less well protected, for instance because of poor judicial enforcement, the need to discipline borrowers may be more pressing than elsewhere, and therefore one may want to make the memory of the system longer and less forgiving.

A particularly interesting memory design is found in the Belgian Central Office for Credit to Private Individuals, a PCR that records only default information concerning household debt. Borrowers who redeem their debt disappear more quickly from the register than borrowers for whom a repayment commitment continues to exist. If arrears are repaid then the information is automatically removed after one year; if the debt is repaid after default, it is removed only after 2 years. Irrespective of the type and status of the obligation, the database does not keep any record for more than 10 years. So “punishment” is stricter for

more serious misconduct (defaults are punished more than arrears), but eventually there is forgiveness for everybody.

Apart from its role in the design of a PCR, this parameter is also a public policy variable, insofar as policy-makers may limit the memory of private credit bureaus by regulation. For instance, Danish credit bureaus are entitled to register and distribute at most 5 years of data that is relevant to assess the financial situation of businesses or individuals; the 1970 U.S. Fair Credit Reporting Act, as amended in 1996, prohibits dissemination of adverse information (such as bankruptcy) after more than 7 years.

3.4. Monopolistic dangers of private information sharing

The literature on Industrial Organization (IO) highlights that information sharing between firms may either increase or decrease the degree of market competition and the surplus enjoyed by consumers. This literature generally considers firms rather than financial intermediaries, and therefore typically abstracts from the effects that information sharing may have on adverse selection or moral hazard problems in downstream relationships with customers. Vives (1990) and Kuhn and Vives (1995) show that the effects of the production of information by an oligopolistic firm on the profits of its competitors and on consumer surplus are in general ambiguous, and depend on the nature of the information produced (aggregate demand, individual demand, production cost) and on the type of strategic variables chosen by competitors (price or quantity competition).

In the context of an oligopolistic market with a homogeneous product and price competition, firms may try to collude to set prices above the competitive level and thereby earn extra profits. The collusive agreement is sustained by each firm's implicit threat of competing aggressively in the future against any potential deviant. But such deviations from collusion can be punished only if detected: for collusion to be sustainable, each firm must be able to observe the prices set by its competitors. Therefore, sustaining collusion requires a certain degree of price disclosure by competitors. On this basis, in recent times competition authorities have often come to regard information-sharing agreements as automatic evidence of collusive practices (Kuhn, 2001).

This contrasts with the literature surveyed in Section 2.1, whose general thrust is that in credit markets information sharing tends to increase competition, by making the information

set of lenders more homogeneous and thereby reducing lenders' information rents. The main difference between the traditional IO standpoint and this new banking literature on information sharing has to do with the type of information exchanged. In the banking literature, lenders share information about the characteristics or behavior of their customers, rather than about prices, sales and costs, as assumed by the traditional IO literature.⁵

Indeed, information sharing among banks has never been a concern of competition authorities: governments often mandate information sharing as a way to enhance competition in the financial sector. This does not rule out, however, that even information-sharing arrangements in the financial sector may be designed to stifle competition. This can be achieved by setting up a credit bureau as a closed-membership "club of incumbents." By refusing to admit potential entrants, incumbents erect an informational barrier to entry: without access to the club's database, entrants are less informed than are incumbents.

This is exemplified by the Mexican case, where in recent years the Mexican Bank Association formed a private credit bureau ("Buro de Credito") in partnership with Duns & Bradstreet and Trans-union. Two attempts to set up competing credit bureaus were unsuccessful because it proved impossible to obtain information from the banks. This happens whenever banks are vertically integrated with a monopolistic credit bureau, with which they have an exclusive relationship. This strategy allows banks to use the bureau as a collective entry prevention device against potential entrants in the credit market, illustrating a potential danger of information sharing arrangements even in credit markets.

This suggests that credit bureaus should be open-access, so that any actual or potential lender can access the same information at non-discriminatory costs. Alternatively, public policy should foster competition among private credit bureaus.⁶ In some cases the only way to create sufficient competition is to set a very low - possibly zero - threshold in public credit registers, as indeed is the case in several Latin American countries.

⁵ Even when they share information about loans, credit bureaus do not reveal the identity of the lender associated with a particular loan.

⁶ This may not always be possible, the strong economies of scale that characterize the industry, which in fact has undergone a process of dramatic concentration (Jappelli and Pagano, 1993).

3.5. Pooling information across company groups and countries

If a credit information system must go beyond negative information and provide data about the overall indebtedness of each debtor, it must identify debtors and their liabilities unambiguously. For households, this is relatively simple, but it is worth mentioning that it may be much more difficult for firms belonging to company groups. A subsidiary may have a very limited debt exposure, but the group may be greatly over-indebted. In fact, a distressed group will want to disguise its true leverage by borrowing new funds via relatively healthy subsidiaries.

Consolidating debt for company linked by complex pyramidal structures and cross-shareholdings is very difficult, and even large PCRs may be ill-equipped to do so. The loans to the various subsidiaries may go undetected to a PCR because each of them does not exceed the reporting threshold. While this is unlikely to happen for large corporations, whose loan sizes are quite large anyway, in some European countries the group structure is commonplace even for small and medium-sized enterprises (see Barca and Becht, 2001). And corporate groups often transcend national borders. If a group takes large amounts of debt via its foreign subsidiaries, both the PCR of the country where the group's holding company is incorporated, and banks, will be unable to get reliable and complete data about the company's overall exposure.⁷

The problems created by access of companies to foreign credit, however, do not arise

⁷ This is exemplified by two conspicuous Italian cases, the Ferruzzi and the Parmalat scandals. In both cases, the huge debt buildup in the early 1990s was facilitated by an incomplete perception of the group's total exposure. In 1992 the Ferruzzi group was the second industrial group in Italy and had a hugely complex financial structure, with an Italian holding company and nearly 300 controlled companies, of which only 100 registered in Italy. The group borrowed heavily both in Italy and abroad, via its many subsidiaries, and in 1993 it entered a state of financial distress. Its total indebtedness was almost US \$20 billion, an amount that "exceeded the entire private external debt of the Philippines (\$14 billion), and was not far from that of Malaysia (\$28 billion) at the end of 1997" (Penati and Zingales, 1998, p. 2). About one quarter of its total unsecured bank debt (\$15 billion) was owed to foreign banks. Much of this debt had been transferred within the group from one company to another via a complex set of intra-group loans. A similar story appears to explain the build-up of debt carried out by Calisto Tanzi, the controlling shareholder of Parmalat. Although in this case a precise account must await the verdict of on-going trials, there is substantial evidence that much of the undetected debt was raised by the foreign subsidiaries of the group.

solely due to the possibility of borrowing via foreign subsidiaries. A multinational group structure compounds the problem, but even when a company borrows directly from foreign banks its debt may go unreported to the domestic PCR. Hence, the roots of this information sharing problem lie in the phenomenon of cross-border lending: not only companies, but also individuals (see Chapter 2 for a discussion of European national and cross-border information sharing regulation) increasingly access foreign credit markets via their foreign subsidiaries, and use such credit to diversify their sources of funds, reduce their cost of capital or overcome domestic credit constraints. As borrowers become integrated into the world capital market, national credit information systems become unable to identify their total indebtedness.

So far, credit bureaus have adopted one of two alternative strategies to respond to this challenge: direct entry into foreign markets or alliances with foreign bureaus. Direct entry can be implemented by setting up local branches in foreign countries or by taking over national credit bureaus.⁸ Other bureaus have created a web of transnational alliances to resist this wave of consolidation. Several European credit bureaus have linked up with each other in recent years. By creating a two-way flow of information between each other, these bureaus are trying to provide the same services as truly multinational entities without surrendering their independence. The same problems arise for PCRs. Again, a possible solution is to coordinate national public registers and create interfaces between their information systems. Of course, this may not be easy to implement. Apart from the fact that in some countries PCRs do not exist, the existing registers often feature different designs regarding coverage, reporting thresholds, and type of information reported and privacy protection clauses, posing formidable problems to their integration. These substantive problems are compounded by the inertia that is so often typical of bureaucratic organizations, which operate under a soft budget constraint and lack the competitive pressure under which private organizations operate.

Does this make national PCRs obsolete organizations, bound to be displaced by the growth of private transitional private credit bureaus? The answer probably hinges on how many years ago a PCR was established. In Europe, where national PCRs are quite old and feature deeply ingrained differences, the seven countries that have them find it difficult to

⁸ Of course, this is unlikely be the only reason for the strategy of credit bureaus' foreign acquisitions. Other reasons are economies of scale, superior technical knowledge accumulated by large bureaus, and desire to diversify revenue structure.

agree on a common set of rules, so that the danger of their displacement by private multinational bureaus is increasing (Jappelli and Pagano, 2003). By the same token, however, countries that are just establishing a public credit register for the first time have the opportunity of designing them so as to ensure compatibility with the systems of their main commercial partners. In this dimension, latecomers may be better positioned than their predecessors.

3.6. Privacy protection

Credit information provision finds an obvious limit in the set of legal provisions designed to protect confidential information, or individual privacy. Such provisions differ widely both within Europe and between the U.S. and European countries and these differences appear to have had profound effects on the development of credit information systems (see Chapter 2 in this volume, and Jappelli and Pagano, 2003). For instance, France's strict privacy protection laws have prevented the development of private credit bureaus in that country.

The degree of privacy protection accorded to prospective borrowers has historically affected the development of credit bureaus. The activities of credit bureaus are regulated almost everywhere so as to prevent violation of privacy and civil liberties. Privacy laws effect a wide range of consumer guarantees, such as limits on access to files by potential users, bans on white information (e.g., in Finland and Australia), compulsory elimination of individual files after a set time (e.g., 7 years in the United States, 5 in Australia), bans on gathering certain kinds of information (race, religion, political views, etc.) and the right to access, check and correct one's own file.⁹

⁹As far as access limits are concerned, there appear to be three levels of privacy protection. There are low-protection countries, such as Argentina, where anyone can access all debtors' data regardless of the purpose of investigation. In medium-protection countries as the United States, data can be accessed only for an "admissible purpose", essentially the granting of credit. A higher level of privacy protection may be embodied in the further requirement of the borrower's explicit consent to access his file. This principle is enshrined in the legislation of several European countries and in the Directive 95/46 of the European Parliament on "the protection of individuals with regard to the processing of personal data and on the free movement of such data". In some countries (such as France, Israel and Thailand) safeguards for consumer privacy are so strong that regulation has impeded the emergence of private credit bureaus.

However, one should not necessarily take a negative view of the effect of privacy laws on credit information systems. As already pointed out in our discussion of the desirable memory of such systems in Section 3.3, divulging certain types of information may lead people to become “too cautious”, that is, it may reduce risk taking and entrepreneurship below the socially desirable level. Therefore, a moderate concern for privacy may also indirectly serve economic efficiency.

In addition, there is one privacy-protection rule that directly improves the accuracy of the data stored by credit information systems: entitling individuals with the right to inspect and correct mistaken information about them. Such feedback not only improves the quality of information, but also helps to correct the negative bias in reporting that credit bureaus are often blamed for (see also the discussion in Chapter 9). Such bias is easily explained: when a negative credit report is mistakenly filed, the lender will generally deny credit and therefore is unlikely to ever find out about the mistaken information, while the opposite would happen if a positive report was filed for a bad credit risk. Therefore, credit bureaus prefer to err on the negative side.

3.7. Designing information sharing systems in developing countries

Some issues in the design of credit information systems are particularly relevant for developing countries, where these systems are often still being designed.

First, in most developing countries, the role of informal lending is much larger than in developed economies. Since, typically, both credit bureaus and PCRs base their information on data reported by formal lenders, their utility is much reduced in these countries. This limitation of information sharing systems could be overcome by allowing informal lenders - such the non-governmental organizations (NGOs) that manage microcredit programs - to access PCRs. For instance, Trivelli, Alvarado and Galarza (2001) report that one of the main limitations of the Peruvian PCR is its insufficient coverage of data about debts with informal and rural lenders, because the majority of such lenders have never had any relation with the formal system.

A second issue is that PCRs are more important in countries where creditor rights

receive relatively poor protection and the law is less effectively enforced, as documented in Section 2.1. In this sense, PCRs appear to act as a partial substitute for the lack of good judicial enforcement. Credit bureaus can of course play this role too. The disciplinary role of negative information can be particularly important in this respect. For instance, in Brazil information sharing mechanisms allow widespread reliance on post-dated checks. Pinheiro and Cabral (2001) report: “Easy, low-cost information on the person writing the check and the high cost to the consumer of being placed on a ‘black list’ for writing a check without funds have made post-dated checks the most widely used form of consumption financing” (p. 179).

Thirdly, in LDCs the availability of information provided by PCRs can effectively induce changes in banks’ lending policies, shifting from a collateral-based lending policy to an information-based one. In many developing economies, it is often complained that formal lenders request their loans to be assisted by collateral whose value greatly exceeds the loan and pay little attention to the prospective cash flows of the project they are financing. The availability of more readily usable information, together with knowledge of credit scoring techniques, may contribute to a shift in lending strategies.

Finally, in developing countries, credit information systems should be designed so as to be accessible by relatively unsophisticated bank personnel, and avoid importing too sophisticated systems, which presuppose very detailed positive information or rely on complex scoring techniques. Most LDCs may usefully start with simple negative information systems, possibly complemented by data on loan exposure, and later proceed to enrich them with additional data on corporate accounts and management and personal information.

4. Conclusions

This chapter offers a comprehensive overview of the economic effects of information sharing systems, drawing together theory and empirical evidence, with an eye to obtaining directions for the design of credit information systems. Information sharing about borrowers' characteristics and their indebtedness can have important effects on credit markets activity. First, it improves the banks' knowledge of applicants' characteristics and permits a more accurate prediction of their repayment probabilities. Second, it reduces the informational rents that banks could otherwise extract from their customers. Third, it can operate as a borrower discipline device. Finally, it eliminates borrowers' incentive to become "over-indebted" by drawing credit simultaneously from many banks without any of them realizing. This chapter provides a brief account of models that capture these four effects of information sharing on credit market performance, as well as of the growing body of empirical studies that have attempted to investigate the various dimensions and effects of credit reporting activity.

One of the insights from the literature is that the design of the mechanism used to share credit information matter at least as much as the decision to set up an information sharing mechanism. The theoretical insights of the literature help to identify key issues in the design of credit information systems: the relationship between public and private mechanisms, the dosage between negative and positive information sharing, the "memory" of the system, and several others. This can provide guidance about possible pitfalls in the design of credit information systems, which are of particular relevance to developing countries, where such systems are often still being engineered.

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Appendix. Definition of variables used in Tables 1 and 2

Bank Lending	Claims of banks on private sector, 1994-95 average. Source: <i>International Financial Statistics</i> (line 32d).
Credit Risk	The index is based on the International Country Risk Guide Financial Indicator (ICRGF) and refers to October 1995. The index is constructed on the basis of a survey of leading international bankers, who are asked to rate each country on a scale of 0 to 10 each of the following 5 risks: default or unfavorable loan restructuring, delayed payment of suppliers' credits, repudiation of contracts by governments, losses from exchange controls, expropriation of private investments. The original index scales from 0 to 50 (maximum creditworthiness). We define Credit Risk as 50 minus the original index, so that 50 represents maximum risk. Source: Erb et al. (1996), Table 4, Series ICRGF.
Creditor Rights	An index aggregating creditor rights. The index aggregates various rights that secured creditors might have in bankruptcy, liquidation and reorganization. Restrictions on the managers' ability to seek unilateral protection from creditors, mandatory dismissal of management in reorganizations, lack of automatic stay on assets, and absolute priority for secured creditors all contribute to this index. The index ranges from 0 to 4. Source: La Porta et al. (1997).
Log GDP	Logarithm of the gross domestic product in 1992-93. Gross Domestic Product is expressed in 1990 million dollars. Source: <i>International Financial Statistics</i> , line 99b for GDP and <i>aa</i> for exchange rates.
GDP growth	Average annual percent growth of per capita gross domestic product, for the period 1970-1993. . Source: <i>International Financial Statistics</i> .
Legal Origin	Identifies the legal origin (English, German, French, Scandinavian) of the company law or commercial code of each country. Source: La Porta et al. (1997).
Rule of Law	Assessment of the law-and-order tradition in the country. Average of the 1982-95 period. Scale from 0 to 10 with lower scores for less tradition of law and order. Source: La Porta et al. (1997).

Figure 1. Credit reporting around the world

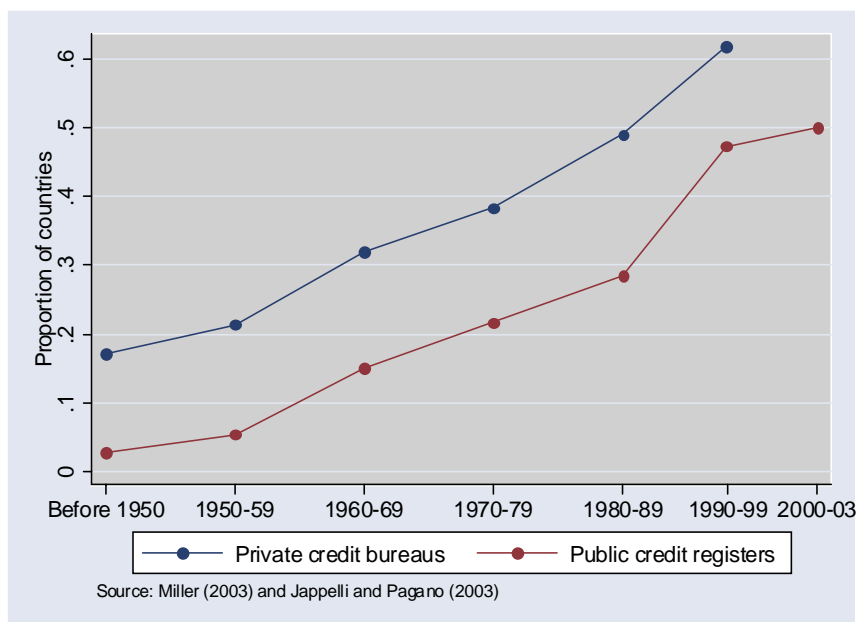
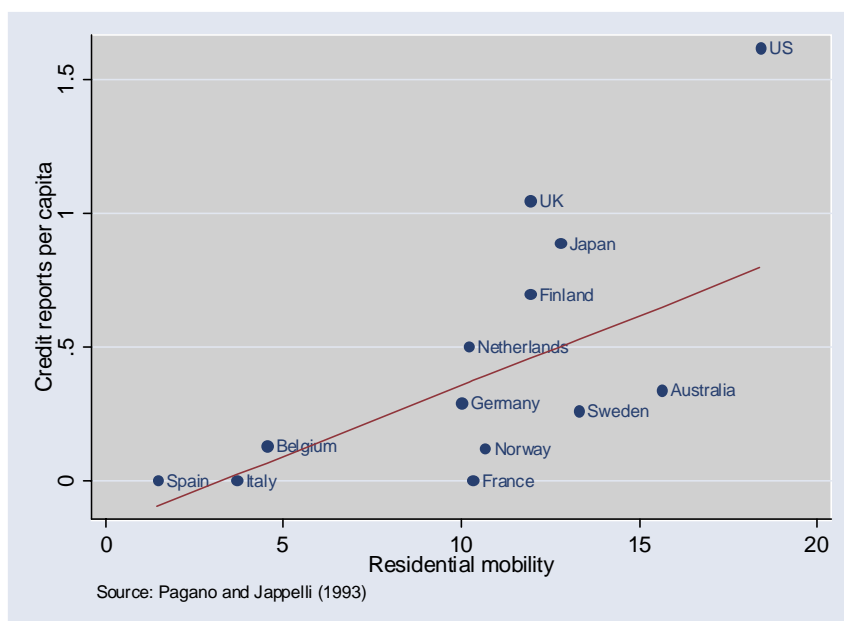


Figure 2. Credit reporting and borrowers' mobility



Note. The number of credit reports refers to 1989 for the United States, the United Kingdom, Germany, France and Spain, to 1988 for Japan, and to 1990 for all other countries. Private consumption is drawn from the OECD National Accounts. Residential mobility is the household's probability of changing residence in a year.

Table 1. Effect of information sharing on Bank Lending / GDP and on Credit Risk

<i>Variable</i>	<i>Bank Lending / GDP</i>		<i>Credit Risk</i>	
	<i>OLS</i>	<i>Robust</i>	<i>OLS</i>	<i>Robust</i>
GDP Growth Rate	2.17 (0.62)	-1.19 (-0.68)	-0.56 (-1.97)	-0.61 (-2.06)
Log GDP	2.23 (0.61)	5.34 (2.00)	-0.34 (-0.74)	-0.21 (-0.43)
Rule of Law	7.72 (3.64)	4.87 (2.89)	-1.67 (-4.74)	-1.71 (-5.45)
Creditor Rights	5.27 (1.07)	9.96 (3.23)	-0.09 (-0.17)	-0.09 (-0.17)
French Origin	-7.01 (-0.65)	2.46 (0.31)	0.90 (0.73)	1.04 (0.70)
German Origin	26.67 (1.24)	14.66 (1.42)	-2.76 (-2.32)	-2.46 (-1.41)
Scandinavian Origin	-44.46 (-3.18)	-29.22 (-2.59)	2.19 (1.42)	2.23 (1.18)
Negative Information Only	29.38 (1.82)	36.46 (3.50)	-4.54 (-2.15)	-3.78 (-1.89)
Positive and Negative Information	15.65 (1.43)	27.23 (2.92)	-2.40 (-1.37)	-2.22 (-1.23)
Constant	-42.65 (-1.22)	-60.64 (-2.96)	27.51 (8.90)	26.49 (7.09)
Adjusted R square	0.67	-.	0.84	-.
Number of countries	40	40	35	35

Note. This table is based on Jappelli and Pagano (2003). Negative Information Only is 1 if prior to 1994 private credit bureaus and/or PCRs exchange black information, and 0 otherwise. Negative and Positive Information is 1 if prior to 1994 credit bureaus or PCRs exchange black and white information. See the Appendix for sources and definition of the other variables. T-statistics are reported in parentheses. White-corrected standard errors are used in the OLS estimates.

Table .2. Determinants of the Presence of Public Credit Registers

<i>Variable</i>	<i>Probit</i>	<i>Tobit</i>
Creditor Rights	-0.07 (-0.81)	2,204.75 (0.95)
Rule of Law	-0.01 (-0.09)	361.37 (0.36)
Pre-existence of a Private Credit Bureau	-0.41 (-2.04)	13,169.54 (2.13)
French Origin	0.49 (3.35)	-11,998.97 (-1.65)
German Origin	0.566 (1.77)	-15,803.28 (-1.72)
Scandinavian Origin	0.476 (1.16)	-10,200.36 (-0.96)
Number of countries	43	41

Note. This table is based on Jappelli and Pagano (2003). Countries are divided according to the presence of public credit registers. Presence of a PCR is 1 if the register is operating in 1998, 0 otherwise. Pre-existence of a Private Credit Bureau is 1 if at least one private credit bureau was in operation before the establishment of the PCR, 0 otherwise. See the Appendix for sources and definition of the other variables. In the Probit regression the dependent variable is the presence of a PCR prior to 1998 and the coefficients indicate the effect of the variable on the probability of establishment of a PCR. In the Tobit regression the dependent variable is the PCR minimum reporting threshold. T-statistics are reported in parentheses.