*Red de Centros de Investigación*
*Banco Interamericano de Desarrollo (BID)*
*Documento de Trabajo R-371*

# Information Sharing in Credit Markets: International Evidence

**Tullio Jappelli and Marco Pagano**

June 1999

## Abstract

Theory predicts that information sharing among lenders attenuates adverse selection and moral hazard, and can therefore increase lending and reduce default rates. We construct a new international data set on credit bureaus and public credit registers. The theoretical predictions are broadly consistent with our data. We also study why central banks often supplement private arrangements by creating public credit registers and distribution of information about borrowers' credit histories. Public intervention is more likely where creditor rights are poorly protected and private arrangements have not arisen spontaneously.

**Keywords**: information sharing, credit markets, default rate.

Tullio Jappelli, Professor of Economics, CSEF (University of Salerno) and CEPR
e-mail: jappelli@synapsis.it

Marco Pagano, Professor of Economics, CSEF (University of Salerno) and CEPR
e-mail: pagano@synapsis.it

**Acknowledgements**: We thank Andrew Powell and Robert Townsend for their comments. Margaret Miller, Joe Pegues, Gennaro Scarfiglieri, Flavia Terribile, and Ignazio Visco provided precious help in gathering data, and Lia Ambrosio excellent research assistance.

# Information Sharing in Credit Markets: International Evidence

**Tullio Jappelli and Marco Pagano**

## Table of contents



## List of tables



## List of figures

## 1. Introduction

A large body of literature shows that asymmetric information between borrowers and lenders can prevent the efficient allocation of credit. Lenders are often unable to observe the characteristics of borrowers, including the riskiness of their investment projects, and this induces adverse selection problems. Lenders may also be unable to control the actions that borrowers take after receiving a loan. A borrower may relax his effort to prevent default or hide the proceeds of his investment to keep from having to repay his debts. Even a solvent borrower may try to avoid repayment if the lender cannot observe or sanction his actions. The consequence is that lenders may ration credit or charge high borrowing rates.

It is often assumed that the only way lenders can overcome these informational problems is to produce information about their customers via screening and monitoring. For instance, they can interview applicants, visit their business before and after granting the loan, and gather information from public records. If lenders operate on a large scale, these data can be used for statistical risk management to grant and price loans on the basis of past performance.

Most of the literature neglects exchange of information with other lenders as an alternative way to learn about one's own customers. This exchange can be voluntary or imposed by regulation. When it occurs spontaneously, it is effected by information brokers, known as «credit bureaus», which operate on the principle of reciprocity, collecting, filing and distributing the information supplied voluntarily by their members. In many countries a great deal of informational exchange also occurs via «public credit registers». These are generally managed by central banks, with compulsory reporting of data on borrowers which are then processed and returned to the lenders.

Such exchange of information raises three interesting issues. The first is the effect on credit market performance. Should we expect the existence of credit bureaus or public credit registers to increase lending activity? Do they increase debtors' willingness to repay, thus reducing defaults? Are they ultimately beneficial to economic activity and welfare?

The second issue relates to the very creation of credit bureaus. It is not obvious why lenders should be willing to divulge valuable information to their competitors, even in exchange for the latter's own data. Understanding the incentives to exchange information also explains why credit bureaus operate in some countries but not in others, and why they appeared in some countries in the last century and in others are only now starting to operate.

A final issue is the role of government. It is unclear whether the market can be relied upon to produce the «right» amount and type of information sharing among lenders. For instance, if credit bureaus arise spontaneously, is there any reason why the government should limit their activities, such as to safeguard privacy? If instead credit bureaus do not arise, should governments promote the exchange of information among lenders?

We explore these issues using a new data set, expressly collected via questionnaires directed to private credit bureaus and central banks. In Sections 2 and 3, we document that borrower coverage and the type of data exchanged vary considerably over time and between countries. Lenders commonly exchange data about past defaults or arrears. Sometimes they also share data about customers' outstanding liabilities, maturities, and details about borrowers' credit history.

Our database supplies evidence on each of the foregoing issues. In Section 4 we analyze the effect of information sharing on lending activity and default rates. We test whether consumer credit is related to the number of years for which credit bureaus have been in operation or the type of information shared. A special focus on consumer credit is warranted because credit bureaus have always been very active in this market segment. We

also test whether total private lending, non-performing loans and loan loss provisions are related to indicators of private and public information sharing.

The emergence of information sharing arrangements is analyzed in Section 5. We discuss how borrowers' mobility, potential loan demand, banking competition and privacy laws affect the existence and the activity of credit bureaus.

In Section 6, the information on the presence of public credit registers around the world is used to analyze regulators' motivations for obliging lenders to engage in information sharing. We inquire whether public credit registers tend to be created in countries where credit markets are plagued by severe information problems, due to poor protection of creditor rights. We also test whether policy makers are more likely to start central credit registers where private credit bureaus have not arisen. Section 7 summarizes our main findings.

## 2. Private Information Sharing Arrangements

In a number of countries, lenders (banks, finance companies, credit card companies, retailers, suppliers extending trade credit) routinely share information on the creditworthiness of their borrowers through credit bureaus, information brokers that in some cases are set up and owned by the lenders themselves and in others operated independently for profit by a third party. Lenders supply the bureau with data about their customers. The bureau collates this information with data from other sources (courts, public registers, tax authorities, etc.) and compiles a file on each borrower. The lenders that have contributed data can later obtain a return flow of consolidated data about a credit applicant by requesting a «credit report» from the bureau. Nowadays this two-way flow of data between lenders and the bureau is effected electronically.

It is the exchange of information between lenders that distinguishes a credit bureau from other agencies that collect and process valuable information from public sources and private investigators. Credit bureaus often do collect and process such data, but this is not their distinguishing characteristic.

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.[1] Most credit grantors do supply their information regularly, particularly those that have accounts receivable on tape.

[1] There are exceptions, however. At one time, American Express declined to share its information with the credit bureaus, but because it was willing to buy reports in large quantities, the bureaus kept on selling reports to that firm. This situation later changed and American Express now provides data on its own customers.

## Figure 1: A Standard Credit Report on an Individual

Source: Credit Reference Association of Australia Limited

FILE NUMBER – 64610042 REF 3664-3186

HARRISON,THOMAS,RONALD,M,M,KRISTINA
SUBJECT BORN – 100850,LIC NO-2421PS
SPOUSE BORN – 250164
EMPLOYMENT – SERVICEMAN,GAZEBO WHOLESALERS PL
ADDRESS – 35,LAND,BONNYRIGG,NSW
PREVIOUS – 48,GERORGE,DANDENONG,VIC

**DIRECTORSHIP DETAILS**

DATE
130886 MRT – GEZEBO WHOLESALERS PL (IN LIQ.) CC-64608113

**MEMBER DEFAULT REPORTS**

| DATE | NAME | AC | AMNT | DF | REF. NO. | DTR PAID |
|---|---|---|---|---|---|---|
| 140388 | STANDARD CHART LOSS REC NSW | L | 5431 | PD | LLR0040LS | MRT |
| 040687 | AGC FIVE DK NSW | L | 7314 | R | L1070515135 | MRT |
| 260186 | ESANDA ADMIN SYD NSW | RM | 6448 | RL | 241174159 | T&K |

**JUDGEMENTS**

| DATE | NAME | AMNT | DF | PLAINT. NO. | DTR PAID |
|---|---|---|---|---|---|
| 150487 | | 9037 | DJ | 15648/86/METN | MRT |

NOTE: ALLEGED DEBT(S) MAY HAVE BEEN PAID SINCE RECORDED, OR ARE POSSIBLY DISPUTED. CHECK WITH CREDITORS FOR CONFIRMATION.

**CREDIT ENQUIRIES**

| DATE | NAME | AC | AMNT | DTR | REFERENCE NUMBER |
|---|---|---|---|---|---|
| 140688 | CITYCORP FIN HURTSVILLE NSW. | L | 8727 | T&K | |
| 131287 | AGC FIVE DOCKK NSW | L | 8700 | T&K | |
| 231087 | JAOHN'S MOTOR NSW | HM | 7000 | T&K | |
| 111186 | WESTPAC WESTERN NSW | CC | 0 | MRT | |
| 221185 | ITICORP FIN SYDNEY NSW | L | 1717 | MRT | |
| 150685 | PERMANENT FIN CORP NSW | HB | 15300 | MRT | |
| 310784 | AGC FIVE DOCK NSW | L | 18000 | MRT | |
| 230484 | ESANDA ADMIN VIC | RM | 19000 | MRT | |

**KEY TO THE INITIALS USED IN THE REPORT**

| | | | |
|---|---|---|---|
| AC | - ACCOUNT TYPE | L | - LEASE ACCOUNT |
| M | - MONTHLY ACCOUNT | HM | - HIRE PURCHASE MOTOR VEHICLE |
| T | - TERMS ACCOUNT | RM | - REAL ESTATE MORTGAGE |
| HB | - HIRE PURCHASE BOAT | CC | - CREDIT CARD |
| AMNT | - AMOUNT OWING OR APPLIED FOR | DF | - REASON FOR REPORTING |
| PD | - REGULAR PAYMENT DEFAULT | R | - REPOSSESSION |
| RL | - REPOSSESION LOSS | DJ | - DISTRICT COURT JUDGEMENT |
| LA | - LEGAL ACTION | DTR | - WHO IS THE DEBTOR |
| MRT | - DEBTOR IS MR. T. HARRISON | T&K | - DEBTOR IS THOMAS AND KRISTINA |

## Figure 2: A standard credit report on a company

Source: Credit Reference Association of Australia Limited

FILE NUMBER – 6261150

BRANDY WHOLESALERS P/L
REG OFFICE –3,SMITH,PENRITH,NSW

**INCORPORATION DETAILS**

| DATE INCORP | REGISTRATION NUMBER | STATE REGISTERED |
|---|---|---|
| 180285 | 234322-78 | NSW |

**CORPORATE AFFAIRS SEARCH**

| DATE | DATE LAS RETURN | SHARED ISSUE | PAID CAPITAL |
|---|---|---|---|
| 130688 | 101286 | 1,000,000 | $840,000 |

**DIRECTORSHIP DETAILS**

| DATE | | FILE NUMBER |
|---|---|---|
| 100688 | THOMAS GARDNER | CN-26579545 |
| 100688 | SAMUEL HARVEY | CN-88502222 |

NOTE: DIRECTOHIP DETAILS WERE OBTAINED FROM CORPORATE AFFAIRS COMM. RECORDS

**MAJOR SHAREHOLDERS**

| DATE | NAME | SHARES HELD |
|---|---|---|
| 100688 | CAROLINE NOMINEES P/L | 385,000 |
| 100688 | THOMAS GARDNER AN ASOCIATES P/L | 422,000 |
| 100688 | SAMUEL HARVEY | 28,000 |

**SECRETARY**

| DATE | NAME |
|---|---|
| 100688 | JOHN CAMPBELL |

**MEMBER DEFAULT REPORTS**

| DATE | NAME | AC | AMNT | DF | REFERENCE NO. | PAID |
|---|---|---|---|---|---|---|
| 020787 | AGC COMMERCIAL LEASE | L | 6000 | LA | 45903 | 1186P |

NOTE: ALLEGED DEBT(S) MAY HAVE BEEN PAID SINCE RECORDED, OR ARE POSSIBLY DISPUTED. CHECK WITH CREDITORS FOR CONFIRMATION.

**SECURITIES**

| DATE | CREDITORS | TYPE | AMT | SECURITY | REFERENCE |
|---|---|---|---|---|---|
| 100188 | STATE BANK OF NSW | RM | 387900 | LAND PENRITH | 323425362 |

**CREDIT ENQUIRIES**

| DATE | NAME | AC | AMNT |
|---|---|---|---|
| 130488 | CORPORATE LEASING SERV NSW | L | 185000 |
| 180787 | J.B.C. IMPORT AGENCY VIC | M | 20000 |

**KEY TO THE INITIALS USED IN THE REPORT**

| | | | |
|---|---|---|---|
| AC | - ACCOUNT TYPE | L | - LEASE ACCOUNT |
| M | - MONTHLY ACCOUNT | DF | - REASON FOR REPORTING |
| RM | - REAL ESTATE MORTGAGE | LA | - LEGAL ACTION |
| AMNT | - AMOUNT OWING OR APPLIED FOR | | |

Around the world, arrangements of this type are found both in the household credit market and in business lending, in varying degrees and with different institutional features. These are described and documented below.

## 2.1 Consumer Credit and Small Business Loans

The consumer credit market and also that for small business loans are characterized by a large number of applicants whose desired loan size is not large enough to warrant individual assessment. In these markets, screening can benefit greatly from statistical analysis of applicants' characteristics and credit histories as predictors of repayment, and such analysis is feasible precisely because of the large number of standard loans. Credit bureaus, which pool data from many lenders and for several years, own the ideal database for estimating statistical models of risk management, which explains why credit bureaus have generally originated precisely in the consumer credit market. They are now increasingly active in the small business and trade credit markets as well.

A credit bureau can issue several kinds of credit report, depending on the information gathered, the type of credit application (consumer credit, house mortgage, small business loan, etc.) and, most importantly, the amount of detail requested by the lender. Reports range from simple statements of past defaults or arrears – «black» or «negative» data – to detailed reports on the applicant's assets and liabilities, guarantees, debt maturity structure, pattern of repayments, employment and family history – «white» or «positive» data. Naturally the price of a credit report depends on the amount of detail. Prices for basic credit reports are currently quite low, averaging about 1 dollar in the United States and the United Kingdom, 2 dollars in Italy, and more than 3 dollars for local credit bureaus in Argentina.

Figures 1 and 2 give examples of the most basic type of credit report, reproduced from a publication of the largest credit bureau in Australia, which only collects and reports negative information. Figure 1 shows an individual credit file for a person with several credit problems: three members of the bureau reported default, there was a debt judgment, and he appears as director of a failed company. The bottom part of the report shows previous queries to the bureau by various lenders. Figure 2 refers to a small company. It shows the main shareholders and directors, with cross references to the individual files that the bureaus has recorded in their names. The company has been reported as insolvent by a bureau member and has pledged a security over its assets to a bank.

The more sophisticated credit bureaus also use statistical models to produce and sell «credit scoring» services, by which they rate borrowers according to characteristics and credit history. Such scores were initially developed by credit grantors mainly for deciding on 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.

To gather more information about their operations around the world, we sent a questionnaire (reported in the Appendix) to credit bureaus in 49 countries.[2] We have received responses from credit bureaus in 33 countries; for 3 more, we obtained data from other sources (Internet sites, published information, etc.). The data obtained are reported in Table 1, which displays, by country, the year in which credit bureaus were first established, the type of information exchanged (black or white), the number of borrowers covered, the number of credit reports issued by credit bureaus, and the size of the consumer credit market in 1980.

[2] The list of countries is given in Tables 1 and 2 and is the same as in La Porta et al. (1997). This choice is dictated by the need to merge our data on information sharing with data on other institutional determinants of lending and default.

## Table 1. Private Credit Bureaus around the World

Figures about credit bureaus are based on a questionnaire sent to the main credit bureaus in each country, whose names are not reported for reasons of confidentiality. When two or more credit bureaus responded for the same country, the information was merged as follows. The starting date refers to the oldest credit bureau in the country. In France, Greece, Israel, Jordan, Singapore and Sri Lanka no credit bureau is reported to operate as of April 1998. The type of information shared refers to the 1990s and is defined as «black» (B) if it refers to defaults and arrears, and «white» (W) if it also includes other information, such as debt exposure. Coverage refers to the number of households (and firms, for Argentina and Chile) for which the largest credit bureaus interviewed in that country have data. This approximately measures the coverage of the whole industry in the country, either because the credit bureau interviewed is the dominant one or because the coverage of the main national credit bureaus tends to coincide (as in the case of Trans Union, Equifax and Experian in the US). [The Philippines is an exception, as we are aware of larger credit bureaus for which we lack data at the moment]. Credit reports are the number of credit reports issued by all the credit bureaus in the country (if available); otherwise, by the credit bureaus responding in that country. Definition and sources for consumer credit and net national product (NNP) are reported in the Appendix.

| **Country** | **Credit Bureau Starting Date** | **Type of Information Shared** | **Coverage, Level / Percent of Population (year)** | **Credit Reports, Level / Percent of Population (year)** | **Consumer Credit, Percent of NNP (1980)** |
|---|---|---|---|---|---|
| Argentina | 1950s | B-W | 20.0 / 57.6 (1997) | 1.2 / 3.4 (1997) | |
| Australia | 1930s | B | 16.7 / 98.0 (1990) | 5.8 / 34.0 (1990) | 7.7 |
| Austria | | B-W | | | |
| Belgium | 1987 | B | 0.8 / 7.9 (1998) | 10.6 / 104.8 (1998) | 4.6 |
| Brazil | 1957 | B | 60.0 / 38.7 (1997) | 200.0 / 128.3 (1997) | |
| Canada | 1919 | B-W | | 24.0 / 82.7 (1998) | 14.4 |
| Chile | 1990 | B-W | 2.5 / 17.6 (1997) | 7.0 / 49.3 (1997) | |
| Denmark | 1971 | B | 0.2 / 4.7 (1996) | 2.6 / 50.3 (1996) | 14.9 |
| Finland | 1961 | B | 0.2 / 4.3 (1990) | 3.5 / 70.2 (1990) | 15.0 |
| France | None | | | | 2.4 |
| Germany | 1927 | B-W | 48.0 / 59.1 (1996) | 48.0 / 59.1 (1996) | 7.9 |
| Greece | None | | | | 0.1 |
| Hong Kong | 1982 | | | | |

| Country | Credit Bureaus' Starting Date | Type of Information Shared | Coverage, Level / Percent of Population (year) | Credit Reports, Level / Percent of Population (year) | Consumer Credit, Percent of NNP (1980) |
|---|---|---|---|---|---|
| Ireland | 1963 | B-W | 2.8 / 78.6 (1996) | 0.8 / 22.5 (1996) | 8.6 |
| Israel | none | | | | |
| Italy | 1990 | B-W | 9.5 / 16.6 (1997) | 2.6 / 4.6 (1996) | 2.5 |
| Japan | 1965 | B-W | 58 / 47.3 (1990) | 149 / 121.5 (1990) | 7.4 |
| Jordan | none | | | | |
| Mexico | 1997 | | | | |
| Netherlands | 1965 | B-W | 5.0 / 32.7 (1996) | 9.8 / 64.1 (1996) | 4.1 |
| Norway | 1987 | B | | 0.5 / 12 (1990) | 13.7 |
| Peru | 1993 | | | | |
| Philippines | 1990 | B | 0.2 / 0.3 (1996) | | |
| Singapore | none | | | | |
| South Africa | 1901 | B-W | | | |
| South Korea | none | | | | |
| Spain | 1990 | | | | 4.9 |
| Sri Lanka | none | | | | |
| Sweden | 1890s | B-W | 6.0 / 68.6 (1996) | 2.2 / 26.0 (1990) | 31.6 |
| Switzerland | 1945 | B-W | 0.5 / 7.6 (1997) | 1.7 / 24.1 (1997) | |
| Turkey | none | | | | |
| United Kingdom | 1960s | B-W | | 60.0 / 104.8 (1989) | 5.7 |
| Uruguay | 1950 | B | | | |
| United States | 1890s | B-W | 200.0 / 76.0 (1997) | 600.0 / 228.1 (1997) | 16.1 |

The table shows that in some countries lenders exchange a massive amount of negative and positive information in the consumer credit market: Canada, the United States, the United Kingdom, Japan, Germany, South Africa, Sweden and Switzerland have the highest number of credit reports per person, and lenders have exchanged information for decades at least and in many cases the better part of a century. Credit bureaus have also operated for several decades in Argentina, Brazil, Finland, the Netherlands, and Australia but on a smaller scale. In Italy credit bureaus are a relatively new phenomenon, but have taken on growing importance in recent years. In some Latin American and Asian countries, credit bureaus are in their infancy, either non-existent or operating on a small scale and exchanging mainly black information.

Our questionnaires also elicit qualitative information on the structure and evolution of the credit bureau industry, that is not reported in the table. In most countries there is a strong concentration. A few countries have just one large credit bureau (Australia, Germany, Argentina, Brazil, Finland, and Ireland). In the U.S., U.K., and Japan competition is limited to two or three large vendors. This process of concentration is relatively recent. Where the industry has the longest history (e.g., in the U.S.), it began with local credit bureaus, progressively merging into larger entities. This reflects economies of scale (the larger the credit bureau, the more complete and accurate its information), as well as recent advances in information technology and the elimination of barriers between local credit markets, as explained in Section 5. In the early 1990s concentration began to extend beyond national boundaries: the top three U.S. bureaus (Equifax, Experian and Trans Union) acquired national credit bureaus throughout in Latin America and in parts of Europe and Asia.

The questionnaires also gather information on ownership structure. Of the credit bureaus interviewed, [XX] are owned by private entrepreneurs, [XX] are owned by a group or association of lenders, and 2 (in Finland and Belgium) are operated or licensed by government agencies. In the U.S., Brazil and Argentina the major credit bureaus are for-profit operations owned by private entrepreneurs, although there are also several local non-profit bureaus owned by chambers of commerce or merchants' associations. In Europe and Japan credit bureaus are typically incorporated as private companies owned by a consortium of lenders, though. With the process of cross-border acquisitions of local credit bureaus, especially by the large U.S. vendors, the industry is becoming increasingly profit-oriented.

## 2.2 Corporate Loans

The information needed to assess the creditworthiness of companies is by its very nature more complex and less standardized than for households. Therefore in the case of business loans credit bureaus generally take a more active role in the production of information, collating credit market data received from lenders and suppliers together with balance sheet data and information from the company itself and from public sources about shareholders and managers. The positive component of a credit report for a company is typically much larger than for an individual, and the nature of the credit bureaus in this market segment is different. Rather than provide standard credit reports and statistical risk management, here credit bureau become rating agencies, gathering and processing information from a variety of sources, including lenders and suppliers.

This very active role in the production, processing, and marketing of information may explain why the credit agencies that treat corporate loans are typically profit-oriented businesses, not lenders' cooperative arrangements. The largest of these agencies worldwide is Dun & Bradstreet (D&B). Formed in 1933 through the merger of two credit reporting agencies (R. G. Dun & Co., formed in 1841, and the Bradstreet Company), today D&B

maintains a global database that covers 48 million businesses, 10 million of them in the United States. It provides a wide range of services, from the assessment of credit risk and suppliers' reliability to the management of credit and accounts receivables. A standard D&B business information report (available online via the Internet) contains payment history, financial condition, business history, management experience, details on lines of business, parent company and subsidiaries, public records, etc.

## 3. Public Credit Registers

All countries have public registers for real estate collateral (mortgages) to protect the seniority rights of collateralized creditors, and bankruptcy information is publicly disseminated to alert present creditors and potential new lenders.[3] These can be considered as basic forms of publicly enforced information sharing. But in several countries government authorities have taken a much more active role in fostering the exchange of information between lenders, creating formal public credit registers (PCRs), which operate in many respects like credit bureaus.

The PCRs are managed by central banks (except in Chile, Costarica and Peru, where they are operated by the banking supervisory authorities, and in Finland, where it is contracted out to a private company). Access to the PCR is granted only to authorized central bank staff (mainly for surveillance reasons and under tight confidentiality rules) and to the reporting financial institutions.[4] This creates a two-way flow of data between credit grantors and the PCR, much as in the case of private credit bureaus.

The key difference from credit bureaus is that participation in the PCR is compulsory, and its rules are not contracted, but imposed by regulation (except in Finland and Sri Lanka, where participation is voluntary). 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 (total loan exposure of each borrower, no details on individual loans). Credit bureaus are less complete in coverage but offer details on individual loans and merge credit data with other data.

Table 2 sets forth the main characteristics of PCRs around the world, based on a questionnaire submitted to 49 central banks, of which 40 have responded (for the questionnaire, see the Appendix); 17 operate a PCR and 23 do not. PCRs are common in continental Europe and Latin America, absent in Anglosaxon countries. Most have been created in the last two decades, except for Germany (1934), Italy (1964) and Mexico (1964). The newcomers are mostly located in Latin America.[5]

The table also shows that the data reported vary 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.

[3] In some countries, public registers also exist for unpaid IOUs and tax liens.

[4] In Argentina and Finland not only financial institutions but also the general public can access the PCR. In Chile the data are also made available to a private credit bureau. In Israel and Greece a database on large loans is collected for supervisory reasons only by the central bank, but this information is not made available externally.

[5] Hong Kong is currently setting up a PCR.

## Table 2. Public Credit Registers around the World

Figures about public credit registers are based on a questionnaire sent to central banks. The data reported to the register are defaulted loans (D), arrears (A), total loan exposure (L), interest rates (R), and guarantees (G). The exchange rates used to convert the minimum reporting threshold into dollars are those of September 1, 1998.

| Country | Public Credit Register's Starting Date | Number of Subjects Covered | Credit Reports Issued | Minimum Reporting Threshold (US$) | Data Reported by Participating Institutions |
|---|---|---|---|---|---|
| Argentina | 1991 | 4,000,000 | -.- | 50 | D, A, L, R, G |
| Australia | none | | | | |
| Austria | -.- | -.- | -.- | 417 | L, G, undrawn credit facilities |
| Belgium | 1985 | 360,000 households (1997), 400,000 firms (1990) | 3,550,000 for households (1997) | 223 for households, 27,950 for firms | D, A (consumer and mortgage credit only) |
| Bolivia | 1988 | 39 | 414 | 0 | D, A, L, R, G, repayments |
| Brazil | 1998 | | | | |
| Canada | none | | | | |
| Chile | 1975 | 2,500,000 | 7,000,000 | 0 | D, A, L, G, risk class, sector, type of debt, etc. |
| Colombia | 1994 | | | | |
| Denmark | none | | | | |
| Finland | 1961 | 213,000 (1991) | 3,500,000 (1990) | 0 | D, A |
| France | 1989 for households, 1984 for firms | 370,000 (1990) | 5,400,000 (1990) | 118,293 (1990) | D, A for households, L, G, undrawn credit facilities for firms |
| Germany | 1934 | 1,200,000 | 1,800,000 | 1,699,800 | L, G |
| Greece | none | | | | |
| Hong Kong | none | | | | |
| India | none | | | | |
| Ireland | none | | | | |
| Israel | none | | | | |

| Country | Public Credit Register's Starting Date | Number of Subjects Covered | Credit Reports Issued | Minimum Reporting Threshold (US$) | Data Reported by Participating Institutions |
|---|---|---|---|---|---|
| Italy | 1964 | 2,200,000 (1994), 6,536,914 (1998) | 1,400,000 (1994) | 86,010 | D, A, L, G |
| Japan | none | | | | |
| Jordan | 1966 | -.- | 14,300 | 42,065 | A, L |
| Kenya | none | | | | |
| Malaysia | | | | | |
| Mexico | 1964 | 260,000 (1997) | 129,870 (1997) | 20,111 | D, A, L, economic activity of debtor, type of credit |
| Netherlands | none | | | | |
| New Zealand | none | | | | |
| Norway | none | | | | |
| Peru | 1988 | | | | |
| Philippines | none | | | | |
| Portugal | 1977 | 2,469,120 (1998) | n.a. | 5 | D, A, L, G, undrawn credit facilities |
| Singapore | none | | | | |
| South Africa | none | | | | |
| South Korea | none | | | | |
| Spain | 1983 | 4,600,000 (1991) | 758,000 (1997) | 6,720 for residents, 336,000 for non-residents | D, A, L, G, regional, sectoral and currency risk |
| Sri Lanka | 1990 | n.a. | 102,175 (1997) | 1,493 for bad loans, 7,465 for regular loans | D, A, G |
| Sweden | none | | | | |
| Switzerland | none | | | | |
| Turkey | none | | | | |
| United Kingdom | none | | | | |
| Uruguay | 1982 | | | | |
| United States | none | | | | |
| Zimbabwe | none | | | | |

PCRs invariably specify a reporting threshold, but this varies considerably. In most of Europe, PCRs effectively collect information only on relatively large loans to businesses, but in Belgium and France they also cover consumer loans. The threshold is highest in Germany and lowest in Belgium. Clearly, the higher the threshold set by regulators, the fewer the borrowers covered and the credit reports issued, as we see in Table 2. 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.

A major emerging problem for PCRs is posed by the growing integration of national credit markets, particularly within the European Union. As of 1998, PCRs are strongly if not exclusively oriented to their respective domestic markets. For instance, Italian banks are required to report to the Italian PCR loans made by their foreign branches. But these loans are not reported to the host-country PCRs. Similarly, Italian companies can borrow abroad without being reported to the Italian PCR. The integration of capital markets thus implies that PCRs are losing the capacity to provide full, accurate and reliable information on the overall credit situation. The presumable result will be the establishment of a single European PCR or else a gradual displacement of national PCRs by the growth of private, transnational private credit bureaus. Since only eight EU countries have PCRs and even they find it difficult to agree on a common set of rules, the second outcome seems more likely.[6]

## 4. The Effect of Information Sharing on Lending and Defaults

Our recent theoretical research suggests a threefold effect of lenders' exchanging information on the credit history of borrowers. First, credit bureaus improve banks' knowledge about applicants' characteristics and permit more accurate prediction of repayment probability. This allows lenders to target and price their loans better, easing adverse selection problems. In this respect the benefit of establishing a credit bureau is greatest where each bank is confronted by a large number of customers on which it has no previous information, i.e., where borrowers are very mobile.

Second, credit bureaus reduce the informational rents that banks could otherwise extract from their customers. They tend to level the informational playing field within the credit market and force lenders to price loans more competitively. Lower interest rates increase borrowers' net return and augment their incentive to perform.

Third, credit bureaus work as a borrower discipline device: every borrower knows that if he defaults his reputation with all other potential lenders is ruined, cutting him off from credit or making it much more expensive. This mechanism also heightens borrowers' incentive to repay, reducing moral hazard.

In the adverse selection model developed by Pagano and Jappelli (1993), information sharing improves the pool of borrowers, decreases defaults and reduces interest rates. It can also lead to an expansion of lending. When banks are local monopolists, however, in some cases lending diminishes, because the exchange of information increases the banks' possibility of price discrimination between safe and risky borrowers and the increase in lending to safe borrowers does not fully compensate for the reduction in that to risky types. When credit markets are contestable, lending activity is more likely to increase: competition limits the banks' ability to extract rents from their customers, and information sharing increases banking competition.

[6] In fact, it may be already occurring: in October 1998, the main Italian credit bureau (CRIF) announced a link-up with other European credit bureaus.

Moral hazard models also imply that information sharing should reduce default rates and interest rates and increase lending, either because credit bureaus foster competition by reducing informational rents (Padilla and Pagano, 1996) or because they discipline borrowers (Padilla and Pagano, 1997). In extreme cases, information exchange may make lending feasible in markets where no credit would be extended otherwise. In these models, whenever banks choose to communicate they bring about a Pareto improvement by raising customers' welfare along with their own profits.

Padilla and Pagano (1997) point out that the disciplinary effect of credit bureaus arises only from the exchange of black information. Information about past defaults generates fear of social stigma. Sharing white information, i.e. data on borrowers' characteristics, while attenuating adverse selection effects, may actually reduce the disciplinary effect of information sharing. Therefore, the comparative benefit of sharing black and white information depends on the relative importance of moral hazard and adverse selection problems in the market.

One way to check these predictions is to relate total lending or default rates to measures of the development of credit bureaus, such as their presence, the quality of information, the population covered, the number of reports issued and the number of years they have been in operation. Performing this exercise poses several data problems. First, missing values and non-responses have limited the number of countries for which we have data on information sharing. Second, data on lending and especially defaults are hard to collect and compare internationally. Third, one must control for legal and institutional variables that are only available for a few countries.

There is also a relevant causality issue. Theoretical models show that information sharing may increase lending and reduce defaults. The same models, however, also suggest that where credit is more abundant lenders have a stronger incentive to set up a credit bureau. Econometrically, one way to go around the endogeneity of information sharing with respect to lending is to relate credit market performance to lagged measures of the quality and intensity of information sharing.[7]

We use three different data sets to test the effects of information sharing on consumer credit, on total private sector debt, and on default rates (represented by such proxies as the frequency of non-performing loans and bank loan loss provisions). In each case we are careful to relate the dependent variable to lagged measures of information sharing, so as to attenuate the problem of endogeneity.

Panel A of Table 3 reports the ratio of consumer credit to net national product (NNP) in a sample of 18 countries in 1980. The countries are divided into three groups, depending on whether in the 1970s (i) no private credit bureau existed, (ii) only black information was exchanged, or (iii) both black and white information was shared.[8] Consumer credit is about three times as large in countries where information is shared, irrespective of the type of information exchanged. However, the correlation may be spurious: information sharing is found in countries with higher GNP per capita, better law enforcement and stronger safeguards for creditor rights, variables that may well themselves be correlated with the size of the consumer credit market. To control for their effect on consumer credit, we turn to regression analysis.

[7] The alternative would be an instrumental variable approach, but this is not feasible because finding data for good instruments is difficult. As we shall see in Section 5, the only exogenous variable that theory identifies for predicting the institution of information sharing is the mobility of borrowers, which can only be measured for a handful of countries.

[8] In the case of consumer credit, and for the sample of countries that we use, PCRs do not affect lending because the thresholds used in the 1970s effectively make such information irrelevant to household borrowing.

## Table 3. Effect of Information Sharing on Consumer Credit

In panel A countries are divided according to the type of information exchanged by private credit bureaus, based on Table 1. Black Information Only is 1 if in the 1970s private credit bureaus exchanged only black information, and 0 otherwise. Black and White Information is 1 if they exchanged black and white information, 0 otherwise. See the Appendix for sources and definition of consumer credit. Consumer credit refers to 1980, except when otherwise noted in the Appendix. Rule of Law and Creditor Rights are drawn from La Porta et al. (1997). [Log GNP per capita refers to 1970 and is drawn from OECD National Accounts]. The second panel reports regressions where the dependent variable is the ratio of consumer credit to net national product (NNP). T-statistics are reported in parentheses.

### *Panel A. Descriptive Statistics*

| Variable | Total Sample | No Information Sharing | Black Information Only | Black and White Information |
|---|---|---|---|---|
| Consumer Credit / Net National Product | 9.06 | 4.24 | 12.53 | 11.97 |
| Log GNP per Capita | 6.21 | 5.15 | 6.86 | 6.89 |
| Rule of Law | 9.14 | 8.57 | 10.00 | 9.32 |
| Creditor Rights | 1.72 | 1.43 | 1.67 | 2.00 |
| | | | | |
| Number of observations | 18 | 7 | 3 | 8 |

### *Panel B. Regression results*
(dependent variable: consumer credit/NNP)

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | 0.171<br>(3.83) | | 0.202<br>(3.69) | |
| Black Information Only | | 8.290<br>(1.74) | | 4.081<br>(0.76) |
| Black and White Information | | 7.732<br>(3.57) | | 5.239<br>(1.27) |
| Log GNP per Capita | | | -3.449<br>(-1.95) | 0.486<br>(0.31) |
| Rule of Law | | | 5.649<br>(2.54) | 2.406<br>(0.89) |
| Creditor Rights | | | 0.481<br>(0.37) | -0.303<br>(-0.17) |
| Constant | 5.077<br>(2.86) | 4.243<br>(2.61) | -26.201<br>(-2.01) | -18.443<br>(-1.02) |
| R square | 0.49 | 0.27 | 0.68 | 0.42 |
| Number of observations | 17 | 18 | 17 | 18 |

The regressions reported in panel B relate the size of the consumer credit market to the number of years that credit bureaus have been in operation and to the type of information exchanged. The number of years is counted from the establishment of the earliest bureau of which we have knowledge. This variable, on the thesis that time in existence correlates with the size of the industry's data bases and the reliability of its storage and processing techniques, is intended to proxy for the quality and intensity of information sharing. The type of information exchanged is captured by two dummy variables, one for black information being exchanged, the other for both black and white information. As discussed above, black information alone may have a disciplinary effect on borrowers, but the availability of both black and white information enhances the banks' screening ability. To estimate reliable credit scoring models, both black and white information are essential.

The size of the consumer credit market is positively correlated with the number of years that credit bureaus have been in operation (column 1). For every decade, the consumer credit market increases by 1.7 percent of national income. The Black Information Only and the Black and White Information dummies also matter (column 2): Their coefficients reveal that where credit bureaus are present, consumer credit is about 8 percentage points higher. These correlations are broadly confirmed by the regression results reported in columns 3 and 4, where we also control for GNP per capita, rule of law and protection of creditor rights. The sign and magnitude of the estimated coefficients of our proxies for information sharing are not greatly affected, although in column 4 the coefficients have larger standard errors, reflecting the small size of the sample.

Next, we look at the relation between total private debt and information sharing. We expand the data set of La Porta et al. (1997), who found that good law enforcement and protection of creditor rights are positively correlated with the breadth of the credit market. They also find that the historical origins of national legal systems are associated with significant differences in lending activity: French (civil law) and Scandinavian systems are associated with a lower ratio of private debt to GNP than English (common law) and German systems. Table 4 presents evidence that, while consistent with that of La Porta et al. (1997), indicates that information sharing also helps to explain the international differences.

The data for Table 4 differ from those used in Table 3 in three important respects. First, the regressions refer to total private sector debt, not just consumer credit. Second, the proxies for information sharing refer to PCRs as well as credit bureaus. Third, the data refer to a more recent period: the dependent variable is measured as of 1994 (not 1980), and the information-sharing proxies refer to the 1990s.

Panel A of Table 4 shows that where private credit bureaus or PCRs exchange both black and white information, the size of the credit market as a percentage of GNP is much higher (75.7 per cent) than where credit bureaus are absent (47.6) or exchange black information only (45.1). The descriptive evidence in Panel A is confirmed by the first two regressions in Panel B. Column 1 shows that each decade of operation of private credit bureaus is associated with a 3.1 percentage points increase in the private debt/GNP ratio and, for PCRs, 5.0 points. None of these coefficients is precisely estimated, however, and they fail to retain statistical significance at conventional levels when additional regressors are introduced.

## Table 4. Effect of Information Sharing on Private Sector Debt

Countries are divided according to the type of information exchanged via private credit bureaus or public credit registers, based on Tables 1 and 2. Black Information Only is 1 if in the 1990s private credit bureaus and/or PCRs exchange only black information, and 0 otherwise. Black and White Information is 1 if in the 1990s credit bureaus or PCRs exchange black and white information. Debt is the sum of the bank debt of the private sector and outstanding non-financial bonds and is drawn from La Porta et al. (1997). Other data are taken from La Porta et al. (1997). See the Appendix for sources and definition of the variables. T-statistics are reported in parentheses.

### *Panel A. Descriptive Statistics*

| Variable | Total Sample | No Information Sharing | Black Information Only | Black and White Information |
|---|---|---|---|---|
| Debt / GNP (%) | 63.26 | 47.6 | 45.13 | 75.67 |
| Log GNP | 12.25 | 11.79 | 11.58 | 12.66 |
| GDP Growth Rate (%) | 3.16 | 4.62 | 2.72 | 2.96 |
| Rule of Law | 7.68 | 6.02 | 7.62 | 8.15 |
| Creditor Rights | 1.87 | 2.60 | 1.63 | 1.78 |
| French Origin | 0.43 | 0.40 | 0.38 | 0.47 |
| German Origin | 0.16 | 0.20 | 0.00 | 0.21 |
| Scandinavian Origin | 0.12 | 0.00 | 0.38 | 0.05 |
| English Origin | 0.28 | 0.40 | 0.25 | 0.26 |
| | | | | |
| Number of observations | 32 | 5 | 8 | 19 |

### *Panel B. Regression Results*

(Dependent Variable: Debt/ GNP)

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | 0.311<br>(1.89) | | | | | | |
| Number of Years Public Credit Registers Have Operated | 0.504<br>(1.32) | | | | | | |
| Black Information Only | | -2.475<br>(-0.16) | | | 9.041<br>(0.71) | 3.660<br>(0.26) | 10.215<br>(0.75) |
| Black and White Information | | 28.066<br>(2.07) | | | 24.033<br>(2.10) | 24.842<br>(2.01) | 23.471<br>(2.00) |
| GDP Growth Rate (%) | | | 4.382<br>(1.99) | 3.503<br>(1.33) | 4.058<br>(1.61) | 2.533<br>(2.83) | 3.077<br>(1.14) |
| Log GNP | | | 6.369<br>(2.23) | 9.557<br>(2.91) | 7.279<br>(2.16) | 1.662<br>(0.46) | 5.744<br>(1.52) |
| Rule of Law | | | 6.328<br>(3.87) | 4.413<br>(2.13) | 3.962<br>(2.00) | 4.182<br>(2.58) | 4.305<br>(1.81) |
| Creditor Rights | | | 4.752<br>(1.59) | 8.184<br>(2.18) | 8.838<br>(2.46) | | 6.598<br>(1.55) |
| French Origin | | | | | | -15.304<br>(-1.52) | -9.869<br>(-0.95) |
| German Origin | | | | | | 13.881<br>(0.96) | 6.812<br>(0.50) |
| Scandinavian Origin | | | | | | -14.027<br>(-0.86) | -13.266<br>(-0.88) |
| Constant | 47.763<br>(6.16) | 47.600<br>(3.96) | -87.527<br>(-2.81) | -116.334<br>(-3.17) | -103.768<br>(-2.66) | -5.524<br>(-0.14) | -74.812<br>(-1.64) |
| R square | 0.15 | 0.25 | 0.57 | 0.42 | 0.65 | 0.59 | 0.69 |
| Number of observations | 31 | 31 | 39 | 30 | 30 | 31 | 30 |

Column 2 shows that black and white information sharing increases the debt/GNP ratio by 28.1 percentage points. This coefficient is statistically significant at the 5 percent level. The remaining regressions introduce the variables used by La Porta et al. (1997). Column 3 replicates the first regression in Table 7 of their paper, using 39 observations. Our sample includes only 31 observations, due to missing data for the information-sharing variables. Column 4 shows that the results of La Porta et al. still hold in our smaller sample. Columns 5, 6 and 7 expand the three specifications reported in Table 7 of La Porta et al. with our dummies for information sharing. In all three specifications, the coefficient of the black-information-only dummy is positive but not statistically different from zero, whereas that of the black-and-white-information dummy is large and significantly different from zero at the 5 percent level. The effect of rule-of-law and creditor rights is attenuated in this expanded specification, due to their correlation with the presence of information sharing. This point will be taken up in Section 6.

Testing the theoretical prediction that information sharing will lower default rates is complicated by the unavailability of internationally comparable data. The IBCA BankScope data set on individual banks' balance sheets contains two variables that one may perhaps presume to be correlated correlated with default rates: non-performing loans and loan loss provisions. Both may be distorted by differences between national accounting procedures and prudential banking regulations. Loan loss provisions are further distorted by their discretionary nature: to a large extent, banks can decide how much to allocate to provisions in anticipation of future losses.

Panel A of Table 5 reveals that the countries where information is shared do not have appreciably lower-than-average non-performing loans or loss provisions. Panels B and C investigate whether this descriptive evidence is confirmed by regression analysis. In both panels the regressions are estimated by weighted least squares, using as weights the number of banks for which IBCA reports the dependent variable.

Column 1 of Panel B shows that a longer credit bureaus history does diminish non-performing loans. In column 2 we introduce the same controls as in Table 4, with the addition of the variable judicial efficiency, an index of the effectiveness and integrity of courts. The number of years of operation of credit bureaus retains its negative sign and is again precisely estimated. The effect of creditor rights and judicial efficiency is negative as expected and the respective coefficients are significantly different from zero at the 5 and 10 percent levels. In columns 3 and 4 we use our second measure of information sharing, i.e., the two dummies capturing the type of information exchanged. However, both these estimates have very large standard errors.

In Panel C, the dependent variable is the ratio of loan loss provisions to total lending. Here the coefficients of all the indicators of information sharing are poorly estimated. The only variables that help to predict loss provisions are judicial efficiency and rule of law, whose coefficients are both negative and significantly different from zero at the 10 percent level or less. This finding accords with the idea that default is less common where courts are efficient and citizens law-abiding.

To summarize, the results of this section indicate that the size of the consumer credit market correlates positively with the number of years of operation of credit bureaus and with the two dummies for the type of information exchanged. Also, total private sector debt is positively affected by information sharing carried out by private credit bureaus and PCRs, particularly by the exchange of white as well as black information. Defaults (i.e., their proxies) are negatively correlated with the number of years of operation of credit bureaus, but not with other proxies for information sharing. The weaker results for defaults may be due to the small size of the sample (in the case of non-performing loans) or the inadequacy of the proxy itself (especially for loss provisions).

## Table 5. Effect of Information Sharing on Non-Performing Loans and Provisions for Loan Losses

Countries are divided according to the type of information exchanged via private credit bureaus or public credit registers, based on Tables 1 and 2. Black Information Only is 1 if in the 1990s private credit bureaus and/or PCRs exchange only black information, and 0 otherwise. Black and White Information is 1 if in the 1990s credit bureaus or PCRs exchange black and white information. Non-performing loans is the ratio of total non-performing loans to total loans in each country. Loan Loss Provisions is the ratio of such provisions by banks to total loans in each country. Both variables are based on the BankScope bank-level data set produced by IBCA. The Appendix reports the data for these two variables and the number of banks used to construct country averages. Other data are taken from La Porta et al. (1997). See the Appendix for sources and definition of the variables. Regressions in Panel B are weighted by the number of banks used to compute non-performing loans in each country. Regressions in Panel C are weighted by the number of individual banks used to compute provisions for loan losses in each country. The weights used in the regressions of Panels B and C are reported in the Appendix. T-statistics are reported in parentheses.

### *Panel A. Descriptive Statistics*

| Variable | Total Sample | No Information Sharing | Black Information Only | Black and White Information |
|---|---|---|---|---|
| Non-Performing Loans / Total Loans (%) | 4.56 | 6.11 | 4.19 | 4.59 |
| Number of observations | 17 | 1 | 5 | 11 |
| | | | | |
| Loan Loss Provisions / Total Loans (%) | 1.12 | 1.27 | 1.16 | 1.07 |
| Number of observations | 30 | 4 | 8 | 18 |

### *Panel B. Regression Results*

(Dependent Variable: Non-Performing Loans)

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | -0.045<br>(-3.42) | -0.037<br>(-2.14) | | |
| Number of Years Public Credit Registers Have Operated | -0.024<br>(-0.48) | -0.034<br>(-0.50) | | |
| Black Information Only | | | -0.563<br>(-0.11) | 1.144<br>(0.29) |
| Black and White Information | | | -2.556<br>(-0.56) | 1.484<br>(0.35) |
| GDP Growth Rate (%) | | -0.377<br>(-0.38) | | 0.539<br>(0.49) |
| Log GNP | | -0.194<br>(-0.40) | | -0.558<br>(-0.96) |
| Rule of Law | | 0.626<br>(1.23) | | 1.269<br>(1.47) |
| Creditor Rights | | -1.744<br>(-2.18) | | -1.788<br>(-2.09) |
| Judicial Efficiency | | -0.901<br>(-1.86) | | -1.650<br>(-2.61) |
| Constant | 6.346<br>(5.87) | 14.214<br>(2.66) | 6.109<br>(1.35) | 13.734<br>(1.64) |
| | | | | |
| R square | 0.54 | 0.83 | 0.08 | 0.72 |
| Number of observations | 18 | 16 | 17 | 16 |

- continued

**Table 5 - continued**

***Panel C. Regression Results***
(Dependent Variable: Loan Loss Provisions)

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | -0.007<br>(-1.56) | 0.006<br>(1.24) | | |
| Number of Years Public Credit Registers Have Operated | -0.006<br>(-1.06) | -0.006<br>(-0.95) | | |
| Black Information Only | | | 0.061<br>(0.05) | 0.917<br>(1.01) |
| Black and White Information | | | -0.594<br>(-0.58) | 0.210<br>(0.22) |
| GDP Growth Rate (%) | | -0.187<br>(-1.19) | | -0.197<br>(-1.18) |
| Log GNP | | -0.021<br>(-0.15) | | 0.108<br>(0.85) |
| Rule of Law | | -0.189<br>(-1.26) | | -0.0262<br>(-1.71) |
| Creditor Rights | | -0.037<br>(-0.23) | | -0.095<br>(-0.98) |
| Judicial Efficiency | | -0.360<br>(-2.34) | | -0.259<br>(-1.89) |
| Constant | 1.409<br>(5.42) | 6.478<br>(3.91) | 1.436<br>(1.40) | 4.449<br>(2.93) |
| | | | | |
| R square | 0.15 | 0.66 | 0.07 | 0.65 |
| Number of observations | 31 | 30 | 30 | 29 |

## 5. The Rise of Information Sharing Arrangements

The theoretical models described in Section 4 deliver predictions not only about the effects of information sharing on credit market performance but also about lenders' incentives to create a credit bureau. Pagano and Jappelli (1993) show that lenders have a greater incentive to share information when the mobility of credit seekers is high and when the potential demand for loans is large. Any technical innovation that reduces the cost of filing, organizing and distributing information should foster credit bureaus' activity. Banking competition, by contrast, might inhibit the appearance of credit bureaus: with free entry, a bank that supplies information about its customers to a credit bureau is in effect helping other lenders to compete more aggressively. This reduces the expected gain from information sharing and could deter the creation of a credit bureau.

Some of these predictions can be tested using international data in the context of the consumer credit market. In Table 1 we update the proxy for the activity of credit bureaus used in Pagano and Jappelli (1993), i.e. the number of credit reports per capita. Figure 3 plots this variable against household residential mobility (a proxy for the mobility of borrowers between banks), showing that countries where residential mobility was highest in the '80s, such as Sweden, Australia and the United States, featured more active credit bureaus in the '90s, whereas in countries with scanty mobility, such as Italy, there is only limited exchange of information among banks. Figure 4 shows that in 1980 consumer credit is not associated with the subsequent intensity of information sharing, as measured by the number of credit reports per capita in the '90s.

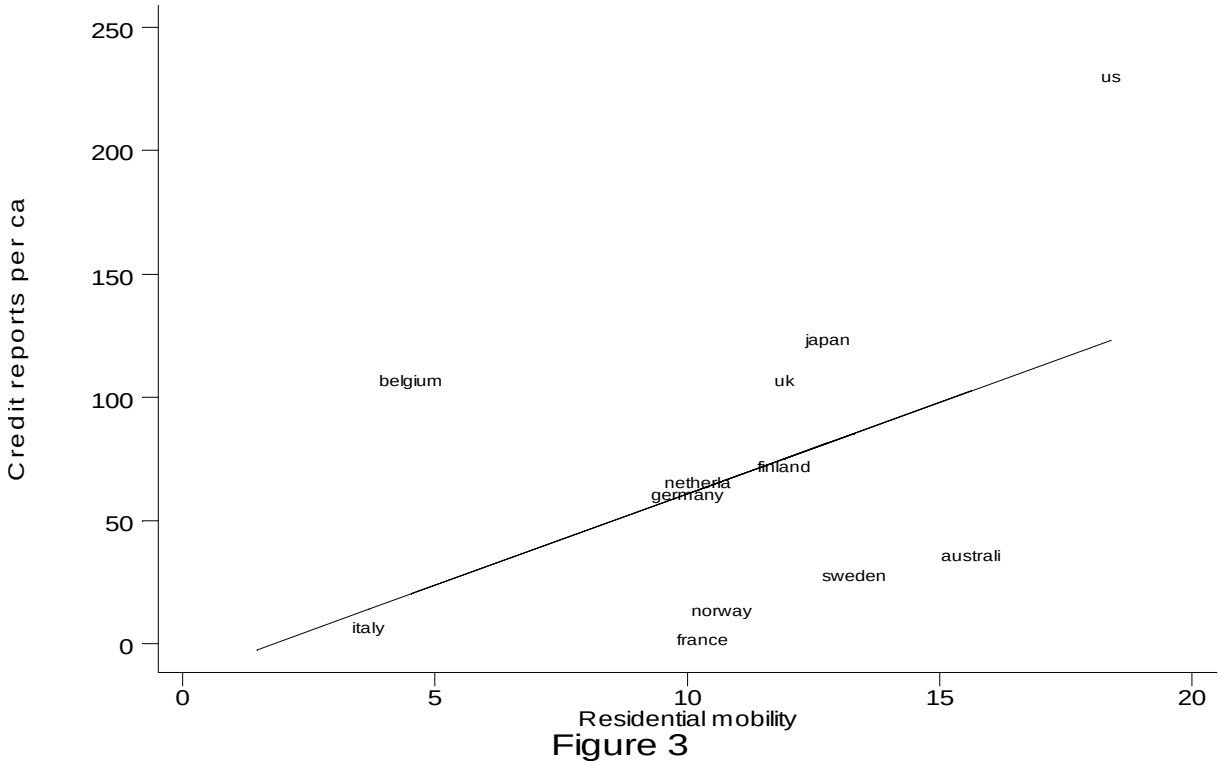


**Figure 3. Credit Reports and Residential Mobility**

Credit reports per capita is the number of credit reports issued by credit bureaus divided by total population, drawn from Table 1. Residential Mobility is the household's probability of changing residence in a year, drawn from Pagano and Jappelli (1993), Table 1, column 6. Both variables are displayed in percentage form.

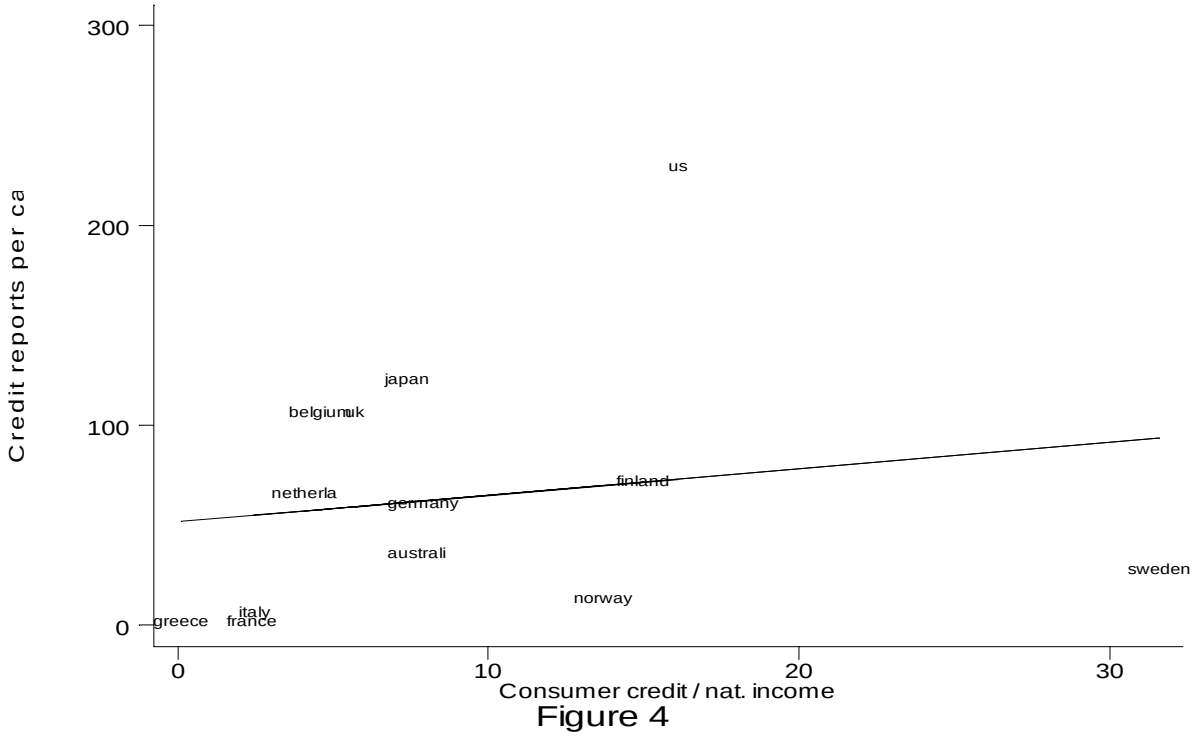


**Figure 4. Credit Reports and Consumer Credit**

Credit Reports is the number of credit reports issued by credit bureaus divided by total population. Consumer Credit is the ratio of consumer credit to national income in 1980. Both variables are drawn from Table 1 and are displayed in percentage form.

If lagged credit market size is considered as a proxy for potential loan demand, non-correlation with credit bureaus' activity clashes with the theory.[9] However, international comparisons fail to convey all the information that can be gleaned from the detailed history of specific countries. In the United States, for instance, R. G. Dun & Co. and the Bradstreet Company were founded in the wake of the credit boom of the early 19th century. Their function was originally to help merchants cope with the ensuing wave of bankruptcies, triggered by stricter collateral rules. Similarly, the modern take-off of U.S. credit bureaus came in the 1920s, with the explosion of instalment credit for consumer durables. More recently, Japan, Italy and Spain have witnessed the emergence of private credit bureaus following substantial expansion of the consumer credit market, invariably accompanied by a surge in defaults. It is reasonable to imagine the same sequence of events in many less developed countries (especially in Latin America) in the past few years, credit bureaus being established after ballooning consumer credit and waves of defaults.

Fear of competition may also inhibit information sharing. When lenders agree to supply data to a credit bureau they lose the monopoly power attached to exclusive customer information, unless they are well protected by other barriers to entry. So lenders' incentives to pool information are greatest when local credit markets are segmented by regulation.

The history of credit bureaus in the United States supports this argument. The rules on branching traditionally limited competition between banks in different states, and as early as the 1920s lenders extensively shared black as well as white information. Conversely, in the United Kingdom, where banks are free to compete nationwide, information sharing developed later and on a smaller scale. British banks were reluctant to share information with finance companies, whose customers are more concentrated geographically. Similarly, in Italy large banks with nationwide coverage were initially hesitant to join CRIF, Italy's main credit bureau at present. CRIF was established in 1990 by small and medium-sized banks in Emilia-Romagna and the Northeast, which had little to fear from one another's competition due to their highly localized market. Later, nationwide banks began to join, estimating that the benefits of membership would outweigh the cost of heightened competition.

A further element that has historically affected the development of credit bureaus is the degree of privacy protection accorded prospective borrowers. The activities of credit bureaus are regulated almost everywhere so as to prevent violation of privacy and civil liberties. Privacy laws actually contemplate 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 (7 years in the United States, 5 in Australia), bans on gathering certain kinds of information (race, religion, political views, etc.) and right to access, check and correct one's own file.

As far as access limits are concerned, there appear to be three levels of privacy protection. The replies to our questionnaire indicate that there are low-protection countries, such as Argentina, where anyone can access all debtors' data regardless of the purpose of investigation. In such 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». One of the countries with the strongest safeguards for consumer privacy is France, where regulation is so strict as to have impeded the emergence of private credit bureaus.

[9] But it does not conflict with the positive correlation between the development of consumer credit and lagged information sharing, documented in Table 3 and discussed in Section 4.

A final element bearing on the development of credit bureaus is the degree of protection of creditor rights. Where the legal and judicial systems give poor protection to creditors, debtors may be tempted to default on their obligations even when they have the means to repay. As we argue in Section 4, credit bureaus can be a remedy to moral hazard in credit relations, by creating a private disciplinary system in place of defective public sanctions. Panel A of Table 4 reports that in countries where there is no information sharing (private or public) the index of creditor rights is 2.60, in countries where there is only black information sharing it is 1.63 and where both black and white information is shared it is 1.78.[10] Thus, the theoretical prediction that information sharing correlates negatively with creditor protection appears consistent with the data.

## 6. Why Should Government Intervene? Normative and Positive Aspects of PCRs

Table 2 shows that in many countries government authorities have established a public credit register, almost always before credit bureaus emerge spontaneously. It is worth asking what the motivations for such extensive policy intervention are. At a normative level, we should try to establish whether it is socially desirable to create a public credit register when no private one emerges. This depends on the particular model of the credit market one adopts.

In models with moral hazard, such as Padilla and Pagano (1996, 1997), the presence of credit bureaus generally increases borrowers' incentives to repay, and if appropriately designed they can lead to a welfare gain (i.e., borrowers' effort to perform is closer to the socially optimum level). Therefore, if credit bureaus fail to arise spontaneously (say, because of coordination problems), one can make a case for the creation of a PCR, viewed as a policy instrument to protect creditors and discipline borrowers. This disciplinary role can be expected to be particularly important where creditors' rights are otherwise poorly protected and enforced.

In models with adverse selection, such as Pagano and Jappelli (1993), information sharing increases the screening ability of banks. If banks have monopoly power (from sources other than privileged information), a credit bureau increases their profits and the welfare of safe borrowers but reduces the welfare of risky borrowers, so it does not lead to a Pareto improvement. If there is competition between banks, the gains from information sharing are rebated back to their customers, reducing the incentive to establish a credit bureau and thus perhaps leaving information sharing up to public intervention.

Promoting stability and competition in the banking system may also constitute motivations for establishing a PCR. Like a private credit bureau, a PCR helps banks to analyze risks, enhance loan quality and improve pricing and allocation. This can ultimately increase the stability of the banking system. A useful byproduct is the creation of a database that the authorities can use to monitor the allocation of loans and to support prudential supervision. Finally, as we argue in Section 4, information sharing tends to promote competition, so a PCR may be regarded as an antitrust device. It may also provide competition for private credit bureaus, forcing them to price their services aggressively, provide supplementary services not supplied by the PCR, and raise the standards of their information collection and distribution.

[10] A similar pattern of creditor rights emerges also for private information sharing alone.

## Table 5. Effect of Information Sharing on Non-Performing Loans and Provisions for Loan Losses

Countries are divided according to the type of information exchanged via private credit bureaus or public credit registers, based on Tables 1 and 2. Black Information Only is 1 if in the 1990s private credit bureaus and/or PCRs exchange only black information, and 0 otherwise. Black and White Information is 1 if in the 1990s credit bureaus or PCRs exchange black and white information. Non-performing loans is the ratio of total non-performing loans to total loans in each country. Loan Loss Provisions is the ratio of such provisions by banks to total loans in each country. Both variables are based on the BankScope bank-level data set produced by IBCA. The Appendix reports the data for these two variables and the number of banks used to construct country averages. Other data are taken from La Porta et al. (1997). See the Appendix for sources and definition of the variables. Regressions in Panel B are weighted by the number of banks used to compute non-performing loans in each country. Regressions in Panel C are weighted by the number of individual banks used to compute provisions for loan losses in each country. The weights used in the regressions of Panels B and C are reported in the Appendix. T-statistics are reported in parentheses.

### *Panel A. Descriptive Statistics*

| Variable | Total Sample | No Information Sharing | Black Information Only | Black and White Information |
|---|---|---|---|---|
| Non-Performing Loans / Total Loans (%) | 4.56 | 6.11 | 4.19 | 4.59 |
| Number of observations | 17 | 1 | 5 | 11 |
| | | | | |
| Loan Loss Provisions / Total Loans (%) | 1.12 | 1.27 | 1.16 | 1.07 |
| Number of observations | 30 | 4 | 8 | 18 |

### *Panel B. Regression Results*

(Dependent Variable: Non-Performing Loans)

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | -0.045<br>(-3.42) | -0.037<br>(-2.14) | | |
| Number of Years Public Credit Registers Have Operated | -0.024<br>(-0.48) | -0.034<br>(-0.50) | | |
| Black Information Only | | | -0.563<br>(-0.11) | 1.144<br>(0.29) |
| Black and White Information | | | -2.556<br>(-0.56) | 1.484<br>(0.35) |
| GDP Growth Rate (%) | | -0.377<br>(-0.38) | | 0.539<br>(0.49) |
| Log GNP | | -0.194<br>(-0.40) | | -0.558<br>(-0.96) |
| Rule of Law | | 0.626<br>(1.23) | | 1.269<br>(1.47) |
| Creditor Rights | | -1.744<br>(-2.18) | | -1.788<br>(-2.09) |
| Judicial Efficiency | | -0.901<br>(-1.86) | | -1.650<br>(-2.61) |
| Constant | 6.346<br>(5.87) | 14.214<br>(2.66) | 6.109<br>(1.35) | 13.734<br>(1.64) |
| | | | | |
| R square | 0.54 | 0.83 | 0.08 | 0.72 |
| Number of observations | 18 | 16 | 17 | 16 |

- continued

**Table 5 - continued**

***Panel C. Regression Results***
(Dependent Variable: Loan Loss Provisions)

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Number of Years Credit Bureaus Have Operated | -0.007<br>(-1.56) | 0.006<br>(1.24) | | |
| Number of Years Public Credit Registers Have Operated | -0.006<br>(-1.06) | -0.006<br>(-0.95) | | |
| Black Information Only | | | 0.061<br>(0.05) | 0.917<br>(1.01) |
| Black and White Information | | | -0.594<br>(-0.58) | 0.210<br>(0.22) |
| GDP Growth Rate (%) | | -0.187<br>(-1.19) | | -0.197<br>(-1.18) |
| Log GNP | | -0.021<br>(-0.15) | | 0.108<br>(0.85) |
| Rule of Law | | -0.189<br>(-1.26) | | -0.0262<br>(-1.71) |
| Creditor Rights | | -0.037<br>(-0.23) | | -0.095<br>(-0.98) |
| Judicial Efficiency | | -0.360<br>(-2.34) | | -0.259<br>(-1.89) |
| Constant | 1.409<br>(5.42) | 6.478<br>(3.91) | 1.436<br>(1.40) | 4.449<br>(2.93) |
| | | | | |
| R square | 0.15 | 0.66 | 0.07 | 0.65 |
| Number of observations | 31 | 30 | 30 | 29 |

It would be interesting to determine which of these motivations, if any, has actually lead the creation of PCRs around the world, so as to address the positive and not only the normative aspects of government intervention in this area. In practice, only a few variables can be used to analyze this issue. First, for 40 countries we know from Table 2 whether they have a PCR as of 1998. We code this information in a dummy variable. Second, comparing Tables 1 and 2 we can see whether a private credit bureau already existed when each PCR was established. If PCRs are created to remedy the failure of private credit bureaus to arise, the pre-existence of a credit bureau should be negatively related to the presence of a PCR. Finally, the creditor rights variable constructed by La Porta at al. (1997) can be used to proxy for the intensity of moral hazard in the credit market. Presumably, creditor rights should be negatively correlated with the presence of a PCR. We will also verify whether other legal variables, such as rule of law and the legal origin dummies already used in Tables 4 and 5, play a similar role.

The correlations between these variables are displayed in Table 6. The conditional averages in Panel A show that a private credit bureau already existed in only 23 percent of the countries where there is a PCR, against 45 percent where there is none. Also, PCRs tend to be formed in countries where creditor rights are less protected (1.4 versus 2.0) and there is less respect for the law (the rule of law variable is 6.6 against 7.2). They are also more likely to be found in countries whose legal system derives from the French civil code tradition (the French-origin dummy is 0.8 against 0.4).

To test the statistical significance of these relations, we estimate probit regressions where the presence of a PCR is the dependent variable. The results, displayed in Panel B, show that the probability of the presence of a PCR is significantly and negatively related to the pre-existence of a credit bureau in all specifications. If the legal origin dummies are not introduced in the probit, the creditor-rights variable also appears with a negative and significant coefficient, as predicted by the theory. When the origin dummies are added as explanatory variables, however, the coefficient of creditor rights is small and not precisely estimated, whereas the French-origin dummy takes a large, positive and statistically significant coefficient. The reason is that creditor rights has a strong negative with French origin; that is, the countries whose legal system is rooted in the French civil code are also those that afford the weakest legal protection to creditors. Finally, the coefficient of the rule-of-law variable is negative, as predicted by the theory, but estimated with a large standard error.

In summary, the historical experience is consistent with the thesis that the establishment of PCRs has been largely motivated by the «substitution» role. First, they have often been created to make up for the lack of private credit bureaus. Where the market alone has not produced information sharing, governments have felt they had to take the initiative. Second, PCRs have been 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.

## Table 6. Determinants of the Presence of Public Credit Registers

Countries are divided according to the presence of public credit registers, based on Table 2. Presence of a PCR is 1 if in 1998 the register is operating, 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. Other data are taken from La Porta et al. (1997). See the Appendix for sources and definition of the variables. The probit coefficients in Panel B indicate the effect of the variable on the probability of establishment of a PCR. T-statistics are reported in parentheses.

### *Panel A. Descriptive Statistics*

| Variable | Total Sample | PCR Present in 1998 | PCR Absent in 1998 |
|---|---|---|---|
| Creditor Rights | 2.03 | 1.44 | 2.43 |
| Rule of Law | 7.17 | 6.64 | 7.57 |
| Pre-existence of a Private Credit Bureau | 0.45 | 0.23 | 0.61 |
| English Origin | 0.35 | 0.06 | 0.57 |
| French Origin | 0.43 | 0.76 | 0.17 |
| German Origin | 0.12 | 0.12 | 0.13 |
| Scandinavian Origin | 0.10 | 0.06 | 0.13 |
| | | | |
| Number of observations | 40 | 17 | 23 |

### *Panel B. Regression results*

(dependent variables: Presence of a Public Credit Register)

| Variable | (1) | (2) | (3) |
|---|---|---|---|
| Creditor rights | -0.200<br>(-2.52) | | -0.044<br>(-0.39) |
| Rule of law | -0.008<br>(-0.24) | -0.012<br>(-0.29) | -0.008<br>(-0.21) |
| Pre-existence of a Private Credit Bureau | -0.417<br>(-2.34) | -0.355<br>(-1.88) | -0.354<br>(-1.88) |
| French origin | | 0.732<br>(3.35) | 0.666<br>(2.24) |
| German origin | | 0.566<br>(1.77) | 0.538<br>(1.66) |
| Scandinavian origin | | 0.476<br>(1.16) | 0.408<br>(0.92) |
| | | | |
| Pseudo R square | 0.243 | 0.398 | 0.386 |
| Number of observations | 39 | 40 | 39 |

## 7. Conclusions

In many countries lenders communicate data concerning their customers' creditworthiness to one another or can access databases that help them assess credit applicants. However, the type, quality, and quantity of data available, and information-sharing mechanism, vary greatly. Often lenders agree to exchange of information spontaneously, via information brokers such as credit bureaus. In other cases they are obliged to do so by the authorities via public credit registers. The empirical literature has not contributed much to our knowledge of this phenomenon and its relevance to credit market performance. Here, we systematically document private and public information-sharing arrangements around the world and analyze their effects on the credit market as well as the reasons for their emergence. The empirical analysis builds upon a new, specially designed data set mainly collected via questionnaires.

We find that the breadth of credit markets is associated with information sharing. The consumer credit market is broader in countries where credit bureaus operate, especially if they have been active for a long time. Total private debt scaled by GNP is also larger in countries where information sharing is more solidly established and intense. These relations persist even when one controls for other economic and institutional variables, such as country size and growth rate, and variables capturing respect for law and the protection of creditor rights. We also find evidence, in accordance with the theory, that defaults are mitigated by public and private information sharing. This evidence is weak, however, perhaps owing to the poor quality of our proxies for defaults and the few degrees of freedom.

We also explore reasons for the rise of credit bureaus. Here the data suggest that the mobility of borrowers, the degree of banking competition, the stringency of privacy laws and the degree of protection of creditor rights all play a role, as suggested by the theory. The lagged size of the consumer credit market, by contrast, appears to be unrelated to the emergence of credit bureaus. If this variable is taken as a proxy for the demand for loans, this lack of correlation is not consistent with the theory. However, international comparisons fail to convey all the information that can be gleaned from the detailed history of specific countries. The historical evidence from the United States, Japan, Spain and Italy suggests that credit bureaus tend to be created in the wake of consumer credit booms.

Finally, our data throw light on the reasons for the widespread creation of public credit registers. We find that PCRs are more likely to be present where creditor rights are poorly protected and private information-sharing arrangements have not arisen.

We regard this paper no more than a first step in the empirical analysis of the effects of information sharing on credit markets. The pervasiveness and intensity of this information exchange warrants much more thorough inquiry into its effects on the lending policies of banks and the conduct of borrowers. There is still no microeconomic evidence on this issue. We also lack accounts of the impact of these arrangements in developing countries, where in many cases they are just being established. It is ironic that private credit bureaus and public credit registers know so much about us while we still know so little about them.

## 8. References

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny (1997), «Legal Determinants of External Finance,» *Journal of Finance*, July, 52(3), 1131-50.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny (1998), «Law and Finance,» NBER Working Paper No. 5661, *Journal of Political Economy*, forthcoming.

Padilla, A. Jorge and Marco Pagano (1996), «Sharing Default Information as a Borrower Discipline Device,» Industry Study Program Discussion Paper No. 73, Boston University, October.

Padilla, A. Jorge and Marco Pagano (1997), «Endogenous Communication among Lenders and Entrepreneurial Incentives,» *The Review of Financial Studies* 10, 1, Winter, 205-236.

Pagano, Marco and Tullio Jappelli (1993), «Information Sharing in Credit Markets,» *The Journal of Finance* 43(5), December, 1693-1718.

# 8. Appendix

## A1. Consumer credit and net national income: Tables 1 and 3

Unless otherwise noted: (i) consumer credit is the sum of credit extended to households by commercial banks, savings banks, finance companies and non-financial enterprises for both instalment and non-instalment loans; (ii) unless otherwise noted, the data in Table 1 refer to 1980. The source for net national income is the OECD National Accounts.

| | |
|---|---|
| Canada | OECD Historical Statistics. |
| United States | Economic Report of the President, Table C75. |
| Japan | Data provided by the Japan Information Centre Corporation. |
| Australia | Bulletin, Reserve Bank of Australia, December 1990, Table D4, p. 55. The figure reported for 1980 is the 1981 value. |
| Belgium | OECD Historical Statistics. |
| Denmark | Data supplied by Danmarks Nationalbank. The data refer to credit extended by commercial banks, savings banks and finance companies. |
| Finland | Data supplied by Suomen Pankki. |
| France | Decha, J. and P. Sicsic (1990) "Développement du crédit à la consommation et économie réelle," *Revue d'Economie Financiere,* n. 5-6, p. 213. The figures include unincorporated business. |
| Germany | OECD Historical Statistics. The figure exclude credit extended by non-financial intermediaries. |
| Greece | Monthly Statistical Bulletin, Bank of Greece, January 1990, Table 2.3, p. 41 The figures exclude credit extended by non-financial intermediaries. |
| Ireland | OECD Historical Statistics and Central Bank of Ireland, Spring 1990, Table C20. |
| Italy | Banca d'Italia, Relazione sull'anno 1989, Table D23, p. 234. |
| Netherlands | Central Bureau of Statistics. The figures exclude credit extended by non-financial intermediaries. |
| Norway | Data supplied by Norges Bank. |
| Portugal | OECD Financial Statistics Monthly. The figure reported is the 1986 value. |
| Spain | Boletìn Estadìstico, Banco de Espana, October 1990, Table V-37. The figure reported is the 1982 value. |
| Sweden | Data supplied by Sweriges Riksbank. |
| U.K. | CSO Financial Statistics, Table 9.3, various issues. |

## A2. Definition of variables from La Porta et al. (1997, 1998): Tables 3 to 6

All data are described in detail and reported in these two articles.

| | |
|---|---|
| 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. |
| Debt / GNP | Ratio of the sum of bank debt of the private sector and outstanding non-financial bonds to GNP in 1994 or last available. Source: *International Financial Statistics*, *World Bond Market Factbook*. |
| GDP growth | Average annual percent growth of per capita gross domestic product, for the period 1970-1993. Source: *World Development R*eport, 1995. |
| Log GNP | Logarithm of the gross national product in 1994. Source: *World Development R*eport, 1996. |
| Origin | Identifies the legal origin of the company law or commercial code of each country. |
| 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 forless tradition of law and order. Source: *International Country Risk Guide*. |
| Judicial efficiency | Assessment of the efficiency and integrity of the legal environment as it affects business. Average between 1980-83. Scale from 0 to 10 with lower scores for lower efficiency levels. |

## A3. Non-performing loans and loan loss provisions: Table 5

Non-performing loans is the ratio of total non-performing loans to total loans in each country. Loan loss provisions is the ratio of bank provisions for loan losses to total loans in each country. Both variables are based on the BankScope bank-level data set produced by IBCA. Each variable is the 1994-95 country average. In each year we consider a total of 7,244 banks for which non-consolidated balance sheet data (i.e., individual bank data) are available in at least one year. The variables of interest are available only for a subsample whose size is reported in the table. Banks include commercial banks, savings banks, medium and long-term credit banks, cooperative banks, real estate / mortgage banks, specialized governmental credit institutions and Islamic banks. We exclude countries for which fewer than 5 banks report data in the 1994-95 average.

| **Country** | **Non-performing loans / total loans** | **Number of banks used to estimate non-performing loans** | **Loan loss provisions for loans / total loans** | **Number of banks used to estimate provisions for loan losses** |
|---|---|---|---|---|
| Argentina | -.- | -.- | 3.79 | 97 |
| Australia | 3.70 | 12 | 0.34 | 34 |
| Austria | -.- | | 0.89 | 71 |
| Belgium | -.- | | 0.26 | 76 |
| Brazil | 6.31 | 94 | 3.63 | 95 |
| Canada | 2.34 | 7 | 0.79 | 17 |
| Chile | 0.93 | 29 | 0.34 | 31 |
| Colombia | 7.34 | 24 | 1.74 | 27 |
| Denmark | -.- | -.- | 1.37 | 84 |
| Ecuador | 4.63 | 25 | 1.99 | 24 |
| Egypt | -.- | -.- | 2.63 | 21 |
| Finland | 3.30 | 6 | 2.51 | 8 |
| France | 8.81 | 125 | 0.95 | 336 |
| Germany | -.- | -. | 0.60 | 1596 |
| Greece | -.- | -.- | 1.20 | 18 |
| Hong Kong | -.- | -.- | 0.28 | 5 |
| India | -.- | -.- | 3.87 | 63 |
| Indonesia | -.- | -.- | 0.84 | 46 |
| Ireland | -.- | -.- | -.- | -.- |
| Israel | -.- | -.- | 0.85 | 16 |
| Italy | 5.21 | 235 | 1.74 | 250 |
| Japan | 1.66 | 107 | 0.53 | 119 |
| Jordan | 5.54 | 6 | 0.86 | 9 |
| Kenya | -.- | -.- | -.- | -.- |
| Malaysia | -.- | -.- | 0.63 | 31 |
| Mexico | 7.09 | 22 | 2.88 | 22 |
| Netherlands | -.- | -.- | 0.05 | 24 |
| New Zealand | -.- | -.- | -.- | -.- |
| Nigeria | -.- | -.- | -.- | -.- |
| Norway | 4.60 | 21 | -0.06 | 30 |

| Country | Non-performing loans / total loans | Number of banks used to estimate non performing loans | Loan loss provisions / total loans | Number of banks used to estimate loan loss provisions |
|---|---|---|---|---|
| Pakistan | -.- | -.- | -.- | -.- |
| Peru | 8.93 | 23 | 3.45 | 18 |
| Philippines | 3.05 | 8 | 0.38 | 13 |
| Portugal | 5.56 | 13 | 1.56 | 31 |
| Singapore | -.- | -.- | -.- | -.- |
| South Africa | -.- | -.- | 0.73 | 6 |
| South Korea | -.- | -.- | 0.79 | 13 |
| Spain | 4.74 | 19 | 0.98 | 163 |
| Sri Lanka | -.- | -.- | 0.83 | 6 |
| Sweden | 7.02 | 15 | 1.12 | 16 |
| Switzerland | -.- | -.- | 0.75 | 87 |
| Taiwan | -.- | -.- | 0.32 | 33 |
| Thailand | -.- | -.- | 0.49 | 17 |
| Turkey | 6.11 | 25 | 2.26 | 27 |
| United Kingdom | -.- | -.- | 0.16 | 59 |
| Uruguay | 3.52 | 5 | 1.47 | 7 |
| United States | 1.65 | 495 | 0.56 | 497 |
| Venezuela | -.- | -.- | 8.11 | 15 |
| Zimbabwe | -.- | -.- | -.- | -.- |

# A4. Questionnaire directed to private credit bureaus

**Aim of the survey**
This questionnaire is directed to managers of credit bureaus and is part of the research project on «Institutional Arrangements to Ensure Willingness to Repay in Financial Markets: A Comparative Analysis of Latin America and Europe», supported by the Inter-American Development Bank and the OECD. The project aims at understanding the frequency, determinants and consequences of non-performing loans in credit markets and comparing them across countries. Part of the research project focuses on how credit bureaus operate in various countries and compares their characteristics.

**Confidentiality**
The researchers carrying out this project guarantee complete confidentiality in the use of the data collected in the survey. Data and results based on the survey will always be presented in tabular form and at a level of aggregation that will safeguard the confidentiality of individual banks.

**PLEASE ENCLOSE ANY PUBLISHED OR OFFICIAL MATERIAL THAT YOU FEEL WOULD BE RELEVANT TO UNDERSTAND THE OPERATION OF CREDIT BUREAUS IN YOUR COUNTRY.**

## 1. DESCRIPTION OF YOUR CREDIT BUREAU

**Town where headquarters is located:** _____

**The credit bureau is owned by:**
- a group of banks ☐
- a group of other financial intermediaries ☐
- individual share-holders ☐
- foreign-owned (majority stake foreign-owned) ☐

**The credit bureau is**
- a company run for profit ☐
- a cooperative enterprise or consortium of lenders ☐
- a semi-public institution ☐
- other (please indicate) ☐

**Indicate who originally started the credit bureau:**
- private entrepreneurs ☐
- consortium of lenders ☐
- government agency ☐
- other (please indicate) ☐

**The credit bureau operates**:
- at multinational level ☐
- at national level ☐
- at regional or provincial level ☐

## 2. SCALE OF OPERATIONS

| | Personal sector | Business sector |
|---|---|---|
| Year started operating | | |
| | | |
| Number of records in your files in 1990 | | |
| Number of records in your files in 1996 | | |
| | | |
| Credit reports issued in 1990 | | |
| Credit reports issued in 1996 | | |
| | | |
| Credit reports issued in 1990 as % of all those issued in your country in that year | | |
| Credit reports issued in 1996 as % of those issued in your country in that year | | |

If the credit bureaus started operating **after 1990**, please supply information on credit reports and number of records in the first year of the operation of the credit bureau.

## 3. SOURCES OF INFORMATION

**Please rank the importance of the following as sources of information for your credit reports on a 1 to 3 increasing scale: 1 = not used or rather unimportant, 2 = important; 3 = crucially important.**

| | Personal sector | Business sector |
|---|---|---|
| Banks | | |
| Other financial institutions | | |
| Credit card companies | | |
| Central Credit Register | | |
| Public records | | |
| Tax files | | |
| Other: (please indicate) | | |

## 4. DATA SUPPLIED BY LENDERS

Which type of data are provided by lenders to your credit bureau?

| | Personal sector | Business sector |
|---|---|---|
| Defaulted loans | | |
| Arrears | | |
| Total loan exposure | | |
| Characteristics of borrowers* | | |
| Other: (please indicate) | | |

* *For households*: employment status, marital status, age, income, assets, etc.; *for firms*: line of business, balance sheet data, personal information about directors, share-ownership structure, etc.)

## 5. RECIPROCITY

Do you apply a principle of reciprocity with your clients (i.e., do you supply information only to those who supply it to you)?

YES ☐ NO ☐

If yes, is there an explicit agreement between you and lenders to exchange information?

YES ☐ NO ☐

What happens if lenders do not comply with the reciprocity agreement (i.e. supply late or incorrect information)?

## 6. CREDIT BUREAUS IN YOUR COUNTRY

Please list the other main credit bureaus that operate in your country:

Please describe briefly the evolution of the credit bureau industry in the last 10 years in your country (growth and problems of the industry, process of concentration, etc.)

## 7. PUBLIC CREDIT REGISTERS

Please indicate if a Public Credit Register exists in your country and, if so, how it affects your operations. (By a P.C.R. we mean a publicly managed database, which forcibly collects data about loans from banks to supply it under request from other banks.)

## 8. PRIVACY LAWS

If laws protecting consumer privacy exist in your country, what do they require?

How do these laws affect the operation of your company?

# A5. Questionnaire directed to Public Credit Registers

This questionnaire is part of a research project that aims at understanding the frequency, determinants and consequences of non-performing loans in credit markets and comparing them across countries. By **Public Credit Register** we mean a public database managed by the Central Bank or some other government institution, which forcibly collects information about loans from banks and makes it available under request from other banks via credit reports.

### 1. MANAGEMENT OF THE PUBLIC CREDIT REGISTER (PCR)

Is the PCR operated by the Central Bank or by another Government agency (please indicate)?

### 2. ACTIVITY

| | |
|---|---|
| Year in which the PCR was established | |
| Number of subjects in the file of the PCR | |
| Number of credit reports issued by the PCR to banks and other lending institutions in 1997 (1996 if not available) | |
| Minimum reporting threshold (specify currency units) | |
| Lenders required to supply data (banks, finance companies, etc) | |
| Is participation compulsory? (yes/no) | |

### 3. DATA REPORTED BY PARTICIPATING INSTITUTIONS TO THE PCR

| | |
|---|---|
| Defaulted loans | |
| Arrears | |
| Total loan exposure | |
| Interest rates | |
| Other (please indicate) | |

### 4. ACCESS TO DATA IN THE PCR FILES

| | |
|---|---|
| Government | |
| Participating financial institutions | |
| Private Credit Bureaus | |
| General public | |
| Other (please indicate) | |

### 5. PRIVATE CREDIT BUREAUS

Please list the names of the **private** credit bureaus that operate in your country.

### 6. PRIVACY LAWS

Please mention if privacy laws exist and, if so, how they affect the operations of the PCR and of private credit bureaus (add pages if necessary).