Measuring Information Sharing in Credit Markets[1]

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Introduction

Access to finance is an important determinant of economic growth (Rajan and Zingales 1998; Beck, Levine and Loayza, 2000). But it is also thought to advance democracy and human rights, as the Nobel Committee stated in 2006 when it awarded the Nobel Peace Prize to Muhammad Yunus and his Grameen Bank "for their efforts to create economic and social development from below" (Nobel Prize Committee, 2006). The fact that group lending schemes, such as that of Grameen Bank, have become so important in developing countries demonstrates that in these countries there is market failure on the credit market. The source of market failure is asymmetric information between borrowers and lenders, which makes lenders reluctant to extend credit. There are institutions that help to overcome these problems of asymmetric information and support a functioning credit market. They, however, are often lacking in developing countries.

Asymmetric information on credit markets

The fundamental problem on the credit market is related to asymmetric information between borrower and lender. The resulting problems are classified as adverse selection, ex ante and ex post moral hazard. Adverse selection arises because the borrowers can, at the time they apply for a loan, better evaluate the risks of their venture and thereby their own creditworthiness. After a loan is granted, the borrowers decide whether to spend the loan in the way agreed upon with the bank or not. However, since the lenders cannot oversee how the borrowers deal with the money, an ex ante moral hazard problem arises. When the repayments are due and the borrowers have the financial means to repay the loan, they decide whether to repay or to default strategically. Since the lenders cannot determine whether the borrowers are not able to repay or do not want to repay, there is ex post moral hazard.

Of course, many remedies have been developed to overcome the problems resulting from asymmetric information by designing a particular contract structure. One of them is collateral (see, for instance, the papers by Bester 1985; Besanko and Thakor 1987; Boot, Thakor and Udell 1991). However, this requires that the borrowers possess sufficient pledgeable assets. All those potential borrowers that do not have sufficient collateralizable wealth will not receive loans. This argument shows that contractual features are not able to fully solve the problems resulting from asymmetric information. Therefore, the solution should be to at least reduce the underlying "evil", asymmetric information.

Through the business relationship between the bank and the firm, the bank obtains more and more insight into the borrower's business conduct and can better evaluate the firm's creditworthiness (for a review of the literature, see Boot 2000). Thus, a relationship reduces the degree of asymmetric information between these two parties. At the same time, the relationship bank is better informed about the firm than other, so-called outside, banks are. This means that the offers outside banks make are based on the information asymmetry between them and the borrower. However, the offer the relationship bank makes will be influenced by the offers a borrower can find on the market. Consequently, the relationship bank can exploit its information advantage by demanding higher interest rates than it could otherwise, given the information it possesses about the borrower – the borrower is "held up" by the bank. Thus, to fundamentally improve the situation on the credit market one must reduce asymmetric information between a borrower and all its potential lenders.

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Information-sharing arrangements as a solution

The idea underlying information sharing it that "the best predictor of future behaviour is past behaviour" (Miller 2003, p. 25) In practice, it is an arrangement by which lenders contribute information about their customers to a common pool which is accessible to all lenders that contribute. Economists focus on information asymmetries in credit markets but so far have paid little attention to its institutional aspects, which is information sharing (Miller 2003).

In the literature the effects of information sharing on adverse selection and on moral hazard have been studied. The first paper on the exchange of information through private credit registries was published by Pagano and Jappelli (1993). In an adverse selection model, the banks, which are local monopolies, benefit from an information exchange through declining default rates. The authors also show that bank competition makes information sharing less likely because it reduces the informational rent a bank can extract in the "hold-up" situation. Incumbent banks can influence the degree of market entry by their decision to share information either on the borrower type or on his performance in the past, such as project outcomes or defaulting. In fact, banks will choose the type of information they provide strategically to deter entry (Boukaert and Degryse 2006). For instance, for intermediate degrees of adverse selection, the relationship bank can limit the scope of entry by revealing the outcome of the first period, but not the type of firm.

Padilla and Pagano (1997) use a moral hazard framework in which banks generate rents from high quality borrowers in the first period of a two-period lending relationship. In this setup, the bank has an incentive to reveal information about the firm's type after the first period. The reason is that banks compete more fiercely in the second period if there is information sharing. Thus, the firms receive a higher return and, therefore, they have a stronger incentive to exert effort. This increases their quality, and the rent a bank extracts in the first period rises. In a companion paper, Padilla and Pagano (2000) study the case where rents are competed away ex ante. In this case, it is better to show information only about the outcome of a project but not the borrower type because the firms' incentives to work hard are thereby the strongest.[2]

[2] However, the incentive effects of information sharing may diminish over time as the borrowers build up a credit history (Vercammen 1995).

The effect of information sharing can best be observed in a laboratory. Brown and Zehnder (2007) find that information sharing disciplines borrowers if repayments are not enforceable. However, if there is a bilateral bank relationship, information sharing has no additional effect on the repayment behavior. Thus, it does not perform better than relationship banking. Kallberg and Udell (2003) use data at the firm-level from the world's largest private credit bureau, Dun & Bradstreet. They show that the information from the credit bureau has significant predictive power in a failure prediction model and goes beyond the information contained in the firms' financial statements. More indirect evidence comes from firm- or country-level studies that show how the presence of information-sharing arrangements influences access to finance. Using firm-level surveys from transition countries, Brown, Jappelli and Pagano (2009) show that information sharing is positively correlated with access to credit and its perceived costs. They also find that for access to finance accounting transparency of the individual firm and the existence of information-sharing arrangements are substitutes. At the country level information sharing seems to be a substitute for the protection of creditor rights. Similar results are obtained in cross-country studies of aggregate credit. Jappelli and Pagano (2002) demonstrate that information sharing is positively associated with bank lending to GDP. They can also determine whether information is about a borrower's default, being in arrears or includes additional information, such as debt exposure. Both types of information seem to influence financial intermediation positively. Djankov et al. (2007) use a large data set for 129 countries showing that information-sharing arrangements are associated with a higher ratio of private credit to GDP. They also study the effect of introducing information-sharing arrangements and find that subsequently the ratio of private credit to GDP rises.

Measuring information sharing on credit markets

The Doing Business initiative of the World Bank provides an excellent source of information for many business regulations and also for information sharing. For the information-sharing arrangements Doing Business gathers these data in two steps. In a first step, they find out whether there is a public credit registry or a private credit information bureau present in a country by contacting bank supervision authorities and public information sources. If this is the case, then in a second step, the credit registries

and credit bureaus are surveyed with respect to their structure and their legal basis. The information obtained from the surveys is checked by the Doing Business team (World Bank 2010).

There are two quantitative measures of information-sharing arrangements: the private credit bureau coverage and the public credit registry coverage. There is also an indicator summarizing qualitative information: the depth of credit information index. We use the World Bank's terminology to differentiate between private and public information-sharing arrangements. "A private credit bureau is defined as a private firm or nonprofit organization that maintains a database on the creditworthiness of borrowers (persons or businesses) in the financial system and facilitates the exchange of credit information among banks and financial institutions. Credit investigative bureaus and credit reporting firms that do not directly facilitate information exchange among banks and other financial institutions are not considered. […] A public credit registry is defined as a database managed by the public sector, usually by the central bank or the superintendent of banks, that collects information on the creditworthiness of borrowers (persons or businesses) in the financial system and makes it available to financial institutions" (World Bank 2010). The information of the public credit registries is also used by the supervisory authorities. The role information sharing plays in bank supervision goes beyond the scope of this article.

The coverage provided by either a private credit bureau or a public credit registry varies between 0, if a credit bureau or a credit registry is not in place, and 100. The coverage in the Table "reports the number of individuals and firms listed by a private credit bureau [or a public credit registry] with information on repayment history, unpaid debts or credit outstanding from the past five years. The number is expressed as a percentage of the adult population (the population aged 15 and above according to the World Bank's World Development Indicators 2009)" (World Bank 2010).

In addition to the quantitative indicators, there is also the index capturing the depth of credit information. It measures "rules affecting the scope, accessibility and quality of credit information available through either public or private credit registries. A score of 1 is assigned for each of the following six features of the public registry or the private credit bureau (or both):

- Both positive credit information (for example, loan amounts and pattern of on-time repayments) and negative information (for example, late payments, number and amount of defaults and bankruptcies) are distributed.

Table

Information sharing

	Private credit bureau coverage		Public credit registry coverage		Depth of credit information index	
	2005	2010	2005	2010	2005	2010
Austria	39.3	39.2	1.1	1.4	6	6
Belgium	0.0	0.0	53.3	56.5	4	4
Bulgaria	0.0	6.2	1.3	34.8	3	6
Cyprus		0.0		0.0		0
Czech Republic	24.9	73.1	2.1	4.9	4	5
Denmark	7.1	5.2	0.0	0.0	4	4
Estonia	9.5	20.6	0.0	0.0	5	5
Finland	14.8	14.7	0.0	0.0	5	5
France	0.0	0.0	1.7	32.5	4	4
Germany	85.6	98.3	0.6	0.8	6	6
Greece	11.1	46.9	0.0	0.0	4	5
Hungary	3.3	10.3	0.0	0.0	5	5
Ireland	100.0	100.0	0.0	0.0	5	5
Italy	57.1	77.5	7.9	12.2	6	5
Latvia	0.0	0.0	0.6	46.5	2	5
Lithuania		18.4	4.4	12.1	3	6
Luxembourg		0.0		0.0		0
Netherlands	64.5	83.5	0.0	0.0	5	5
Poland	38.0	68.3	0.0	0.0	4	4
Portugal	7.9	16.4	63.7	81.3	5	5
Romania	0.0	30.2	0.4	5.7	4	5
Slovak Republic		44.0	0.6	1.4	3	4
Slovenia	0.0	0.0	2.5	2.7	3	2
Spain	6.5	7.6	39.4	45.3	5	5
Sweden	98.0	100.0	0.0	0.0	4	4
United Kingdom		100.0	0.0	0.0	6	6
Croatia	0.0	77.0	0.0	0.0	0	4
Macedonia		0.0	0.6	28.1	3	4
Norway	100.0	100.0	0.0	0.0	4	4
Switzerland	23.3	22.5	0.0	0.0	5	5
Turkey	30.0	42.9	3.2	15.9	5	5
Australia	95.4	100.0	0.0	0.0	5	5
Canada	100.0	100.0	0.0	0.0	6	6
Japan	61.5	76.2	0.0	0.0	6	6
New Zealand	97.8	100.0	0.0	0.0	5	5
United States	100.0	100.0	0.0	0.0	6	6

Empty cells: Data not available.

Source: World Bank (2010).

- Data on both firms and individuals are distributed.
- Data from retailers, trade creditors or utility companies as well as financial institutions are distributed.
- More than two years of historical data are distributed. Registries that erase data on defaults as soon as they are repaid obtain a score of 0 for this indicator.
- Data on loans below 1 percent of income per capita are distributed. A registry must have a minimum coverage of 1 percent of the adult population to score a 1 for this indicator.
- Regulations guarantee borrowers the right to access their data in the largest registry in the economy" (World Bank 2010).

Accordingly, the value of this index ranges from 0 to 6. The higher the value of the index, the more credit information is available from the private or the public information-sharing arrangements. In countries without any information-sharing arrangements the index is set at 0.[3]

In the Table we list the three indicators for 36 OECD and EU countries for the years 2005 and 2010. Among these countries seven do not have a private credit bureau. In eight countries the whole population is covered by a credit bureau. The other countries are spread in between without any particular pattern. Compared with the year 2005 the coverage of private credit bureaus increased significantly in several countries. In particular, in the new EU member states in eastern Europe the credit bureaus that did not exist before transition started in 1989 expanded their coverage (often significantly).

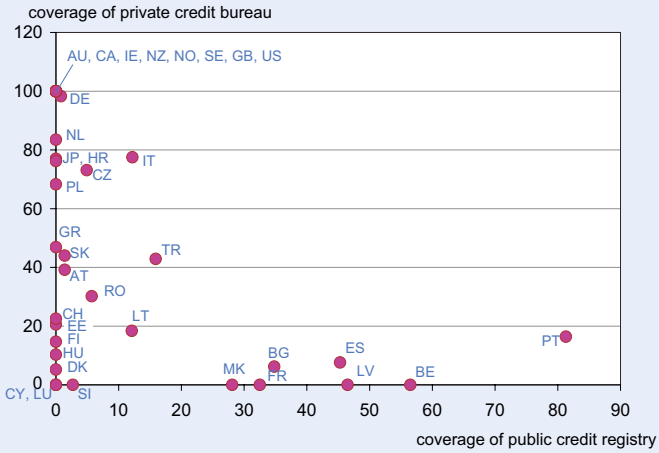
The figures for public credit registry coverage are quite different from those of the credit bureau. In 20 out of the 36 countries a public credit registry does not exist. There is no country in which the total population is covered by a credit registry. Coverage is highest in Portugal with 81.3 percent. In many countries the coverage is at the one-digit level. This probably reflects the fact that the threshold levels above which loans must be reported to the credit registry are quite high (Jappelli and Pagano 2003). There seems to be a clear influence of legal origin because in the Anglo-American countries no public credit registries exist. The coverage of the public credit registries has increased relative to 2005. Again, coverage went up in the new EU-27 member states. But the figures for France, Italy, Portugal and Spain are higher in 2010 than in 2005, too.

One could ask whether private credit bureaus and public credit registries are complements or substitutes. There is no clear answer to this question. Miller (2003) argues that they are complements, whereas Pagano and Jappelli (2003) that they are substitutes. Figure 1 illustrates the relationship between the two information-sharing arrangements for our set of 36 countries. There are some countries (Cyprus, Luxembourg, Slovenia) which have hardly any information sharing. In all the other countries there is at least one form of information sharing. In those countries that do not have a private credit bureau a substantial fraction of the population is covered by a public credit registry.

For the depth of credit information index most countries have a score between 4 and 6. Values below are due to the (nearly complete) absence of information arrangements in these countries. Those with a score of 4 include some new EU-27 members, some Scandinavian countries, Belgium, France and Portugal.

Figure 1

COVERAGE OF PRIVATE CREDIT BUREAU AND PUBLIC CREDIT REGISTRY

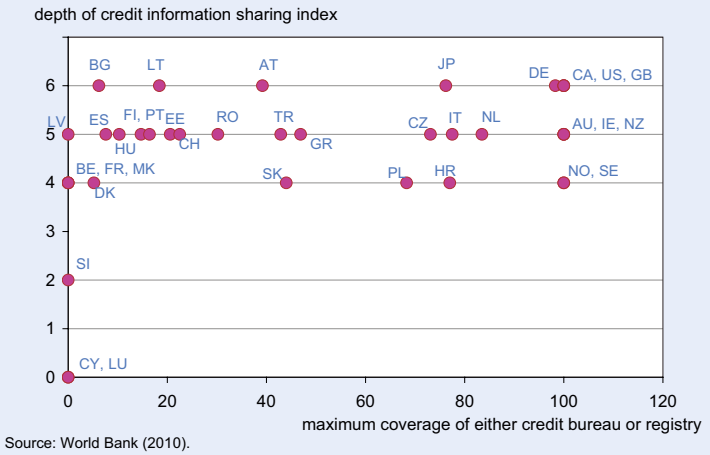


Source: World Bank (2010).

3 The World Bank (2010) explains the functioning of the indicator as follows: "In Turkey, for example, both a public and a private registry operate. Both distribute positive and negative information (a score of 1). The private bureau distributes data only on individuals, but the public registry covers firms as well as individuals (a score of 1). The public and private registries share data among financial institutions only; no data are collected from retailers or utilities (a score of 0). The private bureau distributes more than two years of historical data (a score of 1). The public registry collects data on loans of $ 3,493 (44 percent of income per capita) or more, but the private bureau collects information on loans of any value (a score of 1). Borrowers have the right to access their data in both the private and the public registry (a score of 1)."

Figure 2

DEPTH OF CREDIT INFORMATION SHARING INDEX AND COVERAGE OF CREDIT BUREAUS/REGISTRIES



Source: World Bank (2010).

Except for the new EU-27 member states, which have improved the quality of their information-sharing arrangements, the values of the index are rather stable. But how are the qualitative and quantitative features of information-sharing arrangements related to each other? Figure 2 captures the maximum coverage by either the private credit bureau or the public credit registry (x-axis) and the depth of credit information index (y-axis). The Figure shows no relation between these two different characteristics of information sharing.

Further improving the measurement

In contrast to many other institutional features, there are both quantitative and qualitative indicators for the extent of information sharing. This provides a very good basis for research. The depth of the credit information index summarizes six different features of the information-sharing arrangement, including whether positive or negative information is distributed. In the literature it has been shown that it matters whether positive or negative information is shared. Therefore, it would be helpful if data underlying the depth of credit information index and how they have changed since the start of the survey became publicly available so that this information can easily be used for research.

The Doing Business data are unique since they cover most countries and have been available since 2005. Previously Jappelli and Pagano (2002) made the effort to collect data on selected countries. Interestingly, for some countries the Doing Business figures and their figures diverge significantly. For instance, for Denmark Jappelli and Pagano (2002) report for the year 1996 a coverage by private credit bureaus of 50.3 percent whereas it was only 7.1 percent in the Doing Business database in 2005 and went down to 5.2 percent in 2010. For Italy, Jappelli and Pagano report that in 1996 4.6 percent were covered by private credit bureaus whereas it is 77.5 percent according to the Doing Business data for 2005. The change for Italy is most likely due to an increase in coverage as was shown for other countries in our sample (see Table). However, it is surprising that the coverage by private credit bureaus went down in some countries (for example, in Denmark). The difference might be related to the way the coverage is calculated. When more than one credit bureau operates in a country, their coverage rates must be aggregated. The method used for aggregation might differ between Jappelli and Pagano (2002) and World Bank (2010). Thus, it would be helpful if more details on the method of aggregation were provided.

In order to create value, the credit bureaus/registries must, of course, provide reliable and correct information. Their reputation will suffer if inaccuracies occur and data quality is poor. In emerging markets complaints about the reliability of information are more frequently found (for Russia, see Skogoreva 2005), but this problem is receiving more and more attention in economies with well-developed institutions as well (for the US, see Cassady and Mierzwinski 2004 or for Germany, see Bundesministerium 2009). Due to the nature of the problem, it is difficult to measure the mistakes on a comprehensive basis. However, there have been more and more attempts to evaluate the degree to which data are misreported. In a very small control sample of the biggest credit bureau in Germany, data were missing or wrong in more than 40 percent of the cases (Bundesministerium 2009). It would be helpful if these data were collected on an international basis and made available for research. One way to improve data quality is to have regulations that guarantee the population the right to access their data, which would allow them to detect mistakes and report them. Actually, the depth of credit information index captures this regulatory provision, which thus might serve as a proxy for data quality.

In most of the 36 countries we look at there is some information-sharing arrangement in place. However, in many less developed countries, this institution is still missing. An important piece of information about a firm's creditworthiness is whether it is bankrupt. This information is made publicly available. In this particular aspect, information-sharing arrangements and a registry recording that a firm is bankrupt are substitutes. In some countries the information about bankrupt firms is accessible online and thus should be readily available. It would be interesting to collect more information about the way in which the fact that a firm is bankrupt is made public as it influences creditors and ultimately the whole credit market (Hainz 2009).

Information-sharing arrangements and research

Information-sharing arrangements are one of the important institutions that significantly influence the functioning of the credit market. The availability of qualitative and quantitative measures of information-sharing arrangements for a large set of countries has made it possible to analyze this institution. But not only the indicators of the information-sharing arrangements are used for research. Credit bureaus or registries also provide an often excellent database for research, depending on what features are collected about the borrower and potential individual loans and loan applications. There are already some important studies using data from the Spanish public credit registry. These studies have investigated, for instance, how access to credit and the terms of a credit contract are influenced by firm- and bank-specific characteristics but also how macroeconomic conditions and monetary policy influence them (Jiménez and Saurina 2004; Jiménez et al. 2009 and 2010). Also for developing countries data from public credit registries can be very insightful. Ioannidou and Ongena (2010), for instance, use data from the Bolivian credit registry to show how a bank relationship influences lending conditions over time. For Pakistan, there is evidence that Islamic loans default less often (Baele et al. 2010).

In these examples, there is one central and public credit registry covering a broad universe of borrowers. In most OECD countries, however, there are several firms operating private credit bureaus. It would therefore be interesting to learn how competition between private providers of information-sharing arrangements influences the market outcome. Moreover, the factors driving the development of information-sharing arrangements are not yet properly understood. These questions are only two examples of what can be investigated in future research.

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