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The value of relationship banking: International evidence

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ABSTRACT

This paper analyses whether repeated borrowing from the same bank affects loan contract terms. We find that relationship loans pay less spread and require less collateral compared to non-relationship loans. These effects for relationship loans are not derived from differences between relationship and nonrelationship loans. The reduction of interest rate spread for relationship loans disappeared during the financial crisis. The results also reveal that borrowers paid higher interest rate spreads, had to post more collateral and the maturity was shortened during the crisis period. The reduction in interest rate spread and collateral depends on the protection of creditors' rights. In countries where creditors' rights are well protected, relationship loans pay less spread and are required to post less collateral than relationship loans in countries with weak protection of creditors' rights.

1. Introduction

Banks are the main providers of debt financing in most countries (Demirgüç-Kunt and Levine, 2001), although there are well documented geographical differences. The financial system in the Euro area is mainly bank-based compared to the market-based system in the US. In fact, more than half of funding to non-financial firms in the Euro area is provided by banks, while bank financing represented 25% of firms' total financing in the US in 2016 (de Guindos, 2020; ECB Economic Bulletin, 2016, issue 5).

The global financial crisis affected banks' solvency and renewed interest in understanding the consequences of shocks to banks' financial health for non-financial firms (Carvalho et al., 2015; Kahle and Stulz, 2013; Santos, 2011; among others). One of the issues of interest for financial researchers about the role of the banking sector in financing the real economy is whether relationship banking may benefit firms or not. Theoretical papers predict that establishing relationships between lenders and borrowers can produce benefits and costs for borrowers (see, e.g., Boot, 2000; Greenbaum et al., 1989; Rajan, 1992; Sharpe, 1990; and Wilson, 1993). From an empirical point of view, the literature gives mixed results, showing both benefits and costs for borrowers as a consequence of relationship banking (Berger and Udell, 1995; Bharath et al., 2011; Blackwell and Winters, 1997; Cole, 1998; Degryse and van Cayseele, 2000; Elsas and Krahnen, 1998; Petersen and Rajan, 1994).

Papers analysing the potential benefits of relationship banking on the availability and terms of loans have focused mainly on small and privately-held borrowers in single countries. Petersen and Rajan (1994), Berger and Udell (1995), and Cole (1998) examined the value of banking relationships in the USA using the National Survey of Small Business Finance (NSSBF). Petersen and Rajan (1994) find that a relationship with an institutional lender increases the availability of financing for small businesses and reduces the interest charged for loans, although the latter effect is statistically insignificant. However, Berger and Udell (1995) show the importance of relationships between banks and borrowers, as lenders offer borrowers with longer relationships lower interest rates and are less likely

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to require collateral. Cole (1998) finds that borrowers purchasing multiple products from a bank are more likely to obtain loans from the bank, although the duration of the relationship was not found to influence the availability of credit. Studying a sample of small companies, Blackwell and Winters (1997) report that firms with longer relationships are monitored less frequently by banks and that less frequently monitored firms pay lower interest rates. Using the Dealscan database, which collects information on loans to large corporations, Bharath et al. (2011) show that borrowing from a prior lender provides better loan terms to US firms. Specifically, they find that repeated borrowing from the same lender affects contract terms, reducing loan spreads and collateral requirements, with the lending relationships being more valuable for borrowers with lower transparency.

In a different institutional context, Elsas and Krahnen (1998) analyse the role of "housebanks" for a sample of 200 medium-sized German firms, a housebank being the company's primary lender, which has access to more relevant and more timely information that non-housebanks or "arm's-length" lenders. Their results show that housebanks are able to provide liquidity insurance in situations of unexpected deterioration of borrower ratings, establishing long-term commitments. However, they find no evidence for intra- or intertemporal price differentiation related to housebanking. Degryse and van Cayseele (2000) study the value of relationship lending for a sample of small Belgian firms. Their results show two opposing effects. The loan rate increases with the duration of the bank-borrower relationship, but decreases with the scope of the relationship. Relationship duration and scope have opposite effects on loan rates, and on collateral requirements, as collateral requirement decreases over the duration of the relationship and increases with its scope.

In summary, the evidence related to the benefits of relationship banking for borrowers is mixed, as the studies in this regard have produced differing results in terms of the consequences of relationship banking for the availability of credit, interest rates, and collateral requirement, as well as in different institutional contexts.

Our paper builds on these facts, studying the effect of relationship banking on bank loan terms. It sheds new light on this important topic by studying, across the world, whether relationship banking is beneficial for borrowers. Our paper adds to this literature by completing this analysis considering the value of relationship banking in an international context and during a period that includes the global financial crisis. Specifically, we analyse how repeated borrowing from the same lender influences bank loan terms (spread, collateral, and maturity) for a sample of 20,590 loans from 47 countries over the period 2003–2018, considering how the global financial crisis and the protection of creditors' rights modify this effect. We know that the global financial crisis and the degree of protection of creditors' rights affect the terms of bank loans (Qian and Strahan, 2007; Santos, 2011). Qian and Strahan (2007) showed that, under strong creditor protection, loans have longer maturities and lower interest rates. Santos (2011) report that US firms paid higher loan spreads during the financial crisis. In this context, the main contributions of this paper are how these issues – protection of creditors' rights and the global financial crisis – interact with relationship banking to influence the terms of bank loans in an international context.

Our results about the price and non-price terms of the loan (collateral and maturity) support the hypothesis that relationship banking reduces information asymmetry between lenders and borrowers. Relationship loans pay less spread and require less collateral compared to non-relationship loans. A relationship bank loan is associated with a reduction of 8.39 basis points in the loan spread and a reduction of 3.30% in the probability of having to post collateral. We also find that relationship banking is associated with shorter maturity of bank loans, although this reduction disappears when we consider differences in borrower characteristics between relationship and nonrelationship loans. The reduction of interest rate spread associated with a relationship loan turns into an increase during the global financial crisis. Moreover, during the crisis period, borrowers paid higher interest rate spreads, had to post more collateral and maturity was shortened. The reduction in interest rate spread and collateral depends on the protection of creditors' rights. In countries where creditors' rights are well protected, relationship loans pay less spread and are required to post less collateral than relationship loans in countries with weak protection of creditors' rights. In fact, the reduction is negligible in countries with weak protection of creditors' rights for relationship loans, however relationship loans reduce loan spreads by 11.47 basis points in countries such as Norway, Finland, and Belgium. This result suggests that relationship banking and the protection of creditors' rights are complementary mechanisms in reducing problems of asymmetric information.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and develops testable hypotheses on relationship banking as a determinant of loan spreads. Section 3 describes our data and presents the descriptive statistics of our variables. Section 4 reports the empirical results and Section 5 analyses the robustness of our results, while our conclusions are laid out in Section 6.

2. Conceptual framework

The idea that the information problems caused by adverse selection and the moral hazard present in the relationships between lenders and borrowers can be reduced if the lending is done by a bank is an old one in the banking literature (Diamond, 1984; Fama, 1985). Banks are able to produce substantial information about borrowing firms that can be useful in the credit decision process. There are several ways for lenders to obtain information about the credit-worthiness of borrowers, such as the development of long-term relationships with customers. Boot (2000) suggests that relationship banking involves customer-specific information obtained over time through repeated interactions. If this information is costly to produce and is reusable, lending to a past borrower is likely to reduce a lender's adverse selection concerns, as prior transactions will have produced proprietary inside information about that borrower.

Continuous contact between lenders and borrowers in the provision of funds or other financial services can generate valuable information for the lender when making decisions about whether to extend credit, the price, the requirement for collateral, or other conditions attached to the loan. Due to the reduction in information asymmetries, the cost of providing future loans should be lower for a relationship lender. In this context, the lender may choose to enjoy these savings itself, share them, or even pass them on. The

theoretical literature has generated conflicting predictions regarding the progression of interest rates over the duration of a relationship. Boot and Thakor (1994) posit that loan rates fall as a borrower-lender relationship matures, given that savings from the bank's improved knowledge of the borrower are passed on to the borrower. However, other theoretical papers (Greenbaum et al., 1989; Sharpe, 1990; and Wilson, 1993) predict that loan rates increase with the duration of a bank-firm relationship. They argue that the borrower could be "locked-in" in the case of a relationship lender failing to pass on the benefits of the lower costs of producing information and monitoring to its borrower. This lock-in effect would be greater for borrowers with fewer alternative sources of financing. According to the those papers, interest rates will increase as the relationship lengthens given that lenders will initially subsidize the borrowers and when they are "informationally captured", they will pay higher rates.

Both theories predict that the repeated provision of bank services over time reveals information about the type of firm. If the lender decides to share these savings with or pass them on to the borrower, then the loan conditions will be better for a borrower that uses its relationship lender. Evidence found by Berger and Udell (1995), Blackwell and Winters (1997), and Bharath et al. (2011) is consistent with this prediction. Evidence found by Degryse and van Cayseele (2000) related to the increase in loan rates with the duration of the bank-borrower relationship for small Belgian firms is consistent with the predictions by Greenbaum et al. (1989), Sharpe (1990), and Wilson (1993). While the former papers focus on small and large US firms, the study by Degryse and van Cayseele (2000) focuses on small Belgian firms operating within the continental European bank-based system. This difference in results leaves the question open as to whether the value of banking relationships is country-dependent or depends on institutional characteristics.

We consider three measures of loan conditions to analyse how repeated borrowing from the same bank affects loan contract terms. First, we use the interest rate spread of the loan, measured as the natural logarithm of the basis points spread of the loan interest over the London Interbank Offered Rate (LIBOR) or LIBOR equivalent (LN_SPREAD). We use "all-in-spread drawn" as the measure of the interest rate spread of the loan. All-in-spread drawn measures the interest rate spread on a loan plus any associated fees in originating the loan, and is an all-inclusive measure of the loan price (Qian and Strahan, 2007; Chava et al., 2009; Lin et al., 2011; Álvarez-Botas, González, 2021b). Second, we focus on how non-price terms of bank loans, such as the collateral requirement and maturity, are affected by lending relationships. Collateral is a dummy variable that equals 1 if the loan was secured and 0 otherwise (COLLAT). [1] Loan maturity is measured as the natural logarithm of the maturity of the loan (in months) (LN_MAT). As most of the firms in our sample are large, publicly traded firms and often have multiple bank relationships, the lock-in effect is likely to be small, as this effect would be greater for borrowers with fewer alternative sources of financing. Thus, we expect that the existence of repeated borrowing results in reductions for spread and for the requirement of collateral. The effect for loan maturity is not so straightforward. On the one hand, if debt investors cannot distinguish the credit quality of firms, borrowers with better quality will consider their long-term debt to be relatively underpriced and consequently they can credibly convey their unobservable quality choosing shorter maturity (Flannery, 1986). As repeated borrowing reduces information asymmetries there will be less need to signal credit quality through debt maturity. On the other hand, firms may choose long-term debt at a higher rate to reduce their greater liquidity risk of being unable to refinance the debt if they choose short-term debt (Diamond, 1991). In this context, repeated borrowing reduces asymmetric information and borrowers will move to shorter maturities, as the refinancing risk is lower.

In this context, our first set of hypotheses is as follows:

Hypothesis 1a. **(H1a)** *Relationship bank loans will have better conditions (lower loan spread and requirement of collateral) than non-relationship bank loans.*

Hypothesis 1b. **(H1b)** *Bank loan maturity could increase or reduce with repeated borrowing.*

The 2008 global financial crisis affected bank solvency and it renewed the interest in understanding the consequences of shocks to banks' financial health for non-financial firms. For instance, Santos (2011) found that US firms paid higher loan spreads during the financial crisis, and that this increase was higher for borrowers that took out loans during the crisis from banks that incurred larger losses. This result highlights that the financial condition of banks is central to economies as it has consequences for business activity (Dell'Ariccia et al., 2008). Consequently, governments usually come to the rescue of failing banks, offering emergency liquidity and different types of bailout programs. If borrowing firms are unable to replace bank loans with alternative sources of external financing, shocks affecting banks' financial health may impose significant costs on the non-financial sector through the restricted credit supply or worsen the terms of bank financing. Previous studies have shown that new lending decreased substantially during the financial crisis (Ivashina and Scharfstein, 2010), corporate investment was reduced (Almeida et al., 2011; Campello et al., 2010), debt maturity was found to decline (González, 2015), and loan spreads were also shown to rise during the crisis (Santos, 2011). As firms suffer an increase in the risk of failure during recessions and hold-up problems increase with borrower risk, banks that have an exploitable information advantage should be able to raise their rates to a greater extent in recessions than is justified by borrower risk (Santos and Winton, 2008). As borrowers entering into relationship loans are usually dependent on bank financing, and because hold-up problems could increase during crises – particularly for firms that are more dependent on bank financing – our second hypothesis is as follows:

Hypothesis 2. **(H2)** *The value of relationship banking will have declined during the global financial crisis.*

In financial contracts, formal institutions are important when establishing the conditions of debt. The existence of effective formal institutions, such as laws that guarantee the protection of creditors' rights, leads to an improved financial environment that enables

[1] This information is not provided for the entire loan sample. Almost forty-percent of our sample did not report whether loans were secured by collateral or not.

better conditions to be established in financial contracts. Stronger protection of creditors' rights gives lenders greater power in the case of bankruptcy and hence the risk they assume will be lower. Moreover, it increases the incentives for borrowers to repay loans and avoid bankruptcy situations. When creditors are highly protected, to the extent that they can replace the management team of a company, bankruptcy generates high costs for the company. This reduces the likelihood of the company taking high risks, and thus moral hazard problems may decrease. Consequently, lenders will be willing to offer credit at a lower cost because there is less opportunity for misappropriation of cash flows. Along these lines, Qian and Strahan (2007) show that bank loans have more concentrated ownership, longer maturities, and lower interest rates under strong creditor protection.

As effective protection of creditors' rights reduces the problems of asymmetric information, it could be related to a reduced role of the banking relationship in ameliorating asymmetric information. In this case, relationship bank loans will not provide better conditions compared to non-relationship loans in countries with strong protection of creditors' rights. However, the way in which repeated borrowing from the same lender influences bank loan terms could also require effective protection of creditors' rights. When banks have fewer legal rights and cannot rely on legal enforcement, they are not able to obtain any benefit in the form of improved monitoring as a result of repeated borrowing. From this point of view, the protection of creditors' rights and relationship banking could be complementary mechanisms in reducing asymmetric information problems.

The discussion above regarding the potential effects of banking relationships on bank loan terms depending on the protection of creditors' rights leads us to our third set of hypotheses. As there may be both positive and negative influences of the joint effect of banking relationship and protection of creditors' rights on bank loan terms, our expectations remain open and hence we pose two contrasting hypotheses:

Hypothesis 3a. **(H3a)** *Relationship bank loans will have better conditions than non-relationship bank loans mainly in countries with weak protection of creditors' rights.*

Hypothesis 3b. **(H3b)** *Relationship bank loans will have better conditions than non-relationship bank loans mainly in countries with strong protection of creditors' rights.*

3. Data

3.1. Sample and variables

The information on bank loans was collected from the Dealscan database. Provided by Thomson Reuters, this database contains historical information on the terms and conditions of over 200,000 loan transactions in the global commercial loan market. Firm-level data were obtained from the Global Compustat database. In order to build the final study sample, the information from the Dealscan and Global Compustat databases was linked using tables provided by Chava and Roberts (2008). Dealscan observations that remained unmatched were manually linked to the Global Compustat database on the basis of the name of the company.[2] This resulted in a sample of 20,590 loan facilities to 4667 borrowers in 47 countries over the period 2003–2018.

We identify lead arranger banks directly from the database (Sufi, 2007; Chaudhry and Kleimeier, 2015). We use two fields to classify lenders as either lead arrangers or simply participants. First, the field labelled as "Lender Role" identifies the different roles of banks, most commonly participant, agent (co-agent), manager (co-manager), administrative agent, lead manager, syndications agent, arranger or documentation agent. Second, the field labelled as "Lead Arranger Credit" provides the values "Yes" or "No" for every bank participating in the credit. We consider that a bank acts as a lead arranger if the "Lead Arranger Credit" field shows "Yes".

Borrowers occasionally enter into more than one loan facility on the same date. In this case, in line with previous papers (Qian and Strahan, 2007; Bae and Goyal, 2009; Beyhaghi et al., 2019; Delis et al., 2020), our unit of analysis is each loan facility. The dependent variables are the price and nonprice terms of the loans: (1) the interest rate spread of the loan (LN_SPREAD), measured as the natural logarithm of the basis points spread of the loan interest over the London Interbank Offered Rate (LIBOR) or LIBOR equivalent; (2) the collateral requirement (COLLAT), measured as a dummy variable that equals 1 if the loan was secured and zero otherwise; and (3) the maturity of the loan measured as the natural logarithm of the maturity of the loan (in months) (LN_MAT).

To test our predictions, we estimate the following regression of loan spreads and maturities. Models [1] and [2] are estimated using ordinary least squares with standard errors clustered by borrower firm level. If there are unobservable common borrower components, loans in a given country cannot be treated as independent observations. The residuals are correlated and OLS standard errors may be biased. Thus, the standard errors are clustered by firm, as Petersen (2009) showed that standard errors clustered by firm are unbiased and produce correctly sized confidence intervals regardless of whether the firm effect is permanent or temporary. To mitigate endogeneity problems ex-ante, we lag all the variables by one year.

$$LN\_SPREAD_{i,t} = \alpha_0 + \beta_1 RL_{i,t} + \beta_2 CR_{c,t-1} + \sum_k FirmControls^k_{i,t-1} + \sum_L LoanControls^L_{i,t} + \sum_t Y_t + \sum_c C_c + \sum_j I_j + \varepsilon_{i,t} \quad (1)$$

$$LN\_MAT_{i,t} = \alpha_0 + \beta_1 RL_{i,t} + \beta_2 CR_{c,t-1} + \sum_k FirmControls^k_{i,t-1} + \sum_L LoanControls^L_{i,t} + \sum_t Y_t + \sum_c C_c + \sum_j I_j + \varepsilon_{i,t} \quad (2)$$

Similarly, we estimate the following baseline probit model on collateral requirements with standard errors clustered by borrower

[2] To deal with mergers and acquisitions when identifying lending relationships we use the Lexis-Nexis database.

firm level:

$$COLLAT_{i,t} = \alpha_0 + \beta_1 RL_{i,t} + \beta_2 CR_{c,t-1} + \sum_k FirmControls^k_{i,t-1} + \sum_L LoanControls^L_{i,t} + \sum_t Y_t + \sum_c C_c + \sum_j I_j + \varepsilon_{i,t} \quad (3)$$

Firm-level controls consist of size, profitability, leverage, tangibility, growth and credit rating. Loan-level controls consist of syndicated size, loan amount, covenants, reputation and proximity of the lead arranger, loan purpose, and loan type. We also include time, country, and industry effects in all the estimations to control for unobservable time (Y_t), country (C_c), and industry (I_j) heterogeneity. An in-depth description of the variables is given below.

3.1.1. Measure of banking relationships

To measure the influence of a prior banking relationship on the price and nonprice terms of loans, we need to split our sample of loans into those that are provided by a relationship bank and those provided by a non-relationship lender. We follow Bharath et al. (2011) to identify loans by a relationship bank. For any particular loan *i* included in our sample, we search all the previous loans, within a 5-year window,[3] of the given borrower in the Dealscan database. We identify all the lead banks in these prior loans and if at least one of the lead banks for loan *i* had been a lead bank in the past, we classify loan *i* as a relationship loan (RL). We use three proxies to measure the relationship strength: (1) A dummy variable that takes the value of 1 when one of the lead arrangers had been a lead arranger in the past within a 5-year window, and 0 otherwise (RL_d); (2) RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past for that borrower within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; and (3) RL_number is the number of loans obtained from a lead arranger that had also been a lead arranger for that borrower in the past 5 years in relation to the number of loans obtained in the last 5 years. In cases where there are multiple lead banks, we take the highest value of these three proxies and assign it to the loan.

3.1.2. Protection of creditors' rights

The protection of creditors' rights variable (CR) is measured by the time creditors have to wait to recover their credit after a default. The time for creditors to recover their credit is recorded in calendar years, reporting an ex-post, effective measure of the protection of creditors' rights as it requires both explicit legal protection and enforcement of the law. The period of time measured by the Resolving Insolvency indicator runs from the company's default until the payment of some or all of the money owed to the bank. Potential delay tactics by the parties involved, such as the filing of dilatory appeals or requests for extension, are taken into consideration. Data are collected from the World Bank Doing Business Database. Lower values of CR mean a higher protection of creditors' rights, as creditors recover their money sooner.

We also consider the quality of the institutional environment measured by law and order (LO) as a control variable in our analysis. Bae and Goyal (2009) show that banks respond to poor enforceability of contracts by increasing loan spreads. Consequently, we include legal enforcement of the country in our estimations. The law and order variable (LO) measures the strength and impartiality of the legal system, as well as widespread observance of the law. The source from which we extracted the data is the International Country Risk Guide (ICRG). The values of this indicator range between 0 and 6, with lower values reflecting poor legal enforcement.

3.1.3. Firm controls

In line with previous research analysing debt conditions (Qian and Strahan, 2007; Bae and Goyal, 2009; Álvarez-Botas, González, 2021b), we also include different firm-level variables to assess the effect of relationship banking on bank loan terms. To ascertain whether heterogeneity in borrower risk affects bank loan spreads, we consider the following explanatory variables: firm size (SIZE); profitability (PROFIT); leverage (LEV); tangibility (TANG); growth (GROWTH); and the borrower's credit rating (VRATING and DRATING).

Firm size (SIZE) is measured as the natural logarithm of total assets (in millions of US dollars). Small firms suffer greater informational asymmetries, while large firms have easier access to both internal and external financing, longer track records, and lower default risk, as they are normally more diversified. This suggests that larger firms should obtain better bank loan terms. Profitability (PROFIT) is measured as the ratio between earnings before interest and taxes and total assets. Banks face lower probabilities of default when borrowing firms are more profitable. In this context, firms with higher levels of current profits will be able to borrow from banks on relatively good terms. Leverage (LEV) is measured as the ratio between the book value of financial debt (short- and long-term debt) and the book value of total assets. Given that firms with high leverage face a greater likelihood of future insolvency, moral hazard problems are greater in these firms. We may therefore expect the terms of bank loans to worsen with leverage. However, higher leverage could also be a proxy for the good reputation of firms in the debt markets, which reduces contracting problems, in this case leverage can lead to better conditions in bank loans. Tangibility (TANG) is measured as the ratio between property, plant, and equipment and total assets. Intangible assets are more difficult to collateralize and suffer higher losses in value when firms experience financial distress. Moreover, the low level of information asymmetry associated with tangible assets makes it easier for lenders to monitor borrowers. Consequently, higher tangibility suggests better bank loan conditions. Growth (GROWTH) is proxied by the ratio of the market value of equity to the book value of equity. Growth firms face greater problems of information asymmetries, thus leading

[3] We choose a 5-year window as more than 75% of the loan facilities included in our sample have maturities of five years or less. Consequently, most of the borrowers in our sample must be refinancing within 5 years. For the same reason, Bharath et al. (2011) choose the same window to construct the lending relationship measures. Our results are qualitatively similar when we consider a 3-year window to identify relationship loans.

Table 1
Descriptive statistics.

	Number of observations	Mean	Median	Standard Deviation	First quartile	Third quartile
SPREAD	20,590	191.47	160.00	141.68	90.00	250.00
LN_SPREAD	20,590	4.97	5.08	0.81	4.50	5.52
COLLAT	12,544	0.69	1.00	0.46	0.00	1.00
MAT	20,590	50.43	60.00	21.48	36.00	60.00
LN_MAT	20,590	3.78	4.09	0.60	3.58	4.09
RL_d	20,590	0.71	1.00	0.45	0.00	1.00
RL_amount	20,273	0.62	1.00	0.45	0.00	1.00
RL_number	20,546	0.61	0.91	0.44	0.00	1.00
LO	20,590	4.96	5.00	0.48	5.00	5.00
CR	20,590	1.53	1.50	0.66	1.50	1.50
LN_SIZE	20,590	13.20	13.71	2.98	11.62	15.30
PROFIT	20,590	0.04	0.04	0.09	0.02	0.08
LEV	20,590	0.29	0.28	0.19	0.16	0.40
TANG	20,590	0.34	0.28	0.25	0.13	0.51
GROWTH	20,590	2.49	1.78	3.34	1.09	2.95
VRATING	20,590	2.07	0.00	2.40	0.00	4.00
DRATING	20,590	0.55	1.00	0.50	0.00	1.00
LN_SYND_SIZE	20,590	2.08	2.08	0.76	1.61	2.64
LN_LOAN_SIZE	20,590	5.28	5.38	1.59	4.28	6.40
COVENANTS	20,590	0.90	0.00	1.55	0.00	1.00
REPUTATION	20,590	4.37	5.00	1.14	4.00	5.00
PROXIMITY	20,590	0.95	1.00	0.21	1.00	1.00

The table reports the descriptive statistics of the variables. SPREAD is the interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; LN_SPREAD is the natural logarithm of SPREAD; COLLAT is a dummy variable that equals 1 if the loan was secured and zero otherwise; MAT is the maturity (in months); LN_MAT is the natural logarithm of MAT; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. SPREAD, MAT and firm-level control variables are winsorized at the 1% and 99% levels.

to higher contracting costs. However, such firms are less likely to engage in risky activities to expropriate creditors. We also include the borrower's credit rating (VRATING and DRATING), given that firms with high credit ratings may obtain more favourable loan terms. We obtain information on Moody's and S&P senior debt ratings at the year of the loan from Dealscan, which we use to control for borrower risk. We focus first on Moody's rating, unless it is missing, in which case we rely on the S&P rating. We construct a firm risk index (VRATING), ranging from one to six. Specifically, we assign a value of one to an Aaa rating, a value of two to an Aa rating, a value of three to an A rating, a value of four to a Baa rating, a value of five to a Ba rating, and a value of six to a B rating or worse. A higher number thus reflects a lower rating. We also assign a value of zero to firms without a rating. We also include a dummy variable (DRATING) that takes the value of 1 if the firm rating is missing and zero otherwise.

3.1.4. Loan controls

Along with firm-specific variables, we include several loan-specific characteristics in our estimations. We consider the number of banks in the loan (LN_SYND_SIZE), as banks have incentives to syndicate higher risk loans in order to spread the risk across a large number of lenders. This variable is measured as the natural logarithm of one plus the number of banks participating in the loan. The size of the loan (LOAN_SIZE) is the natural logarithm of the amount (in millions of US dollars). As larger loan sizes are associated with better borrowers, we expect that the bigger the loan, the lower the loan spread. We include a proxy for the presence of covenants in the loan. We focus on prepayment and dividend restrictions covenants. Prepayment covenants include those covenants that require early retirement of the loan on certain events, basically an asset sale or a security issuance. The prepayment covenants that we examine are asset, equity, debt and insurance sweeps. Dividend covenants limit the ability of the borrower to distribute cash to its shareholders. We construct a covenant index (COVENANTS) adding the value of one to the index if that specific covenant is included in the loan. This index varies between 0 and 5, with higher values being associated with the existence of more covenants. We consider a proxy for the

reputation of the lead arranger of the loan which is measured as arranger's market share (REPUTATION). [4] We count the number of times a bank participates as lead arranger in the loans in our sample. We assign a value of 5 to those banks participating in more than 1000 loans,[5] a value of 4 for leads with between 500 and 1000 loans, a value of 3 for 200–500 loans, a value of 2 for 100–200 loans and finally, a value of 1 for banks that are lead in less than 100 loans. For loans with multiple lead banks, the highest value of REPUTATION is used. PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the country of loan syndication are the same and zero otherwise. We also include loan type and loan purpose fixed effects to saturate our model from differences in bank loan conditions due to loan type or purpose. For each dependent variable the other two dependent variables are included as explanatory variables, except in the case of COLLAT because it would limit the number of observations in our estimations.

3.2. Descriptive statistics

Table 1 provides the descriptive statistics of dependent and explanatory variables. The mean (median) of the SPREAD variable is 191.47 (160) basis points and sixty-nine per cent of the loans are secured. The average (median) value of maturity is 50.43 months (60 months). Seventy-one per cent of the loans in our sample are relationship loans. The mean value of CR is 1.53 and the mean value of LO is 4.96. Most of the loans are credit lines (54%) and for general corporate purposes (45%).[6] The mean bank loan has a Moody's rating of A, as the mean value of VRATING is 2.07, and in the fifty-five per cent of the loans the credit rating is missing. The median loan has a lead arranger with the highest reputation and in ninety-five per cent of the loans the borrower's country coincides with the country of syndication.

In Table 2 we examine whether key loan and firm characteristics are significantly different for relationship and nonrelationship loans. We split the total sample based on the existence of prior relationships using the dummy variable that identifies the existence of repeated borrowing (RL_d). In the first column, we report the mean (median) values for dependent and explanatory variables, while the second column shows the same information for relationship loans. The last column reports the differences in mean (median) loan and firm characteristics between relationship and nonrelationship loans. We provide the t-statistic for differences in means and the z-statistic for Wilcoxon's rank sum test for differences in medians. On average, SPREAD is 55 basis points lower for a firm borrowing from a relationship lender compared to a borrower without a prior relationship with the bank, with this difference being statistically significant. In the same vein, relationship loans are less likely to be secured. Companies borrowing from relationship lenders are larger in size, more profitable, with more opportunities of growth and with a better credit rating than those borrowing from nonrelationship banks. The subsample of relationship loans have significantly higher leverage than nonrelationship loans, and is consistent with better access to debt for relationship loans. These differences between the two borrower groups are statistically significant at the 1% level. While these univariate tests provide preliminary evidence that borrowers obtain significant benefits from repeated borrowing, the results do not take into account potentially significant differences in borrower characteristics between relationship and non-relationship loans.

The descriptive statistics for dependent variables, for proxies of the relationship strength and for country variables are reported in Table 3. There is wide variation between countries in price and nonprice terms of loans and in proxies of relationship loans. As for legal enforcement, the mean value of LO is 4.96 however, in countries such as Colombia, Brazil, Argentina, Mexico and the Philippines the value is around 2, whereas others such as Austria, Denmark, Finland, Iceland, Ireland, Luxemburg and Norway stand out for having a high law and order value of 6. As regards the protection of creditors' rights, countries such as Ireland, Japan, Canada and Singapore exhibit a high level of this variable as the time for creditors to recover their credit after a default is low, whereas the degree of protection in Czech Republic, Brazil and Philippines is limited.

Table 4 presents the correlation matrix. The correlations between LN_SPREAD and COLLAT and the proxies for relationship loans are negative, a finding in line with banking relationships leading to better terms in bank loans. Meanwhile, the correlation of LN_MAT with the measures of relationship loans is positive but not always significant. LN_SPREAD correlates negatively with LO and CR. The correlation of LN_SPREAD with LO is as expected, seeing as higher law and order values are associated with lower spreads. However, the correlation of LN_SPREAD with CR is not as expected, given that a longer time for creditors to recover their credit should be associated with higher spreads. Bank loan spread correlates negatively with firm size, profitability, tangibility, growth, loan size, the size of the syndicate, reputation and proximity; while the correlation is positive with respect to leverage, maturity, collateral, borrower credit rating, and the dummy of credit rating. COLLAT is not correlated with LO, but has a positive correlation with CR. Furthermore, the collateral requirement correlates negatively with firm size, profitability, tangibility, growth, loan size, the size of the syndicate, reputation and proximity; whereas the correlation is positive with respect to leverage and maturity. Finally, loan maturity has positive correlations with protection of creditors' rights, profitability, leverage, VRATING, DRATING, syndicate size, loan size, and reputation; while the correlation is negative with legal enforcement, firm size and proximity with the lead arranger.

[4] We aggregate all lead arrangers to their parent company and assume that the information about the borrowers is shared between subsidiaries and parent companies. We also assume this exchange of information when there is a merger or an acquisition affecting the lead arrangers.

[5] The banks with a value of 5 for REPUTATION are: JP Morgan, Bank of America, Citigroup, Wells Fargo, Barclays, BNP Paribas, RBS, HSBC, Deutsche Bank, Bank of Tokyo, Credit Agricole, Mizuho Bank, Societe Generale, and Credit Suisse.

[6] The descriptive statistics of loan type and loan purpose are not shown for reasons of space.

Table 2
Descriptive statistics relationship vs. nonrelationship loans.

	Nonrelationship loans (RL_d=0)	Relationship loans (RL_d=1)	Statistic for differences
SPREAD	230.65	175.59	25.66***
	(200.00)	(150.00)	(23.81***)
LN_SPREAD	5.17	4.89	22.97***
	(5.30)	(5.01)	(23.81***)
COLLAT	0.82	0.63	21.07***
	(1.00)	(1.00)	(20.71***)
MAT	50.63	50.36	0.81
	(60.00)	(60.00)	(−1.83*)
LN_MAT	3.78	3.79	-0.75
	(4.09)	(4.09)	(−1.83*)
LO	4.90	4.98	-10.42***
	(5.00)	(5.00)	(−9.01***)
CR	1.62	1.49	12.21***
	(1.50)	(1.50)	(13.06***)
LN_SIZE	12.49	13.49	-22.16***
	(12.87)	(14.13)	(−26.73***)
PROFIT	0.03	0.04	-10.38***
	(0.04)	(0.05)	(−7.78***)
LEV	0.26	0.30	-12.75***
	(0.24)	(0.28)	(−15.07***)
TANG	0.34	0.34	-0.73
	(0.28)	(0.28)	(−1.78*)
GROWTH	2.34	2.47	-2.52**
	(1.66)	(1.82)	(−7.12***)
VRATING	1.45	2.32	-23.81***
	(0.00)	(2.00)	(−23.05***)
DRATING	0.70	0.49	28.77***
	(1.00)	(0.00)	(28.21***)
LN_SYND_SIZE	1.62	2.23	-46.68***
	(1.50)	(2.30)	(−43.16***)
LN_LOAN_SIZE	4.52	5.58	-45.71***
	(4.61)	(5.70)	(−44.20***)
COVENANTS	1.02	0.86	6.98***
	(0.00)	(0.00)	(6.11***)
REPUTATION	3.89	4.56	-39.58***
	(5.00)	(5.00)	(−36.27***)
PROXIMITY	0.93	0.96	-9.03***
	(1.00)	(1.00)	(−9.01***)

The table reports the differences in means and medians between relationship and nonrelationship loans. SPREAD is the interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; LN_SPREAD is the natural logarithm of SPREAD; COLLAT is a dummy variable that equals 1 if the loan was secured and zero otherwise; MAT is the maturity (in months); LN_MAT is the natural logarithm of MAT; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. SPREAD, MAT and firm-level control variables are winsorized at the 1% and 99% levels. The t-statistic for difference in means and the z-statistic for Wilcoxon's rank sum test are provided. *** , **, and * represent significance at the 1%, 5%, and 10% level, respectively.

4. Results

4.1. The value of relationship banking

Table 5 reports the results of the OLS estimation when the dependent variable is the interest rate spread of the loan, the standard errors being clustered at the borrower firm-level. Columns (1), (3) and (5) show the results when considering our proxies of banking

Table 3
Descriptive statistics by country.

Country	Observations	SPREAD	COLLAT	MAT	RL_d	RL_amount	RL_number	LO	CR
Argentina	5	570.00	1.00	31.20	0.00	0.00	0.00	2.20	2.40
Australia	316	184.71	0.63	46.97	0.75	0.63	0.61	5.57	1.00
Austria	19	67.74	0.00	60.74	0.79	0.70	0.74	6.00	1.10
Belgium	48	182.76	0.84	61.90	0.44	0.38	0.38	5.00	0.90
Brazil	68	167.63	0.75	52.18	0.49	0.26	0.25	2.06	6.38
Canada	631	219.38	0.74	44.51	0.68	0.64	0.64	5.74	0.80
Chile	33	147.36	0.57	53.64	0.45	0.31	0.34	4.85	4.51
China	234	266.98	0.88	49.53	0.35	0.30	0.29	3.70	1.78
Colombia	6	190.00	0.00	52.00	0.33	0.25	0.25	1.83	2.13
Croatia	5	104.00	–	44.60	0.60	0.55	0.50	4.70	3.10
Cyprus	7	307.14	1.00	58.86	0.86	0.86	0.86	5.00	1.50
Czech Republic	5	56.50	–	60.00	0.40	0.33	0.13	5.00	9.20
Denmark	19	206.58	1.00	63.16	0.63	0.58	0.55	6.00	2.18
Finland	61	127.30	0.47	55.36	0.67	0.62	0.62	6.00	0.90
France	501	144.59	0.58	58.90	0.71	0.66	0.64	4.97	1.90
Germany	415	156.96	0.64	56.90	0.74	0.67	0.64	5.00	1.20
Greece	53	186.43	0.93	67.68	0.55	0.52	0.51	4.23	2.08
Hong Kong	224	174.79	0.90	45.23	0.61	0.52	0.53	4.97	1.04
Iceland	7	261.43	–	61.71	0.00	0.00	0.00	6.00	1.00
India	341	232.48	0.95	69.38	0.53	0.39	0.39	4.05	4.30
Indonesia	79	297.73	1.00	47.51	0.59	0.54	0.54	2.87	2.18
Ireland	81	166.91	0.58	49.43	0.69	0.68	0.67	6.00	0.40
Italy	167	179.30	0.67	56.56	0.60	0.57	0.56	3.87	1.80
Japan	254	82.17	0.88	36.12	0.71	0.45	0.45	5.00	0.60
Korea	127	153.94	0.96	61.31	0.56	0.22	0.23	4.98	1.50
Luxembourg	39	236.69	0.75	49.21	0.77	0.76	0.71	6.00	2.00
Mexico	104	208.36	0.60	56.71	0.53	0.35	0.35	2.33	1.80
Netherlands	186	226.24	0.67	54.58	0.65	0.60	0.60	6.00	1.10
New Zealand	21	124.93	1.00	64.57	0.67	0.49	0.42	5.74	1.30
Norway	52	200.72	0.87	64.56	0.58	0.46	0.49	6.00	0.90
Pakistan	11	197.32	–	48.09	0.55	0.55	0.55	3.31	2.80
Peru	3	310.00	1.00	48.00	0.33	0.33	0.33	3.00	3.10
Philippines	31	203.53	1.00	52.87	0.77	0.57	0.55	2.39	5.51
Poland	23	86.70	0.67	61.30	0.61	0.38	0.44	4.34	3.00
Portugal	20	152.06	0.57	55.85	0.70	0.65	0.60	5.00	2.05
Qatar	3	115.00	0.00	48.00	0.67	0.67	0.67	5.00	2.80
Romania	5	168.40	–	36.00	0.20	0.20	0.20	4.00	3.30
Russia	121	222.50	0.45	45.04	0.80	0.53	0.51	3.84	2.00
Singapore	107	183.10	0.62	45.36	0.65	0.62	0.60	5.01	0.80
Spain	234	183.84	0.25	48.91	0.86	0.82	0.80	4.97	1.50
Sweden	83	141.74	0.84	63.13	0.63	0.63	0.63	5.98	2.00
Switzerland	147	96.68	0.14	39.57	0.80	0.74	0.72	5.00	3.00
Taiwan	1617	95.93	0.97	54.42	0.67	0.60	0.59	4.96	1.90
Thailand	14	351.57	0.75	41.86	0.21	0.21	0.21	2.50	2.19
Turkey	46	242.34	0.27	48.91	0.74	0.58	0.63	3.76	3.46
USA	13,252	206.08	0.68	49.46	0.73	0.64	0.63	4.97	1.44
United Kingdom	765	187.73	0.53	49.50	0.76	0.72	0.71	5.35	1.00
Total	20,590	191.47	0.69	50.43	0.71	0.62	0.61	4.96	1.53

The table reports the number of observations, the mean value of the dependent variables, of the proxies of RL, and the country variables (LO and CR) by country. SPREAD is the interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; COLLAT is a dummy variable that equals 1 if the loan was secured and zero otherwise; MAT is the maturity (in months); RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years.

relationship, firm-specific variables, and loan-specific characteristics. The results show that repeated borrowing from the same bank reduces loan spread, as forecast in Hypothesis 1, regardless of the proxy used to measure the repeated borrowing.

Columns (2), (4) and (6) also include the protection of creditors' rights and law and order variables. The LO variable has a negative coefficient, indicating that firms in countries with strong legal enforcement have a lower loan spread, a finding consistent with the evidence provided by Bae and Goyal (2009) and Álvarez-Botas, González (2021a). The level of protection and enforcement of creditors' rights (CR) has a positive coefficient, showing that firms in countries where it takes more time for creditors to recover their credit after a default have a higher loan spread, a result consistent with the evidence provided by Qian and Strahan (2007). Our results are hence in line with those reported in the law and finance literature, showing that firms in countries with an efficient judicial system and strong protection of investors' rights will obtain debt under better conditions. When the law and order and protection of creditors'

Table 4
Correlations.

	LN_SPREAD	COLLAT	LN_MAT	RL_d	RL_amount	RL_number	LO	CR	LN_SIZE	PROFIT	LEV	TANG	GROWTH	VRATING	DRATING	LN_SYND_SIZE	LN_LOAN_SIZE	COVENANTS	REPUTATION
COLLAT	0.50***																		
LN_MAT	0.08***	0.14***																	
RL_d	-0.16***	-0.18***	0.00																
RL_amount	-0.14***	-0.19***	0.03***	0.90***															
RL_number	-0.13***	-0.19***	0.03***	0.90***	0.98***														
LO	-0.04***	-0.00	-0.03***	0.07***	0.10***	0.10***													
CR	-0.03***	0.07***	0.07***	-0.08***	-0.11***	-0.11***	-0.54***												
LN_SIZE	-0.27***	-0.23***	-0.07***	0.16***	0.10***	0.09***	-0.03***	0.09***											
PROFIT	-0.28***	-0.24***	0.09***	0.07***	0.09***	0.09***	-0.06***	0.00	-0.08***										
LEV	0.17***	0.15***	0.07***	0.09***	0.05***	0.05***	-0.04***	0.05***	0.04***	-0.20***									
TANG	-0.02***	-0.03***	-0.01	0.01	-0.03***	-0.03***	-0.04***	0.09***	0.09***	-0.07***	0.22***								
GROWTH	-0.11***	-0.11***	-0.01	0.02**	0.03***	0.03***	0.00	-0.02***	-0.04***	0.23***	-0.05***	-0.07***							
VRATING	0.07***	-0.02***	0.04***	0.16***	0.12***	0.12***	0.03***	-0.07***	0.39***	-0.08***	0.24***	0.07***	-0.02***						
DRATING	0.11***	0.17***	0.02***	-0.20***	-0.15***	-0.15***	-0.04***	0.08***	-0.46***	0.02**	-0.17***	-0.07***	-0.01	-0.95***					
LN_SYND_SIZE	-0.33***	-0.31***	0.12***	0.31***	0.31***	0.30***	-0.02**	0.04***	0.27***	0.18***	0.05***	0.06***	0.02***	0.18***	-0.26***				
LN_LOAN_SIZE	-0.31***	-0.41***	0.03***	0.30***	0.29***	0.27***	0.04***	-0.10***	0.38***	0.19***	0.05***	0.06***	0.09***	0.34***	-0.43***	0.54***			
COVENANTS	0.29***	0.30***	0.06***	-0.05***	-0.06***	-0.06***	0.03	-0.05***	0.01	-0.14***	0.07***	-0.08***	-0.01	0.23***	-0.14***	-0.12***	-0.11***		
REPUTATION	-0.19***	-0.22***	0.07***	0.27***	0.26***	0.26***	0.03***	-0.09***	0.18***	0.13***	0.02***	0.04***	0.05***	0.23***	-0.26***	0.36***	0.44***	-0.08***	
PROXIMITY	-0.08***	-0.04***	-0.03***	0.07***	0.06***	0.06***	-0.01	0.04***	0.10***	-0.04***	0.01	0.02***	-0.02***	0.02***	-0.03***	0.03***	-0.01**	0.07***	-0.01

The table presents the correlation matrix. LN_SPREAD is the natural logarithm of SPREAD; COLLAT is a dummy variable that equals 1 if the loan was secured and zero otherwise; LN_MAT is the natural logarithm of MAT; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. *** , **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 5
Relationship banking and interest rate spread of bank loans.

	(1)	(2)	(3)	(4)	(5)	(6)
RL_d	-0.06***	-0.06***				
	(−4.91)	(−4.74)				
RL_amount			-0.07***	-0.07***		
			(−5.27)	(−5.19)		
RL_number					-0.07***	-0.07***
					(−5.35)	(−5.24)
LO		-0.22***		-0.22***		-0.22***
		(−4.14)		(−4.09)		(−4.16)
CR		0.05*		0.04*		0.05*
		(1.77)		(1.71)		(1.77)
LN_SIZE	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	(−10.67)	(−11.05)	(−11.03)	(−11.36)	(−10.75)	(−11.13)
PROFIT	-1.27***	-1.27***	-1.28***	-1.27***	-1.27***	-1.26***
	(−17.10)	(−17.14)	(−17.10)	(−17.14)	(−17.06)	(−17.10)
LEV	0.32***	0.32***	0.32***	0.32***	0.32***	0.32***
	(8.57)	(8.63)	(8.51)	(8.57)	(8.56)	(8.62)
TANG	-0.05*	-0.04	-0.04	-0.04	-0.05*	-0.04
	(−1.65)	(−1.47)	(−1.50)	(−1.33)	(−1.72)	(−1.54)
GROWTH	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(−4.90)	(−4.99)	(−5.01)	(−5.10)	(−4.89)	(−4.99)
VRATING	0.36***	0.36***	0.36***	0.36***	0.36***	0.36***
	(33.54)	(33.44)	(33.14)	(33.04)	(33.41)	(33.30)
DRATING	1.70***	1.70***	1.69***	1.69***	1.70***	1.70***
	(30.31)	(30.32)	(30.00)	(30.00)	(30.26)	(30.26)
LN_SYND_SIZE	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***
	(−4.70)	(−4.61)	(−4.47)	(−4.37)	(−4.57)	(−4.48)
COVENANTS	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***
	(12.16)	(12.01)	(11.97)	(11.80)	(12.09)	(11.93)
LN_MAT	0.09***	0.08***	0.09***	0.09***	0.09***	0.09***
	(7.22)	(7.22)	(7.22)	(7.22)	(7.32)	(7.31)
LN_LOAN_SIZE	-0.07***	-0.07***	-0.07***	-0.07***	-0.07***	-0.07***
	(−12.23)	(−12.24)	(−12.02)	(−12.03)	(−12.24)	(−12.25)
REPUTATION	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***
	(−10.30)	(−10.22)	(−10.06)	(−9.98)	(−10.25)	(−10.16)
PROXIMITY	-0.15***	-0.15***	-0.15***	-0.14***	-0.15***	-0.14***
	(−4.08)	(−3.80)	(−4.01)	(−3.74)	(−4.01)	(−3.74)
Constant	5.48***	5.85***	5.49***	5.85***	5.48***	5.85***
	(16.01)	(17.49)	(15.90)	(17.37)	(16.00)	(17.51)
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,590	20,273	20,273	20,546	20,546
#firms	4667	4667	4654	4654	4666	4666
Adj R^2 (%)	62.75	62.89	62.64	62.78	62.79	62.93
F-test	157.88***	170.27***	155.17***	162.03***	157.37***	168.70***

Regressions are estimated using OLS clustered by borrower firm. The dependent variable is LN_SPREAD and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

rights variables are included in the estimations, the three proxies for relationship loans maintain their negative, significant coefficients. The coefficient for RL_d in column (2) suggests that a relationship loan is associated with a reduction in the interest rate spread of 8.39 basis points.

The signs of the coefficients obtained for borrower-level variables are as expected. Larger or more profitable firms borrow at lower interest rates. High leverage is associated with higher interest rates, which means that firms with high leverage face a greater likelihood of future insolvency, leading to higher interest rates. The market-to-book ratio (GROWTH) is negatively related to loan spreads, reflecting that growth firms are less likely to engage in risky activities to expropriate creditors. Safer borrowers (firms with a lower value of the VRATING variable) obtain loans at lower interest rates, while firms without a rating (DRATING) face higher costs.

In addition to firm-specific variables, we also include several loan-specific characteristics in our estimations. Loans from larger syndicates or loans that are larger in size have lower loan spreads, probably as a result of the diversification of risk across a larger number of lenders.[7] Loans with longer maturity have higher loan spreads, reflecting that banks charge higher spreads on loans with longer maturities, a finding in line with the "credit quality" hypothesis. Loans with a higher number of covenants pay higher spreads. Finally, both reputation and proximity of the lead arranger reduce the interest rate spread.

Table 6 shows the results when the dependent variable is a dummy variable (COLLAT) that takes the value of 1 if the loan is secured and zero otherwise. In this case, we run a probit model, the standard errors being clustered at the borrower firm-level. Relationship loans are associated with lower collateral, as the coefficients of the three proxies for relationship loans are negative and significant. The LO variable has a positive and significant coefficient, suggesting that borrowers in countries with higher legal enforcement are more likely to post collateral. It may be due to lenders having more incentives to require collateral when the legal system is efficient. The requirement of collateral is not related to the protection and enforcement of the creditors' rights.

Larger or more profitable firms are required to pledge less collateral. The coefficient of leverage is positive, revealing that highly leveraged firms have to provide collateral. The market-to-book ratio (GROWTH) is negatively related to collateral requirement, reflecting that growth firms are less likely to be required to post collateral, probably reflecting less incentives to expropriate creditors as they will have to access to the market repeatedly. Risky borrowers (firms with a higher value in the VRATING variable) have to pledge collateral to obtain loans, while firms without a rating (DRATING) also face a higher collateral requirement.

The results for loan-specific characteristics are as follows: (1) loans from larger syndicates or loans that are larger in size have less collateral requirements, probably as a result of the diversification of risk across a larger number of lenders; (2) loans with longer maturity have to pledge more collateral, reflecting that banks require more collateral on loans with longer maturities, as they are more risky; (3) loans paying higher interest rates are also required to post more collateral; (4) loans with a higher number of covenants have to post collateral; and (5) reputation and proximity of the lead arranger makes it less likely for them to require collateral from borrowers.

Table 7 reports the results of estimating model [2]. Relationship loans are associated with lower maturity, regardless of the proxy measuring the relationship strength. This result suggests that repeated borrowing reduces refinancing risk and makes borrowers move to shorter debt. Legal enforcement and protection of creditors' rights do not have any influence on loan maturity.

More profitable and more risky firms borrow at longer maturities. Similarly, borrowers without a credit rating also choose long-term bank loans. Larger loans and loans from larger syndicates have longer maturities. Loans with more covenants have also longer maturities. Higher reputation of the lead arranger increases maturity, while proximity reduces it.

Summing up, relationship loans are associated with lower spread, collateral and maturity of the bank loans. These results provide evidence that borrowers obtain benefits from relationship banking as regards price and nonprice terms of bank loans, however they do not consider the fact that repeated borrowing is systematically related to differences in firm and loan characteristics. In such way, the impact of borrowing from relationship lenders could arise from differences between relationship and nonrelationship loans, as the decision to form a relationship may be endogenous. To address this issue, we use Propensity Score Matching (PSM) to estimate the predicted probability of loans belonging to relationship lenders based on firm and loan characteristics. We estimate a logit model to obtain propensity score to be a relationship lender, using as dependent variable RL_d. The borrower and loan characteristics to generate the probability of that loan being obtained from a relationship lender are firm size, profitability, leverage, tangibility, growth, rating variables, loan size, loan purpose and loan type dummy variables and industry dummies. We use two specifications of matching. First, the average treatment effect (ATE) is estimated by matching each subject to a single subject with the opposite treatment whose propensity score is closest. Second, we estimate the average treatment effect on the treated (ATET) using a caliper (0.02).

Table 8 shows that for both matching specifications, spread and requirement of collateral are lower for relationship loans. In column (1) we report the mean LN_SPREAD differences between relationship loans and nonrelationship loans, while columns (2) and (3) report the mean differences for COLLAT and LN_MAT. Spreads are between 7.76 and 9.73 basis points lower for relationship loans. These figures are similar to the evidence obtained from Table 5. Similarly, the mean difference for collateral between both groups reveals that relationship loans are less likely to require collateral. These results suggest that the differences in spread and collateral are not due to differences in the characteristics of the sample. However, we do not find differences in maturity for either of the specifications.

Thus, in line with our Hypothesis 1, relationship bank loans have better loan terms than non-relationship bank loans, as relationship loans pay lower spreads and pledge less collateral, suggesting that the establishment of relationships with banks generates

[7] We have also considered the Herfindahl index —computed using the share of each lead arranger in the loan—as a proxy for the ownership structure of the loan. Although, the results are in line with more concentrated loans increasing loan spread, they are not always statistically significant. This lack of significance could be due to the smaller number of observations when we use the Herfindahl index instead of LN_SYND_SIZE.

Table 6
Relationship banking and collateral of bank loans.

	(1)	(2)	(3)	(4)	(5)	(6)
RL_d	-0.12**	-0.12**				
	(−2.28)	(−2.33)				
RL_amount			-0.12**	-0.13**		
			(−2.25)	(−2.34)		
RL_number					-0.12**	-0.13**
					(−2.26)	(−2.36)
LO		0.45*		0.42*		0.44*
		(1.95)		(1.77)		(1.88)
CR		-0.24		-0.25		-0.25
		(−1.29)		(−1.37)		(−1.36)
LN_SIZE	-0.09***	-0.09***	-0.10***	-0.09***	-0.09***	-0.09***
	(−5.97)	(5.55)	(−6.27)	(−5.86)	(−5.93)	(−5.51)
PROFIT	-1.47***	-1.47***	-1.42***	-1.43***	-1.47***	-1.47***
	(−4.25)	(−4.25)	(−4.13)	(−4.14)	(−4.25)	(−4.26)
LEV	0.89***	0.88***	0.87***	0.86***	0.89***	0.87***
	(5.33)	(5.27)	(5.15)	(5.10)	(5.29)	(5.23)
TANG	-0.14	-0.14	-0.13	-0.12	-0.15	-0.14
	(−1.11)	(−1.10)	(−0.97)	(−0.95)	(−1.13)	(−1.11)
GROWTH	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**
	(−2.22)	(−2.18)	(−2.20)	(−2.16)	(−2.23)	(−2.19)
VRATING	0.56***	0.57***	0.56***	0.57***	0.56***	0.56***
	(9.87)	(9.97)	(9.75)	(9.86)	(9.77)	(9.89)
DRATING	2.66***	2.67***	2.65***	2.66***	2.64***	2.65***
	(9.61)	(9.71)	(9.43)	(9.54)	(9.51)	(9.61)
LN_SYND_SIZE	-0.19***	-0.19***	-0.19***	-0.19***	-0.19***	-0.19***
	(−4.42)	(−4.41)	(−4.39)	(−4.38)	(−4.41)	(−4.39)
COVENANTS	0.24***	0.24***	0.24***	0.24***	0.24***	0.24***
	(12.06)	(12.15)	(11.94)	(12.02)	(12.04)	(12.13)
LN_MAT	0.25***	0.25***	0.25***	0.26***	0.26***	0.26***
	(5.54)	(5.53)	(5.61)	(5.59)	(5.65)	(5.64)
LN_SPREAD	0.78***	0.78***	0.79***	0.79***	0.78***	0.78***
	(13.42)	(13.39)	(13.49)	(13.46)	(13.40)	(13.36)
LN_LOAN_SIZE	-0.07***	-0.08***	-0.07***	-0.07***	-0.07***	-0.08***
	(−2.98)	(−3.17)	(−2.85)	(−3.03)	(−3.09)	(−3.27)
REPUTATION	-0.05**	-0.05**	-0.05*	-0.05**	-0.05*	-0.05**
	(−1.97)	(−2.06)	(−1.95)	(−2.04)	(−1.95)	(−2.04)
PROXIMITY	-0.30*	-0.32**	-0.29*	-0.30**	-0.29*	-0.31**
	(−1.93)	(−2.09)	(−1.86)	(−1.99)	(−1.90)	(−2.04)
Constant	-5.66***	-7.85***	-5.67***	-7.70***	-5.66***	-7.79***
	(−9.81)	(−5.93)	(−9.73)	(−5.67)	(−9.79)	(−5.81)
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
# observations	12,478	12,478	12,298	12,298	12,446	12,446
#firms	3404	3404	3393	3393	3403	3403
Pseudo R^2 (%)	49.94	50.03	49.97	50.06	49.84	49.93
Chi2-test	1535.41***	1530.89***	1511.00***	1508.92***	1531.93***	1528.11***

Regressions are estimated using a probit model clustered by borrower firm. The dependent variable is COLLAT a dummy variable that equals 1 if the loan was secured and zero otherwise; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 7
Relationship banking and maturity of bank loans.

	(1)	(2)	(3)	(4)	(5)	(6)
RL_d	-0.05***	-0.05***				
	(−5.08)	(−5.09)				
RL_amount			-0.02*	-0.02*		
			(−1.90)	(−1.91)		
RL_number					-0.03**	-0.03**
					(−2.49)	(−2.50)
LO		-0.01		0.01		-0.00
		(−0.14)		(0.15)		(−0.08)
CR		-0.03		-0.02		-0.02
		(−1.15)		(−1.09)		(−1.07)
LN_SIZE	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(−6.70)	(−6.64)	(−7.10)	(−7.01)	(−6.80)	(−6.74)
PROFIT	0.78***	0.78***	0.77***	0.77***	0.78***	0.78***
	(11.19)	(11.18)	(11.03)	(11.02)	(11.16)	(11.15)
LEV	0.04	0.04	0.03	0.03	0.03	0.03
	(1.23)	(1.21)	(0.78)	(0.76)	(0.98)	(0.95)
TANG	0.01	0.01	0.02	0.02	0.02	0.02
	(0.59)	(0.59)	(0.72)	(0.71)	(0.67)	(0.67)
GROWTH	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(−1.35)	(−1.36)	(−1.13)	(−1.13)	(−1.28)	(−1.29)
VRATING	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
	(11.11)	(11.12)	(11.08)	(11.09)	(11.12)	(11.12)
DRATING	0.50***	0.50***	0.50***	0.50***	0.50***	0.50***
	(10.49)	(10.50)	(10.50)	(10.50)	(10.54)	(10.54)
LN_SYND_SIZE	0.09***	0.09***	0.08***	0.08***	0.08***	0.08***
	(8.86)	(8.84)	(8.42)	(8.40)	(8.61)	(8.59)
COVENANTS	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
	(7.50)	(7.53)	(7.44)	(7.48)	(7.44)	(7.47)
LN_SPREAD	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***
	(7.40)	(7.39)	(7.40)	(7.40)	(7.50)	(7.49)
LN_LOAN_SIZE	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***
	(9.02)	(8.99)	(8.97)	(8.95)	(8.81)	(8.79)
REPUTATION	0.02***	0.01***	0.01***	0.01***	0.01***	0.01***
	(2.84)	(2.84)	(2.64)	(2.63)	(2.69)	(2.68)
PROXIMITY	-0.13***	-0.13***	-0.13***	-0.13***	-0.13***	-0.13***
	(−4.76)	(−4.77)	(−4.74)	(−4.77)	(−4.74)	(−4.75)
Constant	2.46***	2.53***	2.49***	2.53***	2.49***	2.54***
	(9.43)	(9.00)	(9.60)	(9.06)	(9.55)	(9.07)
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,590	20,273	20,273	20,546	20,546
#firms	4667	4667	4654	4654	4666	4666
Adj R^2 (%)	29.54	29.54	29.53	29.54	29.46	29.46
F-test	61.95***	60.74***	60.02***	58.81***	60.92***	59.76***

Regressions are estimated using OLS clustered by borrower firm. The dependent variable is LN_MAT the natural logarithm of maturity (in months) of the loan; RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; LN_SIZE is the natural logarithm of the firm's total assets (in millions of US $); PROFIT is the ratio between earnings before interest and taxes and total assets; LEV is the ratio between the book value of debt and the book value of total assets; TANG is the ratio between property, plant, and equipment and total assets; GROWTH is the ratio of the market value of equity to the book value of equity; VRATING is a firm risk index using Moody's and S&P ratings that ranges from one to six, a value of one being assigned to an Aaa rating, a value of two indicating an Aa rating, …, and six indicating a B rating or worse – we assign a zero to borrowers without a rating; DRATING is a dummy variable that takes the value of 1 if the rating of the firm is missing and zero otherwise; LN_SYND_SIZE is the natural logarithm of one plus the number of banks participating in the loan; LN_LOAN_SIZE is the natural logarithm of the loan (in millions of US $); COVENANTS is an index that adds a value of 1 if someone of these covenants (asset, equity, debt and insurance sweeps, and dividend restrictions) are included in the loan; REPUTATION is variable which takes values between 1 and 5 according to the number of times that a bank is a lead arranger in the sample; and PROXIMITY is a dummy variable that takes the value of 1 if the borrower's country and the syndication country are the same and zero otherwise. Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 8
Relationship banking for matched samples.

	LN_SPREAD	COLLAT	LN_MAT
ATE	-0.07***	-0.03***	-0.01
	(−4.47)	(−2.86)	(−0.74)
ATET	-0.06***	-0.03**	-0.00
	(−2.84)	(−2.38)	(−0.29)

Table reports the mean interest rate spread (column (1)), collateral (column (2)) and maturity (column (3)) differences between relationship and nonrelationship loans by using the propensity score estimators to match them. We use two specifications: 1) the average treatment effect (ATE) is estimated by matching each relationship loan to a nonrelationship loan whose propensity score is closest, and 2) the average treatment effect on the treated (ATET) using a caliper (0.02). T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 9
Relationship banking and bank loan terms during the financial crisis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RL_d	-0.08***			-0.10*			-0.05***		
	(−5.81)			(−1.73)			(−4.47)		
RL_amount		-0.08***			-0.12**			-0.01	
		(−6.16)			(−2.03)			(−1.07)	
RL_number			-0.08***			-0.12**			-0.02*
			(−6.11)			(−2.06)			(−1.67)
LO	-0.22***	-0.22***	-0.22***	0.45*	0.42*	0.44*	-0.01	0.01	-0.00
	(−4.13)	(−4.06)	(−4.15)	(1.95)	(1.76)	(1.88)	(−0.15)	(0.13)	(−0.08)
CR	0.05*	0.04*	0.04*	-0.24	-0.25	-0.25	-0.03	-0.02	-0.02
	(1.75)	(1.65)	(1.72)	(−1.30)	(−1.37)	(−1.36)	(−1.15)	(−1.05)	(−1.04)
CRISIS	0.37***	0.38***	0.39***	0.47**	0.42**	0.38*	-0.15***	-0.13***	-0.14***
	(7.19)	(7.49)	(7.60)	(2.34)	(2.12)	(1.96)	(−3.35)	(−2.92)	(−3.18)
CRISIS*RL_d	0.14***			-0.19			-0.04		
	(4.45)			(−1.45)			(−1.30)		
CRISIS*RL_amount		0.15***			-0.09			-0.08**	
		(4.29)			(−0.65)			(−2.32)	
CRISIS*RL_number			0.14***			-0.08			-0.07**
			(3.98)			(−0.59)			(−2.18)
Constant	5.85***	5.86***	5.86***	-7.87***	-7.71***	-7.80***	2.53***	2.52***	2.53***
	(17.69)	(17.55)	(17.70)	(−5.95)	(−5.67)	(−5.81)	(8.97)	(8.99)	(9.01)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,273	20,546	12,478	12,298	12,446	20,590	20,273	20,546
#firms	4667	4654	4666	3404	3393	3403	4667	4654	4666
Adj R^2 / Pseudo R^2 (%)	62.96	62.84	62.98	50.05	50.06	49.93	29.55	29.57	29.49
F-test / Chi2-test	163.18***	157.07***	162.52***	1534.05***	1509.20***	1528.71***	59.96***	58.15***	59.04***

Regressions are estimated using OLS clustered by borrower firm in columns (1) to (3) and columns (7) to (9) and a probit model in columns (4) to (6). The dependent variable is LN_SPREAD in columns (1) to (3) and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; the dependent variable is COLLAT in columns (4) to (6) and is measured as a dummy variable that equals 1 if the loan was secured and zero otherwise; and the dependent variables is LN_MAT in columns (7) to (9) and is measured as the natural logarithm of the loan maturity (in months). RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

benefits for borrowers.

4.2. The value of relationship banking during the global financial crisis

Table 9 gives the results for the regressions explaining the terms of bank loans (interest rate spread, the requirement of collateral

Table 10
Relationship banking and bank loan terms according to the protection of creditors' rights.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RL_d	-0.11***			-0.64***			-0.07**		
	(−3.32)			(−3.08)			(−2.42)		
RL_amount		-0.13***			-0.66**			0.02	
		(−3.43)			(−2.45)			(0.59)	
RL_number			-0.12***			-0.75***			0.02
			(−3.07)			(−2.73)			(0.48)
LO	-0.22***	-0.22***	-0.22***	0.42*	0.43*	0.44*	-0.01	0.01	-0.00
	(−4.16)	(−4.09)	(−4.17)	(1.86)	(1.83)	(1.89)	(−0.15)	(0.17)	(−0.05)
CR	0.04	0.04	0.04	-0.50**	-0.35	-0.40**	-0.03	-0.02	-0.02
	(1.48)	(1.52)	(1.59)	(−2.37)	(−1.62)	(−1.98)	(−1.34)	(−0.93)	(−0.88)
RL_d*CR	0.03*			0.35***			0.01		
	(1.65)			(2.61)			(0.59)		
RL_amount*CR		0.04*			0.36**			-0.03	
		(1.79)			(2.04)			(−1.43)	
RL_number*CR			0.04			0.42**			-0.03
			(1.45)			(2.33)			(−1.50)
Constant	5.88***	5.88***	5.87***	-7.33***	-7.49***	-7.45***	2.54***	2.51***	2.52***
	(17.63)	(17.53)	(17.65)	(−5.64)	(−5.58)	(−5.66)	(9.07)	(9.06)	(9.07)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,273	20,546	12,478	12,298	12,446	20,590	20,273	20,546
#firms	4667	4654	4666	3404	3393	3403	4667	4654	4666
Adj R^2 / Pseudo R^2 (%)	62.90	62.80	62.94	50.12	50.13	50.02	29.54	29.55	29.47
F-test / Chi2-test	259.94***	239.71***	250.15***	1544.87***	1535.61***	1556.44***	60.06***	58.67***	59.59***

Regressions are estimated using OLS clustered by borrower firm in columns (1) to (3) and columns (7) to (9) and a probit model in columns (4) to (6). The dependent variable is LN_SPREAD in columns (1) to (3) and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; the dependent variable is COLLAT in columns (4) to (6) and is measured as a dummy variable that equals 1 if the loan was secured and zero otherwise; and the dependent variables is LN_MAT in columns (7) to (9) and is measured as the natural logarithm of the loan maturity (in months). RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; RL_amount is the relative weight of the amount lent by a lead arranger bank that has been a lead arranger in the past within a 5-year window in relation to the total amount of the loans obtained in the last 5 years; RL_number is the number of loans obtained from a lead arranger that had been also a lead arranger in the past 5 years in relation to the number of loans obtained in the last 5 years; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

and maturity) for relationship loans during the global financial crisis. We define CRISIS as a dummy variable that takes the value of one in the crisis years (2008–2009), and zero otherwise. The interaction terms between RL_d, RL_amount and RL_number and the proxy for the financial crisis measure the difference in the terms of bank loans for relationship loans in the crisis period compared to the non-crisis period.

Columns (1) to (3) report the results for interest rate spread. The coefficients for the interaction terms, CRISIS*RL_d, CRISIS*RL_amount, and CRISIS*RL_number are positive and statistically significant. This positive sign of the interaction term coefficients is consistent with the increase of interest rate spreads for relationship bank loans during the crisis. The coefficients of the proxies of relationship loans in columns (1) to (3) are negative and significant, showing that during the non-crisis period relationship loans reduce interest rate spread. The existence of higher interest rate spreads for relationship loans during the financial crisis is consistent with hypothesis two. Finally, the coefficient for CRISIS is positive and significant in line with higher interest rate spreads for bank loans during the crisis period. This last result is consistent with previous evidence showing an increase in interest rate spreads of bank loans during the global financial crisis (Álvarez-Botas et al., 2022; Santos, 2011). The coefficients reported in column (1) suggest that obtaining a relationship loan is associated with a reduction in the interest rate spread of 11.07 basis points during the non-crisis period and with an increase of 8.90 basis points during the financial crisis.

When the requirement of collateral is considered as a dependent variable (columns (4) to (6)) there is no difference in the effect of obtaining a relationship loan during crisis or non-crisis periods as the coefficients of the interaction terms between CRISIS and the measures of relationship loans are not statistically significant. Additionally, the coefficient of CRISIS is positive and significant in line with higher requirements of collateral for bank loans during the crisis.

Columns (7) to (9) in Table 9 show the results for loan maturity. The coefficients for the proxies of relationship loans and their interaction terms with CRISIS are negative, although not always statistically significant. The joint interpretation of these results suggest that maturity is lower for relationship loans and loan maturity decreases even more during the crisis. Additionally, the

coefficient for the crisis is negative and significant. This result is consistent with the evidence provided by González (2015) with corporate debt maturity declining during the financial crisis.

Firm- and loan-control variables behave as in Tables 5, 6 and 7 for spread, collateral and maturity, although their coefficients are not tabulated.

4.3. The value of relationship banking according to the protection of creditors' rights

Table 10 shows the results when we consider the joint effect of relationship loans and the protection of creditors' rights through the interaction term between the proxies for relationship loans and protection of creditors' rights (CR). The coefficient of the interaction term between relationship loans and CR measures the effect of repeated borrowing on bank loan terms when the protection of creditors' rights decreases, as our measure of creditors' rights has an inverse relationship with the protection and enforcement of these rights.

In columns (1) to (3) the dependent variable is the interest rate spread of the bank loan. The coefficients of RL_d*CR and RL_amount*CR are positive and significant, in line with a higher value of relationship banking in countries with stronger protection of creditors' rights. However, the coefficient for RL_number*CR is positive although not statistically significant. The coefficients for relationship loans remain negative, as in Table 5. Consequently, our results suggest that relationship loans pay lower spreads in countries with stronger protection of creditors' rights. In terms of economic significance, the coefficients reported in column (1) suggest that in those countries where the protection of creditors' rights is weak (e.g. Romania, where creditors have to wait 3.3 years to recover their credit after a default), obtaining a relationship loan is associated with a reduction in the loan spread of 1.58 basis points, a value that is close to zero. However, in countries where the protection of creditors' rights is higher (e.g. Norway, Finland, and Belgium, where creditors have to wait 0.9 years to recover their credit after a default), obtaining a relationship loan is associated with a reduction in the loan spread of 11.47 basis points. We can therefore conclude that relationship banking reduces loan spread and does so to a greater extent when there is strong protection of creditors' rights.

When the dependent variable is the requirement of collateral, the results reveal that the coefficients of RL_d is negative (column (4)), in line with a reduction in collateral requirement in relationship loans, while the coefficients of the interaction terms between the proxies of relationship loans and CR are positive and significant, as this reduction in collateral requirement for relationship loans is higher in countries where creditors' rights are well protected. In terms of economic significance, the coefficients reported in column (4) suggest that obtaining a relationship loan is associated with a 3.30% decrease in the probability of requiring collateral for a country with average protection of creditors rights (for example, Cyprus, Korea or Spain where the time creditors have to wait to recover their credit after a default is 1.5 years). However, this reduction in the probability of requiring collateral is 11.18% in countries such as Belgium, Finland and Norway where the value of CR is 0.9 years.

Columns (7) to (9) in Table 10 show the results when the dependent variable is loan maturity. We observe that the interaction terms between the proxies for relationship loans and CR are not significant. This result suggests that the effect of relationship loans on maturity does not differ according to protection of creditors' rights.

As for our third hypothesis, the results confirm Hypothesis 3b for spread and the requirement of collateral, as relationship bank loans will have better conditions than non-relationship bank loans mainly in countries with strong protection of creditors' rights, demonstrating the complementary role of relationship banking and creditor protection.

5. Robustness analysis

This section focuses on four methodological issues that could affect our results, i.e. the composition of the sample, the definition of the crisis period, additional country variables in our baseline model, and the potential endogeneity between interest rate spread, collateral and maturity.

First, in order to test whether our results were driven by US firms, which dominate the sample under study, we estimate the results of Tables 5, 6 and 7 considering a dummy variable (D_noUS) that takes the value of one if the borrower is a non-US firm and zero if the borrower is a US firm. We also consider if the effect of relationship loans could be different for emerging countries.[8] To do that we include a dummy variable (D_EMERG) in the estimations that takes the value of one if the borrower is a firm from an emerging country and zero otherwise. These two dummy variables are multiplied by RL_d, the coefficients of the interaction terms measuring the differential effect of relationship loans for these countries. Columns (1) and (2), (4) and (5), and (7) and (8) show the results, respectively, for interest rate spread, collateral and maturity. First, the coefficients of the interaction terms D_noUS*RL_d are not significant in columns (1) and (4) showing that relationship loans have no different effects on interest rate spread and collateral for US and non-US borrowers. Consequently, relationship loans reduce interest rate spread and collateral equally for US and non-US borrowers. The coefficient for D_noUS*RL_d in column (7) of Table 11 is negative and significant, while the coefficient for RL_d is statistically insignificant. These results suggest that the reduction of loan maturity shown in Table 7 is due to non US companies. Second, for emerging countries we find that relationship loans have to pledge more collateral than non-relationship loans, as the coefficient for D_EMERG*RL_d is positive and significant in column (5).

[8] Emerging market economies are classified in different ways by different observers. Levels of income, quality of financial systems, and growth rates are all popular criteria but the exact list of emerging market economies vary depending on the institution. We consider the following to be emerging economies: Brazil, Chile, China, Colombia, India, Indonesia, Mexico, the Philippines, Russia, South Korea, Taiwan, Thailand and Turkey.

Table 11
Robustness analysis (I): Sample composition and definition of the crisis period.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RL_d	-0.06***	-0.06***	-0.08***	-0.08	-0.15***	-0.07	-0.02	-0.05***	-0.05***
	(−4.38)	(−4.32)	(−6.18)	(−1.52)	(−2.76)	(−1.27)	(−1.32)	(−4.77)	(−4.63)
LO	-0.22***	-0.22***	-0.22***	0.45*	0.45**	0.45*	-0.01	-0.01	-0.01
	(−4.14)	(−4.13)	(−4.11)	(1.93)	(1.97)	(1.95)	(−0.16)	(−0.15)	(−0.14)
CR	0.05*	0.05*	0.05*	-0.22	-0.25	-0.24	-0.02	-0.03	-0.03
	(1.77)	(1.77)	(1.76)	(−1.18)	(−1.39)	(−1.32)	(−1.11)	(−1.14)	(−1.15)
D_noUS	0.14			-0.32			0.13		
	(0.46)			(−1.20)			(0.60)		
D_noUS*RL_d	0.00			-0.23			-0.10***		
	(0.07)			(−1.44)			(−4.52)		
D_EMERG		-0.43			0.20			-0.07	
		(−1.45)			(0.25)			(−0.29)	
D_EMERG*RL_d		-0.00			0.40*			0.01	
		(−0.06)			(1.76)			(0.24)	
CRISIS			0.23***			0.57***			0.03
			(4.98)			(3.02)			(0.85)
CRISIS*RL_d			0.14***			-0.23**			-0.01
			(5.23)			(−2.03)			(−0.39)
Constant	5.71***	7.67***	5.89***	-7.44***	-7.82***	-7.90***	2.40***	2.53***	2.53***
	(18.37)	(22.97)	(19.17)	(−5.68)	(−5.96)	(−5.97)	(8.77)	(9.01)	(9.02)
Firm-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,590	20,590	12,478	12,478	12,478	20,590	20,590	20,590
#firms	4667	4667	4667	3404	3404	3404	4667	4667	4667
Adj R^2 / Pseudo R^2 (%)	62.89	62.89	62.98	50.07	50.07	50.07	29.66	29.54	29.54
F-test / Chi2-test	170.73***	169.43***	161.19***	1514.60***	1556.90***	1529.87***	61.89***	60.11***	59.73***

Regressions are estimated using OLS clustered by borrower firm in columns (1) to (3) and columns (7) to (9) and a probit model in columns (4) to (6). The dependent variable is LN_SPREAD in columns (1) to (3) and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; the dependent variable is COLLAT in columns (4) to (6) and is measured as a dummy variable that equals 1 if the loan was secured and zero otherwise; and the dependent variables is LN_MAT in columns (7) to (9) and is measured as the natural logarithm of the loan maturity (in months). RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; D_noUS is a dummy variable that takes the value of 1 if the borrower is a non-US firm and 0 if the borrower is a US firm; D_EMERG is a dummy variable that takes the value of 1 if the borrower is a firm from an emerging country and 0 otherwise; CRISIS is a dummy variable that takes the value of 1 for the years 2008–2010 and 0 otherwise. Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Second, we test whether our results are robust when considering a different definition for the crisis period. We consider a dummy variable identifying an alternative length for the crisis in column (3) of Table 11 for interest rate spread, in column (6) for collateral and in column (9) for maturity. The dummy variable for the crisis takes the value of one for the years 2008–2010, and zero otherwise. This dummy variable is multiplied by RL_d, reflecting the effect of relationship loans on the terms of bank loans during the period 2008–2010. The coefficient of CRISIS*RL_d is positive and significant in column (3), suggesting an increase in interest rate spread for relationship loans during the crisis and corroborating the results reported in Table 9. The coefficient of CRISIS*RL_d is negative and statistically significant in column (6) showing that the requirement for collateral falls during the crisis for relationship loans when we consider a longer crisis period. The coefficient of CRISIS is positive and significant in columns (3) and (6) suggesting that interest rate spread and the requirement of collateral increased during the crisis.

Third, another concern that may be raised is that our baseline model excludes some key variables that could influence the relationship between repeated borrowing and bank loan terms. We add other country factors to our estimations, such as economic development (ECON_DEV), legal origin of the country (FRENCH, GERMAN, SCAND and SOCIALIST), financial markets development (STMKTCAP) and the weight of banking financing in the economy (BANK_FINANC). ECON_DEV is a dummy variable that takes the value of 1 if the borrower belongs to a high income country according to the classification of the World Bank and zero otherwise. FRENCH, GERMAN, SCAND and SOCIALIST are dummy variables that take the value of 1 if the borrower belongs to a country with this legal origin and zero otherwise. STMKTCAP is the stock market capitalization of the country as a percentage of its GDP. BANK_FINANC is the amount of private credit by deposit money banks as a percentage of its GDP. STMKTCAP and BANK_FINANC are obtained from Financial Development and Structure Dataset (Beck et al., 2000). Table 12 reports the results when we include these variables in our baseline models. The influence of repeated borrowing on interest rate spread (columns (1) to (4)) remains negative and significant as in Table 5. Additionally, the lack of significance of the interaction terms between these new variables and RL_d suggests that there is no different effect of relationship loans on spread when economic development, financial market development or the weight of banks in

Table 12
Robustness analysis (II): Additional country variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RL_d	-0.09*	-0.07***	-0.04**	-0.05*	-0.11	-0.13**	0.08	0.19
	(−1.76)	(−5.35)	(−2.38)	(−1.76)	(−0.38)	(−2.52)	(0.48)	(1.04)
LO	-0.22***	-0.22***	-0.25***	-0.18***	0.45*	0.41*	0.42*	0.27
	(−4.15)	(−4.22)	(−4.61)	(−2.72)	(1.93)	(1.80)	(1.86)	(0.92)
CR	0.04*	0.05**	0.06**	0.03	-0.24	-0.25	-0.22	-0.12
	(1.69)	(1.96)	(2.18)	(0.97)	(−1.30)	(−1.34)	(−1.19)	(−0.64)
ECON_DEV	0.41				-0.50			
	(1.36)				(−0.60)			
ECON_DEV*RL_d	0.03				-0.01			
	(0.64)				(−0.03)			
FRENCH		0.10				0.54		
		(0.33)				(0.64)		
FRENCH*RL_d		0.09*				-0.05		
		(1.77)				(−0.21)		
GERMAN		-1.04***				2.19***		
		(16.51)				(6.03)		
GERMAN*RL_d		0.03				0.38		
		(0.71)				(1.18)		
SCAND		-0.08				0.81		
		(−0.50)				(0.90)		
SCAND*RL_d		-0.08				-0.05		
		(−0.50)				(−0.06)		
SOCIALIST		-0.13				0.99**		
		(−0.94)				(2.04)		
SOCIALIST*RL_d		0.00				-0.34		
		(0.07)				(−0.90)		
STMKTCAP			0.00***				0.00	
			(4.75)				(1.07)	
STMKTCAP*RL_d			-0.00				-0.00	
			(−1.63)				(−1.32)	
BANK_FINANC				0.01***				-0.00
				(8.68)				(−0.82)
BANK_FINANC*RL_d				-0.00				-0.01*
				(−0.17)				(−1.70)
Constant	5.44***	5.75***	5.86***	5.66***	-7.35***	7.66***	-7.94***	-6.11***
	(18.38)	(17.58)	(17.61)	(15.94)	(−5.04)	(−5.77)	(−6.00)	(−2.93)
Firm-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,590	20,590	20,590	18,633	12,478	12,478	12,478	11,434
#firms	4667	4667	4667	4315	3404	3404	3404	3147
Adj R^2 / Pseudo R^2 (%)	62.89	62.91	62.95	63.70	50.03	50.07	50.06	49.54
F-test / Chi2-test	169.26***	160.27***	228.12***	154.16***	1530.93***	1544.92***	1534.71***	1466.85***

Regressions are estimated using OLS clustered by borrower firm in columns (1) to (3) and columns (7) to (9) and a probit model in columns (4) to (6). The dependent variable is LN_SPREAD in columns (1) to (4) and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; and the dependent variable is COLLAT in columns (5) to (8) and is measured as a dummy variable that equals 1 if the loan was secured and zero otherwise. RL_d is a dummy variable that takes the value of 1 if one of the lead arrangers had been a lead arranger in the past within a 5-year window and zero otherwise; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; ECON_DEV is a dummy variable that takes the value of 1 if the borrower belongs to a high income country according to World Bank classification and zero otherwise; FRENCH, GERMAN, SCAND and SOCIALIST are dummy variables that take the value of 1 if the legal origin of the borrower's country is French, German, Scandinavian or Socialist and zero otherwise; STMKTCAP is the percentage of stock market capitalization to GDP; BANK_FINANC is the percentage of private credit by deposit money banks to GDP. Country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

the economy are considered. As for the legal origins, the positive and significant coefficient of FRENCH*RL_d reveals that relationship loans have no effect on spread in countries with that legal origin. This result is consistent with the evidence found by Degryse and van Cayseele (2000) for small Belgian firms. As for collateral, the inclusion of ECON_DEV, STMKTCAP and BANK_FINANC results in relationship loans not having significant effect on the requirement of collateral. However, only the coefficient of BANK_FINANC*RL_d is statistically significant revealing a reduction in collateral for relationship loans when the weight of bank financing increases.

Finally, we address the issue of joint determination of price and nonprice terms of bank loans. If the terms of bank loans are jointly determined, the true effects of relationships on these variables may vary when we consider the different loan terms independently.

Table 13
Robustness analysis (III): Instrumental variables estimation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RL_d	-0.06***	-0.08***	-0.11***	-0.12***	-0.09*	-0.26	-0.05***	-0.05***	-0.07**
	(−4.41)	(−5.60)	(−2.60)	(−5.55)	(−1.96)	(−1.01)	(−4.98)	(−4.50)	(−1.98)
LO	-0.22***	-0.21***	-0.22***	0.06	0.06	0.06	-0.00	-0.00	-0.00
	(−4.01)	(−4.00)	(−4.03)	(0.29)	(0.29)	(0.29)	(−0.10)	(−0.11)	(−0.11)
CR	0.05*	0.05*	0.04	-0.06	-0.06	-0.09	-0.03	-0.03	-0.03
	(1.73)	(1.71)	(1.41)	(1.54)	(−1.51)	(−1.15)	(−1.14)	(−1.14)	(−1.31)
CRISIS		0.38***			-0.09			-0.15***	
		(4.70)			(−0.16)			(−2.68)	
CRISIS*RL_d		0.14***			-0.21			-0.04	
		(3.91)			(−0.77)			(−1.21)	
RL_d*CR			0.03			0.09			0.01
			(1.38)			(0.55)			(0.47)
LN_SPREAD				0.41	0.41	0.41	0.09**	0.09**	0.09**
				(0.80)	(0.80)	(0.81)	(2.32)	(2.32)	(2.31)
LN_MAT	0.09***	0.09***	0.09***	-1.70	-1.70	-1.69			
	(4.48)	(4.49)	(4.46)	(1.31)	(−1.30)	(−1.28)			
COLLAT	-0.09	-0.09	-0.11				-0.04	-0.04	-0.04
	(−0.27)	(−0.25)	(−0.30)				(−0.13)	(−0.14)	(−0.14)
Constant	5.72***	5.73***	5.76***	1.92	1.88	1.99	2.39***	2.38***	2.40***
	(17.46)	(17.68)	(17.34)	(0.23)	(0.22)	(0.24)	(7.36)	(7.28)	(7.51)
Firm-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan type effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	20,577	20,577	20,577	20,521	20,521	20,521	20,577	20,577	20,577
#firms	4660	4660	4660	4635	4635	4635	4660	4660	4660
Adj R^2 / Pseudo R^2 (%)	61.73	61.86	61.58				29.25	29.24	29.22
F-test / Chi2-test	166.29***	160.18***	260.07***	19,299.49***	19,271.92***	19,020.03***	60.75***	59.94***	60.01***
Endogeneity test	0.91	0.88	0.95	0.28	0.28	0.28	0.14	0.14	0.14
Cragg-Donald stat.	38.96	38.83	38.02				40.95	40.78	40.06
Stock & Yogo critical value (10%)	16.38	16.38	16.38				16.38	16.38	16.38

Regressions are estimated using OLS clustered by borrower firm in columns (1) to (4) and a probit model in columns (5) to (8). The dependent variable is LN_SPREAD in columns (1) to (4) and is measured as the natural logarithm of interest rate spread on a loan (over the LIBOR) plus any associated fees in originating the loan; the dependent variable is COLLAT in columns (5) to (8) and is measured as a dummy variable that equals 1 if the loan was secured and zero otherwise; RL is a dummy variable that equals 1 if the loan was a relationship loan and zero otherwise; LO is the law and order variable; CR captures the time for creditors to recover their credit and is recorded in calendar years; CRISIS is a dummy variable that takes the value of 1 for the years 2008 and 2009 and 0 otherwise. Firm- and loan-control variables and country, industry, and time effects are included in all the estimations, although we do not report their coefficients. T-statistics are in parentheses. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Consequently, we re-estimate our main model specifications above for the price, requirement of collateral and maturity of loans using an IV framework (Bharath et al., 2011).[9] We use the two-stage least-squares (2SLS) method using instruments for our endogenous variables. We use the current default spread[10] at the time the loan is made as an instrument for the observed interest rate spread. For the collateral we use two instruments: (1) loan concentration, as Berger and Udell (1990) show that the requirement of collateral will increase with the relative weight of the current bank loan to the total amount of debt, and (2) the industry median tangibility ratio as industries whose assets have greater tangibility will be more likely to provide collateral. We consider the maturity of assets as the instrument for loan maturity, since firms try to match the maturity of debt to the economic life of the investments. Our proxy for asset maturity is the ratio between the annual depreciation and the property, plant and equipment. We perform an endogeneity test under the null hypothesis that the specified endogenous regressors can actually be treated as exogenous and the results are reported at the bottom of Table 13. When the p value of the F-test is higher than 10%, the null hypothesis is not rejected and the estimations with the observed values of spread, collateral and maturity are valid. Additionally, in order to test the validity of our instruments, we consider the Cragg-Donald statistic, comparing it with the critical values computed by Stock and Yogo (2005). When the Cragg-Donald statistic is higher than the Stock and Yogo critical values it indicates the absence of the weak instruments problem.

The results of the IV estimation are presented in Table 13. For the three dependent variables the test of the exogeneity of the

[9] When we do not have information about the collateral we assign a zero to this variable in order not to limit the number of observations in our estimations.

[10] The default spread is measured monthly as the difference between the yields on Moody's seasoned corporate bonds with a Baa rating and the yields on 10-year US government bonds.

instrumented variables is not statistically significant. Thus, we do not reject the null hypothesis of no endogeneity. If there is no endogeneity, a standard OLS regression or probit with the observed values of spread, collateral and maturity would be preferable and the conclusions for the price and nonprice loan terms have to be inferred from results shown in Tables 5–12.

6. Conclusions

This paper analyses the effect of relationship banking on the terms of bank loans (spread, collateral, and maturity) for a sample of 20,590 loans from 47 countries over the period 2003–2018, considering how the financial crisis and the protection of creditors' rights modify this effect. Our results show that relationship loans pay lower spreads and require less collateral compared to non-relationship loans. A relationship bank loan is associated with a reduction of 8.39 basis points in the loan spread and a reduction of 3.30% in the probability of needing to post collateral. During the 2007–2008 financial crisis, relationship loans paid higher interest rates than non-relationship loans in line with more serious hold-up problems during crises, as banks are able to exploit their information advantages with respect to borrowers they have closer relationships with. Additionally, during the years of the crisis, all borrowers paid higher interest rates, posted more collateral and the maturity was shortened.

The reduction in interest rate spread and collateral depends on the protection of creditors' rights. In those countries where creditors' rights are well protected, relationship loans pay less spread and are required to post less collateral than relationship loans in countries with weak protection of creditors' rights. In countries with strong protection of creditors' rights, such as Belgium, Finland and Norway, a relationship loan is associated with a reduction of 11.47 basis points in the spread, meanwhile the effect is almost zero in those countries with weak protection. This result suggests that relationship banking and protection of creditors' rights are complementary mechanisms in reducing asymmetric information problems.

Our results suggest that relationship banking has systematically generated benefits for firms, although it has done so contingent on the presence of strong protection of creditors' rights. Regulators should be aware that there are important positive effects of relationship banking for firms and how these effects are affected by the financial crisis and the protection of creditors' rights.

Data availability

Data will be made available on request.

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