The Benefits of Relationship Lending in a Cross-Country Context: A Meta-Analysis

Vlado Kysucky, Lars Norden

Please scroll down for article—it is on subsequent pages

INFORMS is the largest professional society in the world for professionals in the fields of operations research, management
science, and analytics.
For more information on INFORMS, its publications, membership, or meetings visit http://www.informs.org

The Benefits of Relationship Lending in a Cross-Country Context: A Meta-Analysis

Vlado Kysucky
Shenzhen University International Business School, Shenzhen 518060, China, vkysucky@szu.edu.cn

Lars Norden
Brazilian School of Public and Business Administration, Getulio Vargas Foundation, 22250-900 Rio de Janeiro, Brazil,
lars.norden@fgv.br

Relationship lending may create benefits for borrowers by reducing information asymmetries. However, empirical evidence is mixed. We conduct a meta-analysis to summarize and explain the heterogeneity in the results in the literature using hand-collected information from 101 studies in the United States, Europe, Asia, and Latin America from 1970 to 2010. We find that strong relationships are generally beneficial for borrowers, but lending outcomes differ across the relationships' dimensions. Long-lasting, exclusive, and synergy-creating bank relationships are associated with higher credit volume and lower loan rates. These benefits are more likely in the United States and in countries where bank competition is high. They are not related to the importance of small and medium-sized enterprises in an economy, suggesting that prevalence of relationship lending does not necessarily come along with borrower benefits. Our inferences are robust when we control for observed systematic heterogeneity in the original studies and hold in a bootstrapping analysis.

Data, as supplemental material, are available at http://dx.doi.org/10.1287/mnsc.2014.2088.

1. Introduction

The theory of financial intermediation suggests that relationship lending has a bright side and a dark side (e.g., Boot 2000). Strong bank–borrower relationships help reduce asymmetric information between lenders and borrowers—the bright side. But, at the same time, these relationships can create hold-up problems whereby the lender captures the borrower to extract rents—the dark side. Hence, the overall effect of strong bank relationships is a trade-off in costs and benefits between lenders and borrowers through interactions across time, space, and financial products. The empirical evidence on the effects of relationship lending is mixed because of substantial differences in data sources, measurement approaches, dimensions of the relationships, and research methods. In particular, research has neither documented nor systematically analyzed cross-country differences in relationship lending yet. It is not clear what underlying country-level factors drive the differences in relationship benefits across economies, and in what way these factors affect the outcomes of relationship lending. In this paper, we conduct the first meta-analysis on the benefits of relationship lending to quantify the heterogeneity in the results, and we provide country-level explanations for differences in relationship-lending outcomes.

Relationship lending is one of the most important lending technologies, and for many private firms, especially small and medium-sized enterprises (SMEs), it is the key source of external financing (e.g., Petersen and Rajan 1994, Berger and Udell 1995, Beck et al. 2005, Berger and Udell 2006, Bharath et al. 2011). Close bank–borrower relationships might create benefits for both sides if informational problems are reduced. The effects of a strong bank-firm relationship are not necessarily a zero-sum game. On the one hand, banks can better assess the risk of default for existing borrowers, whereas the latter might benefit from improved credit availability and more favorable borrowing terms over time. On the other hand, banks might follow an intertemporal pricing strategy by offering attractive lending terms at the beginning of a relationship to win over a customer and then raising the loan rates and fees on subsequent business. A close bank–borrower relationship might create a lock-in effect (hold-up, ex post information monopoly) if the borrower does not have sufficient alternative banking relationships (e.g., Degryse and Ongena 2005), or if switching costs are high (e.g., Ioannidou and Ongena 2010). But, borrowers might have incentives for moral hazard in both strong and weak bank relationships. A large borrower that is in distress has incentives to rely on a "too-big-to-fail" effect if the relationship is strong. Instead of making

an effort to improve its financial conditions, the borrower might gamble on getting more funds from the bank. Or, a relatively risky borrower has incentives to hide private knowledge about its default risk in a weak bank relationship, as long as the possibility exists to benefit from lending terms that are more favorable compared to the true default risk.

Empirical studies on relationship lending have produced evidence that focuses primarily on the benefits from a banking relationship. However, there is no clear consensus on whether, and under which conditions, relationship lending is beneficial for the borrower, the bank, or both. To investigate this issue we use meta-analysis, which has several advantages over field evidence-based empirical research or qualitative surveys. Meta-analysis provides a set of formal quantitative tools to summarize the results on a common topic and explain differences in study-to-study variation in outcomes. It offers objective perspective and avoids potential biases of individual judgment. This method is especially useful in our setting for several reasons. The data from empirical studies on relationship lending range from country-specific firm surveys to samples of proprietary credit file data from banks. The original single-country studies cannot identify and test country-level determinants of the relationship-lending outcomes. Meta-analysis allows us to quantify the overall effect of relationship lending, increase the number of observations from different sources and time periods, reduce the impact of sampling errors within individual studies, and control for the unobserved between-study heterogeneity. We identify the sources of disagreement among the studies and introduce new institutional factors to test hypotheses on the economic drivers that account for the differences in relationship-lending outcomes among the economies. One limitation of meta-analysis is the reliance on inputs from the original studies. If the original studies are misspecified in a systematic way, the resulting biases may carry over to the meta-analysis. To reduce this possibility, we account for the precision of the input, control for observable systematic heterogeneity, and conduct a bootstrapping analysis of our meta-analytic results.

We develop a multidimensional conceptual framework that considers key dimensions of the strength of bank–borrower relationships and key lending relationship outcomes. First, we summarize the overall effect from the perspective of the borrower, decompose the effects into a matrix of relationship dimensions and lending outcomes, and examine the variation of the benefits. Second, we estimate meta-analytic regressions with country characteristics to explain the heterogeneity in the results. Our sample consists of 101 studies that report multivariate empirical results on relationship lending and lending outcomes using 2,979 effects based on 4.1 million firm-year observations from 28 countries.
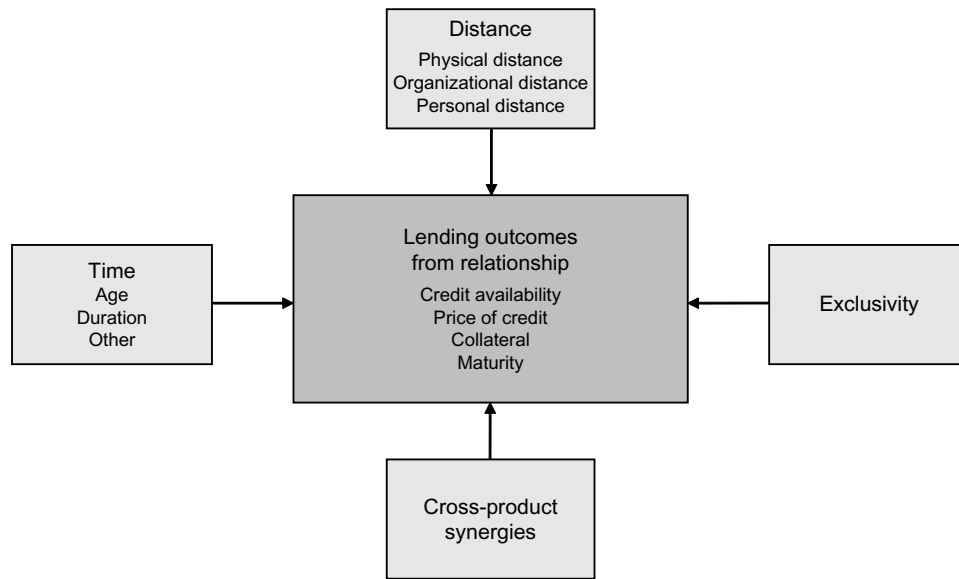
2. Conceptual Framework

Our conceptual framework combines lending relationship dimensions with lending outcomes. The key dimensions of the strength of the relationships are time, distance, exclusivity, and cross-product synergies. The lending outcomes are loan rates, credit volume, collateral, and maturity. The transmission channel of relationship effects is the information, which affects lending outcomes by the choice of the communication mode, lending technology, and incentive structure (e.g., Agarwal and Hauswald 2009, Agarwal and Ben-David 2013). We consider the source of the information (public and private) and the type of information (soft and hard). What matters for relationship lending is private information, both hard and soft. Whereas soft information is conducive to relationship lending that comes at a higher price, the opposite is found for hard information and arm's-length lending (Agarwal and Hauswald 2009). Figure 1 summarizes our conceptual framework.

Time represents a dimension that is characterized by repeated interactions between contracting parties, validation of the interactions, potential learning, and collection of public and private information. Time is conducive to the production of both public/private and hard/soft information. The age of the borrower is a proxy for public information about a firm. Older firms are more likely to pay lower interest rates and obtain more credit. The duration of the relationship is a proxy for private information about a firm. Lenders obtain more private information about the borrower the longer the relationship.

Distance between the bank and borrower has important implications for the type and usage of private information produced by banks. We consider physical, organizational, and personal distance. Smaller distance facilitates more intense personal connection and leads to greater soft information production, resulting in a negative (positive) correlation between physical distance and loan rates (loan volume). However, the overall outcome depends on the proximity of competing banks and the availability of soft and hard information (Degryse and Ongena 2005, Agarwal and Hauswald 2010). Moreover, technological change and organizational structure of banks also affect distance and thereby the strength of bank relationships.

Exclusivity denotes the extent to which a firm concentrates its borrowings on a single lender. Information might be more complete, more accurate, and easier to interpret the more exclusive a bank relationship is. Relationship exclusivity promotes primarily private information production, both hard and soft.

Figure 1   Dimensions of the Strength of Lending Relationships and Their Lending Outcomes

Notes. This figure displays the multidimensional conceptual framework. The effects of relationship lending are represented by the impact of the four dimensions of the strength of bank–borrower relationships on their lending outcomes shown in the center of the figure.

Firms with a relatively large number of lending relationships tend to be riskier in the sense that leverage and the share of unsecured bank debt are higher. More exclusive relationships are associated with beneficial credit terms for borrowers although exclusive banks might be prone to take advantage of their monopoly position.

Cross-product synergies represent the scope of the financial services provided by the bank. Lenders and/or borrowers may benefit from increased information production and shared costs of multiple services. A key source of informational synergies for commercial banks might be the simultaneous provision of lending, payment services, and deposit taking. In the retail context, relationship customers exhibit higher credit utilization and lower default and attrition rates. Information about customers' other bank products helps to predict borrower credit quality over time (e.g., Agarwal et al. 2009).

3.   Hypotheses

The empirical literature on relationship lending draws conflicting conclusions, in part, because of different data sources, time periods, methods, or relationship-lending measures. In the first step we summarize the evidence and test whether it supports the view that the bright side of relationship lending prevails over its dark side.

HYPOTHESIS 1.   *Strong bank–borrower relationships are associated with beneficial lending outcomes for the borrower.*

In the second step, we investigate several factors that explain the benefits of relationship lending for borrowers in a cross-country context. We expect

that more competition in the banking sector creates incentives for banks to use relationship lending as a device to differentiate (and shield) themselves from their competitors (Boot and Thakor 2000). Single country studies find negative effects of competition (Petersen and Rajan 1995) or U-shaped effects of competition on relationship-lending benefits for borrowers (Degryse and Ongena 2005, Elsas 2005, Presbitero and Zazzaro 2011). In bank-based systems, characterized by a relatively high ratio of bank deposits over gross domestic product (GDP), banks can commit more resources to relationship lending and thereby provide more benefits to borrowers (e.g., Allen and Gale 2000, Krahnen and Schmidt 2004). We further expect that borrowers benefit from higher bank efficiency and from reduced information asymmetries in SME lending. Legal systems, law enforcement, and property rights influence outcomes of financial intermediation (La Porta et al. 1998). On the one hand, countries with strong legal foundations develop efficient and stable financial markets and intermediaries, which improve the financing of the corporate sector. On the other hand, relationship lending may serve as an (informal) mechanism to offset a weak legal system and enforcement, and improve allocative efficiency. We hypothesize that close bank-borrower relationships might be more important in the developing economies and in the environment of weak institutions, high corruption, low transparency, and high inflation.

HYPOTHESIS 2. *The likelihood of beneficial effects of relationship lending for borrowers is greater in countries with* (a) *high bank competition*, (b) *bank-based financial systems*, (c) *high prevalence of relationship lending*,

(d) *developing countries*, (e) *weak legal institutions*, (f) *high level of corruption*, (g) *high inflation*, and (h) *high cost efficiency in the banking sector*.

4. Data

We use two search strategies to collect the results from the original studies. First, we look for the terms "relationship lending" and "relationship banking" in the following six databases: ISI Web of Knowledge, Scopus, ScienceDirect, JSTOR, ABI/INFORM, and SSRN.[1] Specifically, we search in the fields "title," "abstract," "keywords," or their equivalents. This strategy results in a total of 850 matches as of May 2012. Second, as common in meta-analyses, we perform a reverse lookup of references in the literature survey articles on relationship lending by Boot (2000), Elyasiani and Goldberg (2004), and Degryse and Ongena (2008). From the reverse lookup we obtain additional 438 matches. After eliminating missing records, both strategies yield a raw sample of 1,258 studies. We search the above databases for more recent or published versions of all unpublished papers and make replacements wherever appropriate.

We then apply several filter rules to arrive at the final sample. We exclude papers with no empirical results and those with no information on relationship lending and lending outcomes. Next, we eliminate studies that are written in language other than English, and historical studies with data prior to the year 1970. Since we focus on corporate borrowers, we also remove the studies that deal with consumer lending. In the next step, we analyze the empirical strategy of all remaining papers and keep those that meet criteria for consistent meta-analysis: (i) empirical results contain at least one multivariate regression model with one of the lending terms as the dependent variable and a proxy for the lending relationship's strength as the explanatory variable; (ii) the relationship strength proxies and lending outcomes fall into one of the above categories (as shown in Figure 1); and (iii) information about the effect size (i.e., the regression coefficient that indicates the relation between the dependent and independent variable) and its statistical significance are available, complete, and comparable within each category. Applying these filters yields a final sample of 101 studies, consisting of 76 published and 25 unpublished papers. Table A.1 of the appendix shows a list of all studies included in our analysis.

We ensure that our selection criteria do not create a systematic bias by checking three potential sources of biases: language selection, time period, and inclu-

sion of published/unpublished studies. We find that studies conducted in languages other than English do not influence our analysis because their number is very low. Before applying content-related filters, there are only three non-English studies in our raw sample of 1,258 studies. There are two studies from the period prior to the year 1970, both from the industrialization era. We do not consider these two banking history studies because the socioeconomic, legal, and regulatory environment has significantly changed afterward. In addition, consistent with the current practice in meta-analysis (Cooper et al. 2009, p. 118), we include unpublished studies in our meta-database and in empirical tests we control for observed publication-level variables that might create a systematic bias.

For each study, we manually collect information on the link between relationship lending and loan terms from all of the tables in a study, including the appendices. This data collection leads to a sample of 2,979 estimation results (hereafter "effects"). The basis of the selected studies is 4.1 million firm-period observations. We collect key characteristics of the selected studies and corresponding country-level variables from publication sources (e.g., ISI Journal Citations Reports, Web of Science, The World Bank Country Indicators, etc.). Table A.2 of the appendix shows the variables and their definitions. Table 1 reports the summary statistics.

The studies in our sample are based on data from Europe (43 studies), the United States (35 studies), Asia (18 studies), and Latin America (5 studies), and span the period from 1970 to 2010. Published papers come mainly from journals on banking, finance, economics, and business. The total number of unique firms in the original papers is around 60,000 from the United States and 161,000 from other regions.

We obtain country-level data from external sources, primarily the World Bank database. For each sample period of the original study, we calculate the average indicator of country-level variables in overlapping periods where the country-level data is available. Across all country-level variables, on average 11% of observations fall into time periods in which country-level series are available but no time overlap exists between the original sample period and the available country indicator. In these cases we use the closest available country-year observation, the majority of which fall within two years of the original sample availability. We note that these indicators are persistent and do not have an effect on our analysis when we estimate the empirical models without the filled data.

5. Empirical Analysis

5.1. Method

This study employs meta-analysis as a statistical tool to systematically combine individual results and to

---

[1] These databases comprise journal articles (ISI Web of Knowledge, Scopus, ScienceDirect and JSTOR), working papers (SSRN), or both (ABI/INFORM). In the ABI/INFORM search, we add Econlit and Banking Information Source.

Table 1   **Summary Statistics of Studies in the Sample**

Panel A. Sample composition (number of studies)									
Publication status		Region		Development status		Data source		Focus on relationship lending	
Published studies	76	United States	35	Developed	87	Firm survey	46	Primary	62
of which		Europe	43	Emerging	14	Proprietary bank data	23	Secondary	39
Banking journals	22	Asia	18			Other	32		
Other journals	54	Latin America	5						
Unpublished studies	25								
Total	101		101		101		101		101

Panel B. Sample characteristics					
	Mean	Median	Min	Max	Std. dev.
Publication year	2,005.3	2,006	1,994	2,012	4.62
Sample period midyear	1,996.6	1,997	1,978	2,008	5.23
Author affiliation ranking	119	139	5	246	62
Journal impact factor	1.263	0.807	0.146	4.602	1.032
No. of citations	49.79	8	0	563	104.81
Firm count	9,994	1,800	100	368,977	41,802
Observation count	44,176	1,500	139	2,078,434	227,522

Notes. This table summarizes the characteristics of the selected studies. A study is denoted as published if it appears in a refereed journal. The region relates to the geography of the data sample in each paper. The development status of countries is based on the World Bank development classification in the median sampling year. The data source represents the primary source of a study's information. The focus on relationship lending denotes whether a study uses relationship strength proxies as the primary explanatory variables in the empirical design. If relationship strength proxies serve as control variables, then a paper is designated as secondary. Banking journals in the selected set of publications include the *Journal of Banking and Finance*; *Journal of Money, Credit and Banking*; and the *Journal of Financial Intermediation*. The author's affiliation ranking is calculated as a five-year moving average of the Arizona State University (ASU) Finance Rankings of each author's affiliation in the year of the publication. The values for this variable comprise only those institutions that are available in the ASU data set. The journal's impact factor is from the Journal Citation Report by Thomson ISI (ISI) for the year of the publication. The number of citations is obtained from Web of Science for each published paper. The journal's impact factor and the number of citations are reported only for published studies. The firm count is the total number of unique firms included in each study. The observation count is the number of unique firm-year observations approximated as the maximum number of observations in any regression specification within each study.

quantify differences across the studies. This method has been successfully used in medical sciences and finds increasing application in social sciences (e.g., Stanley 2001). It provides tools to correct for statistical artifacts and to obtain an estimate of the true relationship between the variables of interest that are not directly comparable in the original studies. Furthermore, meta-analysis allows researchers to identify possible determinants of differences and to test new theories by exploiting systematic patterns of heterogeneity. Empirical testing in meta-analysis consists of four main steps: (1) literature search and data collection; (2) computation of comparable effect sizes; (3) estimation of the magnitude and the direction of the true relationship; and (4) explanation of systematic heterogeneity (if present). The total variance in the observed results is comprised of the true variance across the studies and the sampling error. Meta-analytic procedures weight the contribution of each individual result by its sampling error and thereby increase the accuracy of the overall estimate of the true relationship. Our study employs state-of-the art meta-analytic methods (Borenstein et al. 2009 and Lipsey and Wilson 2001).

The term "effect" in our analysis refers to the measure of significance, direction, and magnitude of a regression coefficient that quantifies the link between one of the relationship strength proxies and one of

the lending outcome variables shown in Figure 1. We calculate three measures (one discrete and two continuous) of effect sizes. The first measure is a discrete indicator that classifies reported effects into positive, negative, and nonsignificant ones at the 10% significance level. The second measure is the one-tail p-value as a continuous interpretation of the direction and the significance of an effect size. The values range from 0 to 1 where values approaching 0 are significantly unfavorable to the borrower, but values approaching 1 are significantly favorable. We confirm that discrete and continuous measures are consistently closely related (Spearman's rank correlation 0.94). The third measure is the continuous Fisher's z-score, which is a partial correlation corrected for skewness. This measure reports the degree of association between the relationship dimensions and the lending outcomes, and accounts for the effect of other explanatory variables included in the original regression models. We obtain partial correlations from regression statistics using the procedure by Greene (2008, Chap. 3). To reduce the effect of potential outliers, we winsorize extreme observations at the 1% and 99% quantile. Based on these three measures, we obtain the information on the relative significance, the direction of the effects, and the magnitude of the strength of the association. Because these indicators are unit free, we can meta-analyze the effects in

a consistent and comparable way across a heterogeneous set of studies (examples of our selected effect size applications in economics are Card et al. 2010, Koetse et al. 2009). To increase the precision of the estimates, we follow Bijmolt and Pieters (2001) and collect a complete set of effects from all studies in our sample. This means that there are multiple observations from each study that are not independent. We account for this dependence as described below.

To test Hypothesis 1, we estimate the overall effect using the three types of individual effect sizes. First, we report discrete relative frequencies of significantly positive, significantly negative, and non-significant effects. Next, we estimate the continuous pooled meta-analytic effect size, and we calculate the overall one-tail p-value (Edgington 1972) and pooled meta-analytic mean correlations (Hedges and Olkin 1985, Lipsey and Wilson 2001, Borenstein et al. 2009). Finally, we employ a random-effects model, which assumes that the true effect varies between the studies. This is a common approach in social sciences, where studies are typically significantly heterogeneous and vary in empirical strategies and samples. Random-effects models apply weighting scheme based on heterogeneity of precision and heterogeneity of effect sizes. We confirm the between-study heterogeneity by Cochran's Q-test for all relationship-outcome combinations. The overall continuous result weights effect sizes by their precision. Namely, we weight each input by the inverse of its squared errors and weight the study clusters by between-study variance (Hedges and Olkin 1985). The statistical power of estimating the pooled effect, and the confidence in interpreting the overall estimate, is positively related to the number of studies and the precision of the individual effect sizes. By combining all of the effects (both significant and insignificant), we reduce the probability of a type-II error and improve the accuracy of the significance estimation for the overall effect.

We test Hypothesis 2 with meta-regressions that allow us to investigate the relationship between country characteristics and the reported results in the original studies. We run four sets of meta-analytic regressions, in which we introduce country-level variables as the main explanatory variables and control for observed differences in study-level characteristics. First, we estimate a pooled binary logit model with a dependent variable indicating whether the effect is significant at 10% level. This regression includes only significant effects. Second, we estimate a random-effects Tobit model using all of the results with one-tail p-value as the dependent variable. Because multiple observations within a study are not independent, in the pooled regression models we use robust standard errors clustered by studies, and in random-effects models we group observations by studies. Third, we estimate a mixed-effects multilevel

regression. Using this method, one or more estimated slopes are allowed to vary from study to study. This solution is a less restrictive estimation of the aggregate evidence with an excess between-study variation. The dependent variable is Fisher's z-score as the measure of the strength of the association between relationship lending and lending terms. Fourth, we employ random-effects robust variance regressions with estimates of the dependent effect sizes. This method is based on Hedges et al. (2010) and provides a robust method for estimating the meta-analytic regressions where effect sizes are correlated. Because we include in our analysis all reported effects, our methods account for a potential bias arising from correlated estimates within the studies.

To address systematic pattern of publication-level heterogeneity, we follow Koetse et al. (2009) and construct variables for four possible sources of systematic variance, including the sources of potential misspecification in the primary studies: data, model specification, estimation method, and publication characteristics. We add controls for each category to all meta-regressions.

5.2. Direction and Significance of the Effects

To assess the direction and significance of relationship benefits, we first estimate the overall pooled effect based on all individual effect sizes. Figure 2 shows the distribution of the continuous one-tail p-values. The effects cluster near 0 (adverse effects for the borrower) and 1 (beneficial effects for the borrower), but the frequency is significantly larger near one, which indicates that benefits for the borrower prevail. Of

Figure 2 **Distribution of the One-Tail p-Values**
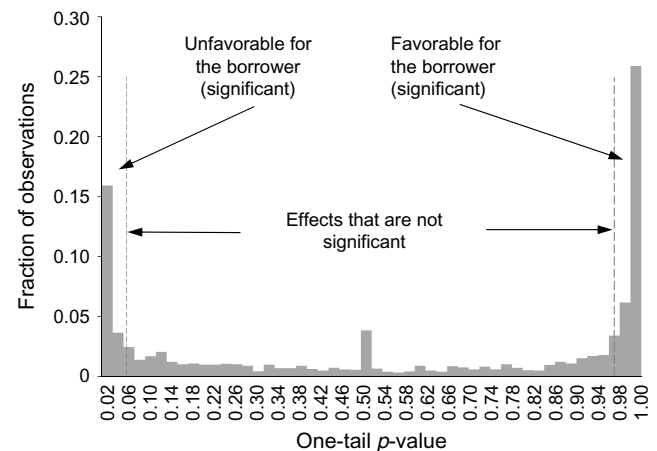
Notes. This figure shows the frequency distribution of one-tail p-values from all selected studies. Values approaching 0 represent results with significantly adverse effects for borrowers at the 10% level; values approaching 1 represent results with significantly beneficial effects for borrowers at the 10% level. Values in the range of 0.05–0.95 indicate results for the borrower benefits that are not significant at the 10% level. The distribution is based on the total number of 2,979 observations.

the significant effects (i.e., leaving the nonsignificant effects aside for a moment), 62% are beneficial for the borrower, whereas 38% are not beneficial for the borrower. This difference is significant at the 1% level, which is consistent with Hypothesis 1.

In the next step we decompose the effects into lending relationship proxies and lending outcome proxies. Panel A of Table 2 shows the relative frequencies of the effects. The positive sign (+) denotes positive and significant regression coefficients; (−) denotes negative and significant coefficients; "B" designates cells with significant borrower benefits; and "N" is for significant borrower "antibenefits."

We find that longer, exclusive, and synergy-creating bank relationships are likely to result in higher credit volumes and lower loan rates. Moreover, firms pledge less collateral the longer they maintain the relationship. These findings indicate that the benefits of relationship lending are of a more general nature since they exist for multiple combinations of lending outcomes and relationship strength proxies. For comparison, the empirical study of Petersen and Rajan (1994) suggests that strong bank relationships primarily help increase the availability of financing to firms but have little impact on the financing costs. The table shows a potential hold-up problem whereby higher exclusivity

is related to more collateral. This problem means that borrowers are either willing to pledge more collateral to an exclusive lender as a signaling device, or lenders accumulate collateral to capture their clients. Close distance is typically associated with more soft information production, which enables lenders to more accurately assess the borrowers as well as the collateral. The effects on distance, however, are mixed and based on a relatively small number of studies, which does not allow us to identify a systematic pattern.

Panel B of Table 2 reports the pooled effects on the continuous scale. We find results in line with the discrete analysis. The largest likelihood of obtaining lower rates and higher volume is related to borrower's age and the exclusivity of the relationship (one-tail p-values approaching 1). The magnitude of the association ρ reveals a possible trade-off in lending terms in exclusive relationships. We observe that reduction in interest rates is 55% greater relative to the increase in the collateral, although the increase in credit volume is lower by 40%.

Our results suggest that strong bank–borrower relationships are beneficial for the borrowers as suggested by Hypothesis 1, but the effects differ across the relationships' dimensions. The relationship benefits mainly stem from repeated interactions over time and from cross selling of multiple financial services

Table 2   Pooled Effect Sizes—Discrete and Continuous Effects

		Panel A. Discrete effects									
		Relationship-lending outcomes									
		RATE			VOL			COLL			MAT	
Strength of relationship lending	Coeff. sign											
Time												
TIME–DURATION	+	67		B	76		B	17		B	2	
	−	101	**		27	***		33	**		11	---
	ns	114			56			58			10	
TIME–AGE	+	17		B	74		B	17				
	−	48	***		20	***		21				---
	ns	135			93			37			13	
TIME–OTHER	+	7			31						7	
	−	14			20			6	---			
	ns	39			36			3			1	
Exclusivity												
EXCLUSIVITY	+	137		B	132		B	46		N		
	−	225	***		99	**		22	***		2	---
	ns	188			177			49			9	
Cross product												
CROSS-PRODUCT SYNERGIES	+	4		B	74		B	9			4	
	−	114	***		15	***		12				---
	ns	86			61			17			11	
Distance												
DISTANCE–PHYSICAL	+	5		N	29							
	−	29	***		21				---			---
	ns	27			44						5	
DISTANCE–ORGANIZATIONAL	+	1			31		N	2				
	−	1	---		14	**		9	---			
	ns	4			22			1				
DISTANCE–PERSONAL	+				7							
	−	4	---			---			---			
	ns	1			2							

Table 2   (Continued)

|		Panel B. Continuous effects			
		Relationship-lending outcomes			
Strength of relationship lending		RATE	VOL	COLL	MAT
Time					
TIME–DURATION	One-tail p-value	0.20	0.98 ** B	0.45	0.18
	ρ	0.007	0.024 ***	0.000	0.026
	No. of studies	43	31	27	3
TIME–AGE	One-tail p-value	1.00 *** B	0.99 *** B	1.00 *** B	0.77
	ρ	−0.020	0.019 ***	−0.018 **	0.020
	No. of studies	29	31	18	2
TIME–OTHER	One-tail p-value	0.87	0.85	0.99 *** B	0.95
	ρ	−0.020	0.055	−0.082 *	0.031 ---
	No. of studies	3	4	2	1
Exclusivity					
EXCLUSIVITY	One-tail p-value	1.00 *** B	1.00 *** B	0.02 ** N	0.12
	ρ	−0.031 ***	0.012	0.020 **	−0.022
	No. of studies	46	40	24	2
Cross product					
CROSS-PRODUCT SYNERGIES	One-tail p-value	0.91 * B	0.88	0.57	0.59
	ρ	−0.024 **	0.009	−0.015	0.041
	No. of studies	18	15	6	2
Distance					
DISTANCE–PHYSICAL	One-tail p-value	0.42	0.94 * B		0.72
	ρ	−0.007	−0.107		−0.014 ---
	No. of studies	7	11		1
DISTANCE–ORGANIZATIONAL	One-tail p-value	0.50	0.96 ** B	0.00	
	ρ	0.031	−0.073 *	−0.031	
	No. of studies	4	6	4	
DISTANCE–PERSONAL	One-tail p-value	0.01 *** N	0.01 *** N		
	ρ	−0.045 ***	0.043 ***		
	No. of studies	3	2		

Notes. Panel A shows the number and the direction of the effect sizes. In each combination of the relationship's strength and lending outcome, (+) denotes positive and significant regression coefficients, (−) denotes negative and significant coefficients, and (ns) denotes coefficients that are not statistically significant in the original studies at the 10% level; ∗, ∗∗, ∗∗∗ indicate significance according to a two-tail binomial sign test at the 10%, 5%, and 1% levels, respectively. The sign test is estimated for pairs of relationship-lending strength outcome, where the number of observations is greater than 30, otherwise we fill the significance cell with "---." Indicator "B" denotes significant pooled effects that are beneficial to the borrower; "N" denotes significant pooled effects that are not beneficial to the borrower, both at the 10% level. Panel B reports the estimates of the overall continuous effects per combination of relationship-lending dimension and the lending outcome. The pooled estimate of the overall one-tail p-value is calculated using Edgington's normal curve method, based on the contrast of the p-value average (Edgington 1972). Values range from 0 (adverse effect for the borrower) to 1 (beneficial effect for the borrower). One-tail p-value is a significance indicator by design; stars next to the one-tail p-value are added for visual purposes. The overall correlations ($ρ$) are meta-analytic pooled estimates of random-effects mean correlations (Borenstein et al. 2009, Lipsey and Wilson 2001). The $ρ$ estimate is based on partial correlations, which are obtained from the t-values of the regression coefficients according to Greene (2008, Chap. 3). "No. of studies" is the total number of studies that contain at least one effect size for the combination of the relationship-lending dimension and a lending outcome. The overall one-tail p-values and $ρ$ are derived from the first occurrences of an effect size per each relationship-outcome combination per each study (no interdependent effect sizes within a study). Star indicators next to $ρ$ correspond to the null test that the true pooled effect $ρ$ is 0, where the number of studies is greater than 2, otherwise we fill the significance cell with "---." In panel B, we report indicator "B" or "N" if either the overall pooled one-tail p-value or pooled $ρ$ are significant at the 10% level. Cochran's Q-value is significant at 1% for all combinations of the relationship-lending dimension and a lending outcome (where the number of studies is at least 5). Variables are defined in Table A.2 of the appendix.

from the same lender. These benefits are realized mostly through higher credit availability and lower loan rates.

5.3. Multivariate Analysis of Relationship-Lending Benefits for Borrowers

We now test Hypothesis 2, which makes predictions about the impact of country characteristics on the likelihood of beneficial effects for the borrower. Countries and regions exhibit substantial variation in the lending environment. Financial systems in continental Europe and Japan are bank based and concentrated. In the United States, capital markets dominate and the banking system is more fragmented, which is reflected by a large number of small banks that provide relationship lending to small businesses (Allen and Gale 2000). We posit that the differences in relationship-lending benefits for borrowers across countries can be partially explained by differences in the structural economic variables. In unreported bivariate analyses, we find that the borrower benefits are more likely by 33% in countries with competitive banking markets. Specifically, when the competition is high, 76% of all effects are beneficial for the borrower. For comparison, when the competition

Figure 3   Relationship-Lending Benefits and Bank Competition
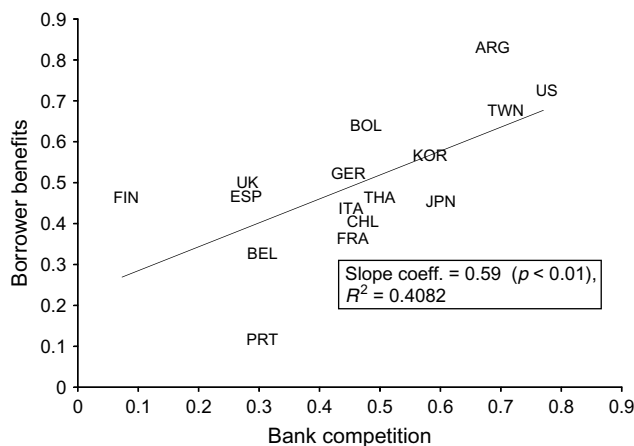
Notes. This figure shows the means of bank competition (0 = perfect monopoly; 1 = perfect competition) and borrower benefits measured by one-tail *p*-values (0 = significant adverse effect for the borrower; 1 = significant beneficial effect for the borrower). The means are calculated as equal-weighted averages of observations per country over the sample period within each study. Effect sizes from multicountry studies are excluded. Countries: ARG, Argentina; BEL, Belgium; BOL, Bolivia; CHL, Chile; GER, Germany; ESP, Spain; FIN, Finland; FRA, France; ITA, Italy; JPN, Japan; KOR, South Korea; PRT, Portugal; THA, Thailand; TWN, Taiwan; UK, United Kingdom; US, United States.

is low, only 43% of effects are beneficial. This finding is consistent across all relationship dimensions. Figure 3 illustrates the link between the extent of banking competition and the average relationship benefits per country. We find a significantly positive and robust linear relationship between the two variables. A simple bivariate cross-sectional ordinary least squares regression has a slope coefficient of 0.59 (*p*-value < 0.01 based on robust standard errors) and an R^2 of 41%. The largest benefits accrue to borrowers in the United States, Argentina, and Taiwan, where the bank competition is highest. The smallest borrower benefits are observed in Europe, especially in countries with low levels of bank competition.

We proceed with multivariate meta-regressions in Table 3. Model (1) reports results with simple region effects. The purpose of this analysis is to capture the aggregate unobserved heterogeneity across the regions. We find that the relationship-lending benefits for borrowers are stronger in the United States compared to Europe, Asia, and Latin America. The contrast is largest for Japan. This result does not indicate that relationship lending is less prevalent in these regions, but that the benefits for borrowers are, ceteris paribus, lower in these regions. As illustrated in Figure 3, this is likely due to higher bank competition in the United States, especially for small businesses. Moreover, lending to small businesses in the United States comes from a large number of community banks, relatively small commercial banks, and credit unions with the mandate to serve local businesses and/or their members.

In models (2)–(5) we explain the results of the studies with country-level variables (Hypothesis 2). The meta-regressions confirm the strong positive relation between bank competition and benefits (consistent with Hypothesis 2(a)). The coefficient is strongest both in magnitude and significance across all specifications. This finding is in line with the argument that banks use relationships to retain customers in the face of competition from other banks (e.g., Boot and Thakor 2000, Degryse and Ongena 2005). Banks exert effort in borrower-specific and/or industry-specific information production and reward their relationship borrowers with more credit and/or better lending terms to prevent them from switching to competitors. Our result is also consistent with the evidence provided by Black and Strahan (2002) who document the impact of policy changes fostering competition in the U.S. banking sector on new incorporations and entrepreneurial activity. At a first glance, this finding seems to contradict studies that show that borrowers can benefit from limited competition by having exclusive bank relationships (e.g., Petersen and Rajan 1994). However, we believe that there is no contradiction since we measure competition at the level of a country's banking system in cross-country context (and we later show that this effect remains robust if we use alternative measures) but not at the individual firm level. In our test of Hypothesis 1 we have already shown that more exclusive bank relationships exhibit lower loan rates and a higher credit volume. We argue that a firm can maintain a value-creating exclusive relationship with a lender in a country with high bank competition. The meta-regression results on competition indicate a monotonic positive relationship, whereas single-country studies have found U-shaped effects of local or national competition on relationship lending (e.g., Elsas 2005, Degryse and Ongena 2008, Presbitero and Zazzaro 2011). We believe that both effects may coexist and can be reconciled—but at different levels of aggregation.

We also find that the borrowers in bank-based economies are less likely to obtain relationship benefits (not consistent with Hypothesis 2(b)). The magnitude of the effect is approximately half the size of the bank competition. This suggests that banks' advantages from deposit funding liquidity do not necessarily translate into borrower benefits as hypothesized. This finding hints at the possibility that larger capital markets (lower bank orientation) exert competitive pressure on the banks to maintain relatively larger borrower benefits. A related hypothesis concerns the importance of SMEs in the economy, considered as lower bound proxy for the prevalence of relationship lending in the country (Hypothesis 2(c)). We do not find a significant relationship between the SME employment and the benefits. The two findings

Table 3   Relationship Lending and Country Characteristics

Method:	Logit, pooled (1) Discrete/binary borrower benefits (1 = yes, 0 = no)			Logit, pooled (2) Discrete/binary borrower benefits (1 = yes, 0 = no)			Tobit, random effects (3) Continuous/one-tail p-value borrower benefits			Meta-regression, mixed effects (4) Continuous/Fisher's z-score			Robust meta-regression (5) Continuous/Fisher's z-score		
Dependent variable:	Coeff.	z	Sig.	Coeff.	z	Sig.	Coeff.	z	Sig.	Coeff.	z	Sig.	Coeff.	t	Sig.
Lending environment															
Bank competition				3.12	4.11	***	0.43	3.36	***	0.07	2.64	***	0.06	2.41	**
Bank deposits/GDP				−1.62	−2.90	***	−0.13	−1.67	*	−0.03	−2.03	**	−0.03	−2.37	**
Pct SME employment				0.00	0.08		−0.001	−0.75		0.00	−0.21		0.00	−0.21	
Developed status				0.19	0.28		0.04	0.39		0.03	1.42		0.02	0.54	
Legal system and property rights				0.03	0.10		−0.029	−0.61		0.00	−0.30		−0.01	−0.60	
Corruption index				0.10	0.18		0.03	0.42		−0.01	−0.39		0.001	0.08	
Inflation				−0.10	−0.96		−0.02	−1.10		0.00	−1.06		0.00	−1.03	
Bank cost-income ratio				−0.95	−0.71		−0.14	−0.60		−0.03	−0.62		−0.02	−0.36	
Regions															
Europe	−1.97	−4.58	***												
Asia, excluding Japan	−1.31	−2.78	***												
Japan	−2.40	−5.08	***												
Latin America	−1.54	−2.04	**												
Publication controls															
Ln no. of observations	−0.06	−0.96		−0.02	−0.21		0.001	0.14		0.00	−0.46		0.00	0.09	
Method strength	0.47	1.29		0.23	0.63		0.02	0.52		0.01	0.86		−0.02	−1.83	*
Published	−0.33	−0.85		−0.50	−1.19		−0.12	−2.18	**	−0.03	−2.32	**	−0.03	−2.37	**
Author affiliation ranking	0.00	0.00		0.00	−0.25		0.00	−0.33		0.00	−0.08		0.00	0.17	
Primary	0.13	0.37		0.23	0.66		−0.01	−0.30		−0.01	−0.49		−0.01	−0.77	
Firm survey	−0.04	−0.13		0.14	0.35		0.02	0.46		0.01	0.44		0.01	0.79	
Subsample	−0.12	−0.54		−0.14	−0.65		−0.03	−1.31		0.00	−0.13		−0.01	−1.55	
Publication year	−0.04	−0.94		0.02	0.47		0.00	−0.13		0.00	0.65		0.00	0.22	
No. of citations	0.00	−0.53		0.00	0.51		0.00	0.36		0.00	0.75		0.00	1.31	
Constant	87.28	0.97		−41.18	−0.42		3.10	0.24		−1.70	−0.59		−0.44	−0.17	
Relationship-lending outcomes	Yes			Yes			Yes			Yes			Yes		
Relationship-lending dimensions	Yes			Yes			Yes			Yes			Yes		
No. of studies	94			92			93			93			93		
No. of observations	1,599			1,582			2,821			2,821			2,821		
Pseudo R^2	0.19			0.19											
τ^2													0.009		

Notes. This table reports the meta-analytic regressions to explain the heterogeneity of relationship-lending benefits for the borrowers by region effects and country-level characteristics. The beneficial effect for the borrower is one of the following: lower price of credit, higher credit availability, lower collateral requirements, or longer loan maturity. Models (1) and (2) report pooled logit estimations, where the dependent variable is a discrete binary indicator, which takes the value of 1 if the effect is significantly beneficial for the borrower and the value of 0 if the effect is significantly unfavorable for the borrower. Standard errors are clustered at the publication level. Model (3) reports panel Tobit with random effects grouped by publications where the dependent variable is a one-tail *p*-value. Model (4) reports meta-regression with a mixed-effects multilevel model using the maximum restricted likelihood estimation. Model (5) reports random-effects robust variance meta-regression with dependent effect sizes. The dependent variable in models (4) and (5) is Fisher's *z*-score. The τ^2 is the residual maximum likelihood estimation of the between-study variance. The omitted reference region is "US." Variables are defined in Table A.2 of the appendix. The *, **, and * ** indicate the coefficients that are significantly different from zero at the 10%, 5%, and 1% levels, respectively.

RIGHTS LINK

lead to a surprising implication that both the bank orientation of the economy and the prevalence of relationship lending do not come along with relationship-lending benefits for borrowers.

The rest of the lending environment characteristics are not significantly related to the relationship benefits. Specifically, we do not find evidence that relationship benefits for borrowers consistently differ in developing countries (Hypothesis 2(d)), in countries with more developed legal systems, higher level of corruption, or in inflationary environment (Hypotheses 2(e), 2(f), 2(g)). Furthermore, we do not find that a higher level of aggregate bank cost-efficiency is related to relationship-lending benefits for borrowers (Hypothesis 2(h)).

Whereas models (1) and (2) of Table 3 are based on logit analysis that considers only the significant effects, we include both significant and insignificant effects in the subsequent analyses. Considering all effects increases the number of observations in meta-regressions and allows us to meta-analyze the effects with continuous measures. The results remain robust when we repeat the analysis using a Tobit estimator with random effects (model (3)), mixed-effects meta-regression (model (4)), and robust variance meta-regression (model (5)).

All of the models include controls to capture publication-level heterogeneity. The coefficient of the indicator variable for published studies is negative across all models. Taking into account the between-study variance in the random-effects and mixed-effects model, the coefficient becomes significant. This finding implies that published studies are less likely to report beneficial relationship-lending effects. We recognize that loan terms might be determined simultaneously but evidence on this issue is mixed and difficult to interpret economically (e.g., Dennis et al. 2000, Brick and Palia 2007). However, some studies show that in banking practice the loan terms are determined sequentially (Standard & Poor's 2006, Bharath et al. 2011, Kirschenmann and Norden 2012). The loan purpose determines the amount and maturity, then bank and borrower agree on the collateral to be pledged, and finally the loan spread is set, considering the borrower risk and all other loan terms. We take possible interaction and the endogeneity of the loan terms into account by categorizing and controlling for the estimation methods used in the original studies to address the potential endogeneity problem.

A potential concern is that our dependent variable, the relationship-lending benefits for borrowers, and two explanatory variables, bank deposits/ GDP and bank competition, are determined endogenously. First, bank deposits/GDP might be endogenous because banks exploit funding and/or informational synergies between deposit taking and lending

(e.g., Berlin and Mester 1999, Norden and Weber 2010). This occurs because banks can use inelasticity in deposit taking and provide relationship borrowers with loan rate smoothing. The endogeneity of this measure, however, is not warranted because the use of particular lending technologies is not necessarily related to the volume of deposit taking (e.g., Acharya et al. 2006). Second, bank competition and relationship benefits may be driven by the same unobserved underlying information and market frictions. Third, there might be a reverse causality between relationship benefits and bank competition. Banks invest in acquisition of proprietary information with expectations of internalizing the relationship benefits. Greater benefits captured by the bank thus attract more competition. In the presence of more competition, it is easier for borrowers to switch lenders, which in turn leads to declining incentive for lenders to collect costly proprietary information.

We address this potential endogeneity by estimating instrumental variable regressions in which we use as instruments country's legal origin and latitude. Legal origin shapes the structure of financial markets and exerts long-term influence on the real economy, including the degree of competition in financial markets (e.g., La Porta et al. 1998, Beck et al. 2005). Since legal origin is a historical heritage, it is exogenous relative to the outcomes of modern relationship lending. The second instrument is country's absolute latitude as a proxy for geographic location. Several studies show that geographical endowments affect the structure and the development of economies and their institutions (La Porta et al. 1999). Legal origin and latitude provide countries with legal framework and resource endowments that determine the economic, financial, and institutional development, but affect the outcomes of the relationship lending only indirectly. Table 4 presents the results.

We find that the positive effect of bank competition holds robustly across all three specifications. The estimated coefficient of bank deposits/GDP is negative but not significant. Although in this case we cannot reject the null hypothesis in the instrumental variables (IV) setting, this finding supports the previous result that the bank-based systems (and higher SME lending) is not associated with outright benefits. In sum, the IV models confirm that more competitive banking markets are ceteris paribus associated with higher likelihood of beneficial relationship-lending outcomes for borrowers after accounting for the potential endogeneity of bank competition.

5.4. Further Empirical Analyses
The following analysis differentiates the lending outcomes by lending terms (except for loan maturity due to a relatively low number of observations for this term). Table 5 reports the results.

Table 4   Instrumental Variable Regressions

Method:	IV probit			IV tobit			IV GMM		
Dependent variable:	(1) *Discrete/binary borrower benefits* (1 = yes, 0 = no)			(2) *Continuous/one-tail p-value borrower benefits*			(3) *Continuous/ Fisher's z-score*		
Instrumented:	Bank competition, bank deposits/GDP			Bank competition, bank deposits/GDP			Bank competition, bank deposits/GDP		
Instruments:	Legal origin, latitude			Legal origin, latitude			Legal origin, latitude		
	Coeff.	z	Sig.	Coeff.	z	Sig.	Coeff.	z	Sig.
Lending environment									
Bank competition	2.29	3.20	***	0.64	3.33	***	0.10	3.26	**
Bank deposits/GDP	−0.77	−0.93		−0.07	−0.29		−0.02	−0.53	
Pct SME employment	0.00	−0.10		0.00	−0.88		0.00	−0.95	
Developed status	0.19	0.26		0.02	0.10		0.04	0.77	
Legal system and property rights	0.02	0.07		−0.04	−0.59		0.00	0.00	
Corruption index	0.10	0.18		0.06	0.44		−0.01	−0.34	
Inflation	−0.03	−0.23		−0.01	−0.35		0.00	−0.21	
Bank cost-income ratio	−0.36	−0.30		−0.16	−0.38		−0.06	−0.75	
Publication controls									
Ln no. of observations	−0.01	−0.26		−0.01	−0.76		0.00	−0.60	
Method strength	0.13	0.37		0.01	0.07		−0.01	−0.82	
Published	−0.30	−0.95		−0.09	−1.04		−0.03	−1.71	*
Author affiliation ranking	0.00	0.02		0.00	−0.17		0.00	−0.12	
Primary	0.17	0.53		0.03	0.63		0.01	0.42	
Firm survey	−0.01	−0.02		−0.03	−0.39		0.00	−0.13	
Subsample	−0.07	−0.54		−0.05	−1.47		−0.01	−1.02	
Publication year	0.00	0.05		0.00	−0.29		0.00	0.29	
No. of citations	0.00	0.08		0.00	−0.10		0.00	0.05	
Constant	−1.54	−0.02		7.71	0.37		−1.04	−0.24	
Relationship-lending outcomes	Yes			Yes			Yes		
Relationship-lending dimensions	Yes			Yes			Yes		
No. of studies	92			93			93		
No. of observations	1,582			2,821			2,821		
χ^2 test of exogeneity	7.68		**	17.48		***	2.94		

Notes. This table contains estimates for the probability of observing relationship-lending benefits for the borrowers using the instrumental variable regressions. Instrumented variables are bank deposits/GDP and bank competition; instruments are legal origin and latitude. Model (1) reports two-step IV probit with bootstrapped standard errors clustered by studies. The dependent variable is a discrete binary indicator, which takes the value of 1 if the effect is significantly beneficial for the borrower and the value of 0 if the effect is significantly unfavorable for the borrower. Model (2) reports two-step IV Tobit with bootstrapped standard errors clustered by studies. The dependent variable is a one-tail *p*-value. Model (3) reports two-step IV generalized method of moments (GMM) with bootstrapped standard errors clustered by studies. The dependent variable is Fisher's *z*-score. Test of exogeneity in models (1) and (2) is Wald χ^2 test of exogeneity, in model (3) the test is GMM C (difference-in-Sargan) statistic. Variables are defined in Table A.2 of the appendix. The *, **, and *** indicate the coefficients that are significantly different from zero at the 10%, 5%, and 1% levels, respectively.

As shown in models (1)–(3), borrowers in the United States generally reap higher benefits across the loan terms compared to the other regions. Whereas relationship borrowers in Europe tend to pay higher interest rates, borrowers in Japan pledge more collateral. In both regions, the borrowers are likely to obtain less credit relative to the United States. Models (4)–(6) show that relationship lenders in competitive banking markets are more likely to compete on lower interest rates and higher credit volume. We do not find evidence that relationship lenders require less collateral when the bank competition is high or in countries with more soft information production in SME lending. Conversely, more collateral is required in bank-based and developed economies.

In another test, we examine a possible ambiguity in the overall direction of the relationship benefits. The overall beneficial effect might be due to the straight benefits for the borrower, or due to the absence of "antibenefits" that have adverse effect on the borrower. To investigate this issue, we follow the studies by Card et al. (2010) and Koetse et al. (2009) and estimate multinomial logit with the three-outcome variable as the dependent variable: 1 (the relationship effect is significant and beneficial for the borrower), 0 (the relationship effect is nonsignificant), and −1 (the relationship effect is significant and unfavorable for the borrower). The results are reported in Table 6. Bank competition is directly related to beneficial outcomes of lending relationships. There is no evidence of adverse effects of bank competition. In contrast, bank orientation is positively related to unfavorable outcomes for the borrower. This analysis confirms our earlier findings and supports the interpretation that

Table 5 **Decomposition of Relationship-Lending Benefits by Loan Terms**

Method:	(1) Tobit, random effects Continuous/ one-tail p-value			(2) Tobit, random effects Continuous/ one-tail p-value			(3) Tobit, random effects Continuous/ one-tail p-value			(4) Tobit, random effects Continuous/ one-tail p-value			(5) Tobit, random effects Continuous/ one-tail p-value			(6) Tobit, random effects Continuous/ one-tail p-value		
Dependent variable:	Rate			Volume			Collateral			Rate			Volume			Collateral		
	Coeff.	t	Sig.	Coeff.	t	Sig.	Coeff.	t	Sig.	Coeff.	t	Sig.	Coeff.	t	Sig.	Coeff.	t	Sig.
Lending environment																		
Bank competition										0.75	4.41	***	0.52	2.31	**	−0.13	−0.51	
Bank deposits/GDP										−0.06	−0.51		−0.18	−1.29		−0.43	−3.68	***
Pct SME employment										0.00	−1.25		0.00	0.09		0.00	−1.38	
Developed status										−0.16	−0.75		0.05	0.31		−0.66	−2.08	**
Legal system and property rights										−0.04	−0.62		−0.01	−0.11		−0.05	−0.66	
Corruption index										0.06	0.60		0.02	0.17		0.11	0.79	
Inflation										−0.05	−1.79	*	−0.01	−0.37		−0.05	−1.61	
Bank cost-income ratio										−0.37	−0.85		0.24	0.69		0.02	0.04	
Regions																		
Europe	−0.37	−4.22	***	−0.24	−2.37	**	0.02	0.20										
Asia, excluding Japan	−0.26	−1.14		−0.15	−1.16		0.24	1.87	*									
Japan	−0.14	−1.22	*	−0.30	−2.23	**	−0.37	−4.40	***									
Latin America	0.10	0.53		−0.17	−1.11		2.09	0.04										
Publication controls																		
Ln no. of observations	0.00	0.33		0.00	−0.26		0.02	1.38		0.01	0.91		0.00	0.03		0.02	1.17	
Method strength	−0.04	−0.72		0.15	2.41	**	−0.07	−0.53		−0.03	−0.61		0.14	2.30	**	0.05	0.32	
Published	−0.13	−1.73	*	−0.02	−0.18		−0.13	−1.54		−0.17	−2.46	*	0.02	0.21		−0.17	−1.62	
Author affiliation ranking	0.00	0.53		0.00	−0.16		0.00	−2.82	***	0.00	0.66		0.00	−0.69		0.00	−2.47	**
Primary	−0.02	−0.23		0.01	0.18		0.03	0.47		0.01	0.11		0.03	0.36		−0.08	−0.94	
Firm survey	0.02	0.31		−0.03	−0.40		0.27	3.99	***	0.08	1.15		0.01	0.06		0.35	4.06	***
Subsample	0.00	0.14		−0.09	−2.37	**	0.03	0.66		0.01	0.32		−0.09	−2.25	**	0.01	0.27	
Publication year	0.00	−0.48		−0.01	−0.96		0.02	1.54		−0.01	−0.81		0.00	−0.40		0.03	2.44	**
No. of citations	0.00	0.18		0.00	−0.50		0.00	0.47		0.00	−0.10		0.00	−0.21		0.00	1.08	
Constant	8.07	0.54		20.37	1.00		−34.69	−1.51		14.34	0.92		9.50	0.45		−61.39	−2.33	**
Relationship-lending outcomes	Yes			Yes			Yes			Yes			Yes			Yes		
Relationship-lending dimensions	Yes			Yes			Yes			Yes			Yes			Yes		
No. of studies	59			51			29			59			50			29		
No. of observations	1,310			1,148			337			1,310			1,108			337		

Notes. This table decomposes lending outcomes into loan rates (models (1) and (4)), credit availability (models (2) and (5)), and collateral requirements (models (3) and (6)). The table reports the meta-analytic regressions that explain the heterogeneity of relationship-lending benefits for the borrowers by region effects and country-level characteristics. The estimation is panel Tobit with random-effects grouped by publications. The dependent variable is a one-tail *p*-value. The omitted reference for regions is "US." Variables are defined in Table A.2 of the appendix. The *∗, ∗∗,* and *∗∗∗* indicate the coefficients that are significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Figure 4   Box Plots of Bootstrapped Coefficients and *p*-Values
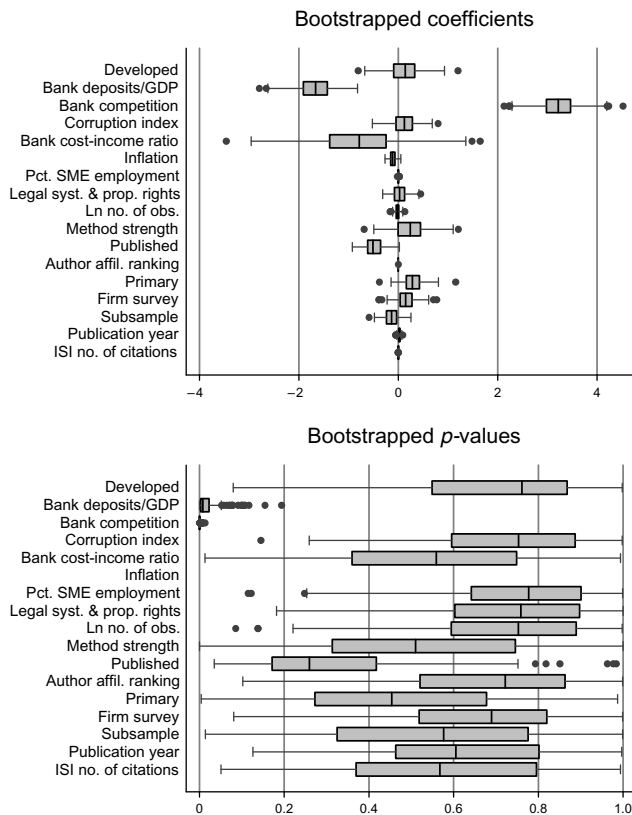
Notes. This figure reports bootstrapped coefficients and corresponding *p*-values using the pooled logit model where the dependent variable is a binary indicator of significance, which takes a value of 1 if the effect is significant and beneficial for the borrower, and a value of 0 if the effect is significant and unfavorable for the borrower. The bootstrapping is based on a random sample generation with replacement using the full sample of all effect sizes (2,979) and 200 repetitions.

the effect of bank competition is driven by its direct association with positive borrower benefits, as shown in Figure 3.

To examine the robustness of our results, we run a random sample analysis and derive bootstrapped estimates from our meta-analysis. We generate a random-draw sample with replacement of size N equal to the sample size, stratified at the study level. We repeat the resampling 200 times and estimate the coefficients and significance for each random sample with the pooled logit model. We plot the distribution of the resulting coefficients and the *p*-values in Figure 4. The results of the bootstrapping analysis confirm our original findings and document robustness of the effect of bank competition and bank system development, both in terms of the size of the coefficient and its significance. In line with the earlier results, the other coefficients cluster around zero with wide significance intervals.

We conduct several additional tests to further study the robustness of our results and their sensitivity

to variable definitions, methods, underlying structural forms, sample selection, and time variance. The results of these additional tests are reported in the online appendix (available as supplemental material at http://dx.doi.org/10.1287/mnsc.2014.2088).

6. Conclusion

In this paper, we conduct a meta-analysis to summarize and explain the heterogeneity of the results in the literature on relationship lending in a cross-country context. We find that strong relationships are generally beneficial for the borrowers, but the lending outcomes differ across the relationship dimensions. The dimensions time, exclusivity, and cross-product synergies are associated with lower loan rates and higher credit volume. However, borrowers with exclusive relationships are likely to post more collateral and those in close physical proximity to their lenders pay higher rates. Our results indicate that the beneficial effects of relationship lending go beyond an improvement in credit availability to firms as suggested by Petersen and Rajan (1994), and that banks trade off the costs and benefits across different relationship dimensions and lending terms.

The meta-regressions show that the likelihood of borrower benefits has a significant relation to the structure of the banking markets. The benefits of relationship lending for the borrowers are more likely when bank competition is high. We document a strong and positive monotonic link between bank competition and relationship-lending benefits for borrowers. We further find that the benefits for the borrowers are more likely in the United States compared to the other regions. The prevalence of relationship lending per se, as found in the bank-based financial systems in Europe and Japan with a large fraction of SME borrowers, does not necessarily come along with benefits for these borrowers.

We note that the inferences of the meta-analysis depend on the inputs from the original studies. Systematic heterogeneity in the original studies might create biases in the overall meta-analytic estimates and meta-regressions. We address this point in three ways. First, we weight individual effects by precision in order to reduce the impact of misspecified studies. Second, in all models we account for possible sources of observed systematic heterogeneity. These sources are related to data, methods, model specifications, and publication characteristics. Third, we perform a random sample analysis using bootstrapping technique, which confirms the robustness of our original estimates.

Our meta-analysis represents the first attempt to provide a systematic and quantitative assessment of the evidence on relationship lending in a cross-country context. Our findings also point at several

Table 6   Three-Outcome Multinomial Logit Model and Monotonicity of the Effects

Method: Multinomial logit	(1) Adverse effect for the borrower			(2) Benefit for the borrower			(3) Adverse effect for the borrower			(4) Benefit for the borrower		
Dependent variable:	Coeff.	z-stat.	Sig.	Coeff.	z-stat.	Sig.	Coeff.	z-stat.	Sig.	Coeff.	z-stat.	Sig.
Lending environment												
Bank competition	−0.12	−0.17		3.28	4.62	***						
Bank deposits/GDP	0.94	2.64	***	−0.57	−1.17							
Pct SME employment	−0.01	−1.15		−0.02	−1.44							
Developed status	−0.39	−0.61		0.14	0.20							
Legal system and property rights	−0.01	−0.03		−0.17	−0.55							
Corruption index	0.12	0.29		0.38	0.78							
Inflation	0.12	1.66	*	0.02	0.17							
Bank cost-income ratio	1.11	0.90		−0.52	−0.45							
Region												
Europe							0.53	1.44		−1.36	−3.21	***
Asia, excluding Japan							0.31	0.67		−1.66	−4.40	***
Japan							0.88	2.19	**	−1.52	−3.75	***
Latin America							1.64	2.82	***	−0.05	−0.07	
Publication controls												
Ln no. of observations	0.32	5.60	***	0.25	3.33	***	0.33	6.05	***	0.24	3.52	***
Method strength	−0.12	−0.56		−0.20	−0.47		−0.34	−1.54		−0.06	−0.17	
Published	0.70	2.35	**	0.05	0.15		0.61	2.11	**	0.18	0.52	
Author affiliation ranking	0.00	−0.24		0.00	−0.39		0.00	−0.59		0.00	−0.45	
Primary	0.31	1.29		0.55	2.23	**	0.30	1.19		0.49	2.01	**
Firm survey	−0.70	−2.45	**	−0.75	−1.83	*	−0.58	−2.36	**	−0.80	−2.06	**
Subsample	−0.05	−0.33		−0.19	−0.87		−0.05	−0.34		−0.10	−0.45	
Publication year	−0.03	−0.85		−0.01	−0.15		0.01	0.35		−0.01	−0.25	
No. of citations	0.00	−0.23		0.00	−0.01		0.00	0.88		0.00	0.04	
Constant	59.14	0.77		13.30	0.17		−30.83	−0.41		17.40	0.23	
Relationship-lending outcomes	Yes						Yes					
Relationship-lending dimensions	Yes						Yes					
No. of studies	93						95					
No. of observations	2,820						2,869					
Pseudo R^2	0.16						0.15					

Notes. This table reports the results from the multinomial logistic models with the three categorical variables: −1 denotes the effect sizes that are significant and unfavorable for the borrower; 0 denotes the effect sizes that are not significant; and 1 denotes the effect sizes that are significant and beneficial for the borrower. Columns (1) and (3) show the estimation for the outcome −1, the effects sizes that are significant and unfavorable for the borrower, relative to the nonsignificant results. Columns (2) and (4) show the estimation for the outcome 1, the effect sizes that are significant and beneficial for the borrower, relative to the nonsignificant results. The omitted reference for regions is "US." Models take into account the clustering of observations at the publication level. Variables are defined in Table A.2 of the appendix. The ∗, ∗∗, and ∗∗∗ indicate the coefficients that are significantly different from zero at the 10%, 5%, and 1% levels, respectively.

interesting avenues for future research. For example, we do not yet fully understand the role of supply and demand, including the impact of bargaining power on outcomes of bank-firm relationships. Therefore, to assess the overall value of relationship lending, it is important to understand the conditions under which relationship lending emerges along with the benefits for the lenders and/or the borrowers. Moreover, the occurrence of financial crises gives rise to the question whether and how relationship lending amplifies or alleviates the transmission of shocks to banks on individual firms (and vice versa) and how this mechanism varies between countries.

Supplemental Material
Supplemental material to this paper is available at http://dx.doi.org/10.1287/mnsc.2014.2088.

Appendix

Table A.1 Studies Included in the Meta-Analysis

ID	Author(s)	Title	Year	Publication	No. of effects	No. of obs.
1	Agarwal R and Elston JA	Bank–firm relationships, financing and firm performance in Germany	2001	*Economics Letters*	5	NA
2	Agarwal S and Hauswald R	The choice between arm's-length and inside debt	2009	*Unpublished*	39	33,855
3	Agarwal S and Hauswald R	Distance and private information in lending	2010	*Review of Financial Studies*	84	25,487
4	Alem M	Insurance motives in lending relationships: Evidence from Argentina	2003	*Unpublished*	9	649
5	Alessandrini P, Presbitero AF, and Zazzaro A	Banks, distances and firms' financing constraints	2009	*Review of Finance*	120	7,844
6	Alessandrini P, Presbitero AF, and Zazzaro A	Global banking and local markets: A national perspective	2009	*Cambridge Journal of Regions, Economy and Society*	6	7,844
7	Angelini P, Di Salvo R, and Ferri G	Availability and cost of credit for small businesses: Customer relationships and credit cooperatives	1998	*Journal of Banking and Finance*	50	2,232
8	Bebczuk RN	What determines the access to credit by SMEs in Argentina?	2004	*Unpublished*	6	139
9	Becchetti L and Garcia MM	Informal collateral and default risk: Do 'Grameen-like' banks work in high-income countries?	2011	*Applied Financial Economics*	3	1,009
10	Berger AN, Rosen RJ, and Udell GF	Does market size structure affect competition? The case of small business lending	2007	*Journal of Banking and Finance*	3	520
11	Berger AN and Udell GF	Relationship lending and lines of credit in small firm finance	1995	*Journal of Business*	18	863
12	Berger AN, Miller NN, Petersen MA, Rajan RM, and Stein JC	Does function follow organizational form? Evidence from the lending practices of large and small banks	2005	*Journal of Financial Economics*	6	546
13	Berger AN, Frame SW, and Ioannidou V	Tests of ex ante versus ex post theories of collateral using private and public information	2011	*Journal of Financial Economics*	6	32,286
14	Bharath S, Dahiya S, Saunders A, and Srinivasan A	Lending relationships and loan contract terms	2011	*Review of Financial Studies*	63	15,636
15	Blackwell DW and Winters DB	Banking relationships and the effect of monitoring on loan pricing	1997	*Journal of Financial Research*	10	174
16	Bonfim D and Dai Q	The number of bank relationships, borrowing costs and bank competition	2009	*Unpublished*	83	38,764
17	Bongini P, Di Battista ML, and Zavarrone E	The value of relationship lending: Small banks in an era of consolidation	2007	*Economic Notes*	5	195
18	Bopaiah C	Availability of credit to family businesses	1998	*Small Business Economics*	7	1,500
19	Brick IE and Palia D	Evidence of jointness in the terms of relationship lending	2007	*Journal of Financial Intermediation*	39	766
20	Calomiris C and Pornrojnangkool T	Relationship banking and the pricing of financial services	2009	*Journal of Financial Services Research*	96	14,439
21	Castelli A, Gerald PD Jr, and Hasan I	Bank relationships and small firms' financial performance	2006	*Unpublished*	12	9,996
22	Cavalluzzo KS, Cavalluzzo LC, and Wolken JD	Competition, small business financing, and discrimination: Evidence from a new survey	2002	*Journal of Business*	16	2,609
23	Cerqueiro G, Degryse H, and Ongena S	Rules versus discretion in loan rate setting	2011	*Journal of Financial Intermediation*	22	3,901
24	Chakraborty A and Hu CX	Lending relationships in line-of-credit and nonline-of-credit loans: Evidence from collateral use in small business	2006	*Journal of Financial Intermediation*	28	1,632
25	Chakraborty A and Mallick R	Credit gap in small businesses: Some new evidence	2012	*International Journal of Business*	11	4,348
26	Cole RA	The importance of relationships to the availability of credit	1998	*Journal of Banking and Finance*	50	2,007
27	Cole RA, Goldberg LG, and White LJ	Cookie cutter vs. character: The micro structure of small business lending by large and small banks	2004	*Journal of Financial and Quantitative Analysis*	48	1,102
28	Coleman ADF, Esho N, and Sharpe IG	Does bank monitoring influence loan contract terms?	2006	*Journal of Financial and Quantitative Analysis*	8	3,694
29	Cosci S and Meliciani V	Multiple banking relationships: Evidence from the Italian experience	2002	*Manchester School Supplement*	3	393

Table A.1   (Continued)

ID	Author(s)	Title	Year	Publication	No. of effects	No. of obs.
30	Cowling M	The incidence of loan collateralization in small business lending contracts: Evidence from the UK	1999	Applied Economics Letters	2	272
31	D'Auria C, Foglia A, and Reedtz PM	Bank interest rates and credit relationships in Italy	1999	Journal of Banking and Finance	4	120,000
32	De Bodt E, Lobez F, and Statnik J	Credit rationing, customer relationship and the number of banks: An empirical analysis	2005	European Financial Management	33	296
33	Degryse H and Ongena S	Distance, lending relationships, and competition	2005	Journal of Finance	71	15,044
34	Degryse H and Van Cayseele P	Relationship lending within a bank-based system: Evidence from European small business data	2000	Journal of Financial Intermediation	24	17,429
35	Deng Y, Hu M, and Srinivasan A	Hold-up versus benefits in relationship banking: A natural experiment using REIT organizational form	2011	Unpublished	32	1,404
36	Dennis S, Nandy D, and Sharpe IG	The determinants of contract terms in bank revolving credit agreements	2000	Journal of Financial and Quantitative Analysis	6	2,634
37	Elsas R and Krahnen JP	Is relationship lending special? Evidence from credit-file data in Germany	1998	Journal of Banking and Finance	12	1,079
38	Ewert R, Schenk G, and Szczesny A	Determinants of bank lending performance in Germany	2000	Schmalenbach Business Review	10	682
39	Fernando C and Chakraborty A	The importance of being known: Relationship banking and credit limits	2010	Quarterly Journal of Finance and Accounting	21	226
40	Ferri G and Messori M	Bank-firm relationships and allocative efficiency in northeastern and central Italy and in the south	2000	Journal of Banking and Finance	18	33,808
41	Ferri G, Kang TS, and Kim I-J	The value of relationship banking during financial crises: Evidence from the Republic of Korea	2001	Unpublished	6	6,936
42	Fraser DR, Ghon Rhee S, and Hwan Shin G	The impact of capital market competition on relationship banking: Evidence from the Japanese experience	2012	Journal of Empirical Finance	13	11,780
43	Fredriksson A	The effect of relationship intensity on loan pricing	2007	Unpublished	9	599
44	Gama APM and Duarte F	The role of collateral and relationship lending in loan pricing: evidence from United Kingdom SMEs	2011	Unpublished	18	326
45	Gloy BA, Gunderson MA, and LaDue EL	The costs and returns of agricultural credit delivery	2005	Journal of Agricultural Economics	3	901
46	Guiso L	Small business finance in Italy	2003	Unpublished	10	3,236
47	Hao L	Bank effects and the determinants of loan yield spreads	2003	Unpublished	8	1,140
48	Harhoff D and Körting T	Lending relationships in Germany—Empirical evidence from survey data	1998	Journal of Banking and Finance	30	994
49	Hernández-Cánovas G and Martínez-Solano P, Koëter-Kant J	Debt maturity and relationship lending: An analysis of European SMEs	2008	International Small Business Journal	9	1,912
50	Hernández-Cánovas G and Martínez-Solano P	Banking relationships: Effects on debt terms for small Spanish firms	2006	Journal of Small Business Management	40	184
51	Hernández-Cánovas G and Martínez-Solano P	Effect of the number of banking relationships on credit availability: Evidence from panel data of Spanish small firms	2007	Small Business Economics	30	2,115
52	Hernández-Cánovas G and Martínez-Solano P	Relationship lending and SME financing in the continental European bank-based system	2010	Small Business Economics	24	182
53	Howorth C and Moro A	Trustworthiness and interest rates: An empirical study of Italian SMEs	2012	Small Business Economics	10	362
54	Hübler O, Menkhoff L, and Suwanaporn C	Financial liberalisation in emerging markets: How does bank lending change?	2008	World Economy	28	NA
55	Jiangli W, Unal H, and Yom C	Relationship lending, accounting disclosure, and credit availability during the Asian financial crisis	2008	Journal of Money, Credit and Banking	40	1,147
56	Jiménez G, Salas V, and Saurina J	Determinants of collateral	2006	Journal of Financial Economics	18	426,112

Table A.1   (Continued)

ID	Author(s)	Title	Year	Publication	No. of effects	No. of obs.
57	Jiménez G, Salas V, and Saurina J	Organizational distance and use of collateral for business loans	2009	*Journal of Banking and Finance*	19	449,931
58	Jiménez G, Lopez JA, and Saurina J	Empirical analysis of corporate credit lines	2009	*Review of Financial Studies*	28	2,078,434
59	Kano M, Uchida H, Udell GF, and Watanabe W	Information verifiability, bank organization, bank competition and bank–borrower relationships	2011	*Journal of Banking and Finance*	55	1,775
60	Kim M-K and Lee G-O	Effect of relationship banking on financing cost and performance of SMEs: Evidence from panel data of Korean small firms	2011	Unpublished	40	NA
61	Kirschenmann K and Norden L	The relation between borrower risk and loan maturity in small business lending	2012	*Journal of Business Finance and Accounting*	30	668
62	Lehmann E and Neuberger D	Do lending relationships matter? Evidence from bank survey data in Germany	2001	*Journal of Economic Behavior and Organization*	45	389
63	Lehmann E, Neuberger D, and Räthke S	Lending to small and medium-sized firms: Is there an East-West gap in Germany?	2004	*Small Business Economics*	48	334
64	Li Y and Srinivasan A	Relationship bank behavior during borrower distress and bankruptcy	2011	Unpublished	20	13,144
65	Machauer A and Weber M	Bank behavior based on internal credit ratings of borrowers	1998	*Journal of Banking and Finance*	9	200
66	Menkhoff L, Neuberger D, and Suwanaporn C	Collateral-based lending in emerging markets: Evidence from Thailand	2006	*Journal of Banking and Finance*	36	416
67	Menkhoff L and Suwanaporn C	On the rationale of bank lending in pre-crisis Thailand	2007	*Applied Economics*	35	416
68	Miarka T	The recent economic role of bank-firm relationships in Japan	1999	Unpublished	4	1,288
69	Mitchell K and Pearce DK	Lending technologies, lending specialization, and minority access to small-business loans	2011	*Small Business Economics*	34	863
70	Montoriol-Garriga J	Relationship lending and small business finance: Empirical analysis of cost of capital, credit rationing, and firm performance	2006	Unpublished	110	510,840
71	Neuberger D and Räthke-Döpplich S	Microenterprises and multiple bank relationships: The case of professionals	2009	*Small Business Economics*	12	208
72	Niskanen J and Niskanen M	Does relationship banking have value for small firms?	2000	*Liiketaloudellinen Aikakauskirja (The Finnish Journal of Business Economics)*	18	919
73	Norden L and Weber M	Credit line usage, checking account activity, and default risk of bank borrowers	2010	*Review of Financial Studies*	4	643
74	Ogawa K, Sterken E, and Tokutsu I	Multiple bank relationships and the main bank system: Evidence from a matched sample of Japanese small firms and main banks	2009	*Contributions to Economics (book)*	8	4,888
75	Ogura Y	Interbank competition and information production: Evidence from the interest rate difference	2010	*Journal of Financial Intermediation*	46	889
76	Ono A and Uesugi I	Role of collateral and personal guarantees in relationship lending: Evidence from Japan's SME loan market	2009	*Journal of Money, Credit and Banking*	32	1,702
77	Ortiz-Molina H and Penas MF	Lending to small businesses: The role of loan maturity in addressing information problems	2007	*Small Business Economics*	20	995
78	Park Y	Parsimonious lenders: Bank concentration and credit availability to small businesses	2008	Unpublished	16	1,453
79	Peltoniemi J	The value of relationship banking: Empirical evidence on small business financing in Finnish credit markets	2004	Unpublished	46	976
80	Peltoniemi J	The benefits of relationship banking: Evidence from small business financing in Finland	2007	*Journal of Financial Services Research*	105	625
81	Petersen MA and Rajan RG	Does distance still matter? The information revolution in small business lending	2002	*Journal of Finance*	48	4,548

Table A.1   (Continued)

ID	Author(s)	Title	Year	Publication	No. of effects	No. of obs.
82	Petersen MA and Rajan RG	The benefits of lending relationships: Evidence from small business data	1994	*Journal of Finance*	74	1,500
83	Petersen MA and Rajan RG	The effect of credit market competition on lending relationships	1995	*Quarterly Journal of Economics*	19	1,459
84	Pozzolo AF	The role of guarantees in bank lending	2004	*Unpublished*	7	67,829
85	Repetto A, Rodríguez S, and Valdés RO	Bank lending and relationship banking: Evidence from Chilean firms	2002	*Unpublished*	54	21,000
86	Santikian L	The ties that bind: Bank relationships and small business lending	2011	*Unpublished*	131	2,981
87	Schenone C	Lending relationships and information rents: Do banks exploit their information advantages?	2009	*Review of Financial Studies*	109	878
88	Scott JA and William CD	Bank mergers and small firm financing	2003	*Journal of Money, Credit and Banking*	12	1,474
89	Scott JA	Loan officer turnover and credit availability for small firms	2006	*Journal of Small Business Management*	60	2,330
90	Shikimi M	Do firms benefit from multiple banking relationships? Evidence from small and medium-sized firms in Japan	2005	*Unpublished*	12	78,695
91	Shin B, Udell GF, and Park S	Lending relationships, credit availability, firm value and banking crises	2008	*Unpublished*	20	1,337
92	Sohn W and Choi H	Banks' lending decisions after loan acquisitions: Do banks favour pre-existing relationships?	2011	*Applied Economics*	28	181
93	Stein I	The price impact of lending relationships	2011	*Unpublished*	29	14,826
94	Streb JM, Bolzico J, Druck P, Henke A, Rutman J, and Sosa Escudero W	Bank relationships: Effect on the availability and marginal cost of credit for firms in Argentina	2002	*Unpublished*	56	15,822
95	Uchida H, Udell GF, and Yamori N	Loan officers and relationship lending to SMEs	2012	*Journal of Financial Intermediation*	18	1,020
96	Uzzi B	Embeddedness in the making of financial capital: How social relations and networks benefit firms seeking financing	1999	*American Sociological Review*	5	2,226
97	Voordeckers W and Steijvers T	Business collateral and personal commitments in SME lending	2006	*Journal of Banking and Finance*	15	234
98	Weinstein DE and Yafeh Y	On the costs of a bank-centered financial System: Evidence from the changing main bank relations in Japan	1998	*Journal of Finance*	24	6,836
99	Wen S and Tseng C	Collateral, relationship banking, and corporate credit risk	2006	*Unpublished*	3	NA
100	Yao J and Ouyang H	Dark-side evidence on bank-firm relationship in Japan	2007	*Japan and the World Economy*	2	NA
101	Ziane Y	Number of banks and credit relationships: Empirical results from French small business data	2003	*European Review of Economics and Finance*	48	244

Table A.2   Variable Definitions

Meta-analytic effect sizes

Discrete measure of significance: This variable classifies reported effects from the studies into positive, negative, and nonsignificant ones at the 10% significance level. Alternatively, the variable classifies effects into significant positive and significant negative at the 10% significance level. Significance is derived directly from the reported regression statistics. Source: sample studies

One-tail p-value: A continuous direction and the significance of all of the effect size. Values range from 0 to 1 where values approaching 0 are significantly unfavorable to the borrower, but values approaching 1 are significantly favorable. One-tail *p*-value is derived from the significance statistics derived from significance statistics reported in a study. If only limited information is provided, such as star indication of the level of significance, we collect the most conservative significance measure (e.g., for significance at $> 10\%$ confidence level we code the effect as significant at 10% confidence level). If the effect is in the direction of the hypothesis that the relationship is beneficial to the borrower (i.e., the relationship's strength has an association with lower rates, greater credit availability, lower collateral requirements, or longer maturity), then the one-tail *p*-value is defined as $p1 = (p2/2)$. If the effect is in the opposite direction, then $p1 = 1 - (p2/2)$. In this calculation $p1$ is the one-tail *p*-value and $p2$ is the two-tail *p*-value reported in papers or derived from significance statistics. For the overall effect size we apply Edgington's (1972) method to calculate a one-tail *p*-value that indicates the pooled estimate of the significance and the direction of the overall true effect. Source: sample studies

Fisher's z-score: Partial correlation corrected for skewness. Partial correlations are obtained directly from sample studies from regression statistics following Greene (2008, Chap. 3): $r_{yz}^2 = (t_z^2/(t_z^2 + df))$, where r_{yz}^2 is the partial correlation between variables y (dependent variable) and z (independent variable), t is the t-statistic associated with the z coefficient, and df is the degrees of freedom. Correction for skewness follows from Borenstein et al. (2009). Positive Fisher's *z*-scores indicate a positive relation between the strength of the relationship and benefits for the borrowers, negative Fisher's *z*-scores indicate a negative relation. Source: sample studies

Relationship strength proxies

TIME–DURATION: Time dimension of the relationship's strength measured by the duration of the lending relationship. Source: own data set

TIME–AGE: Time dimension of the relationship's strength measured by the age of the borrower. Source: own data set

TIME–OTHER: Time dimension of the relationship's strength measured by other time-related variables, such as number of repeated interactions over time, loan officer turnover, or frequency of interactions. Source: own data set

EXCLUSIVITY: Exclusivity dimension of the relationship's strength measured by the degree of exclusive lending relationship between lenders and borrowers, e.g., number of lending relationships, concentration of lending, or main bank status. Source: own data set

CROSS–PRODUCT SYNERGIES: Cross-product synergies dimension of the relationship's strength, e.g., number of services provided by the lender, existence of deposit taking services, and scope of financial services provision. Source: own data set

DISTANCE–PHYSICAL: Distance dimension of the relationship's strength measured by physical distance between lender and borrower. Source: own data set

DISTANCE–ORGANIZATIONAL: Distance dimension of the relationship's strength measured by organizational distance between lender and borrower, e.g., membership in lending institutions, cooperative membership, board linkages, or distance between bank branch and bank headquarters. Source: own data set

DISTANCE–PERSONAL: Distance dimension of the relationship's strength measured by personal distance between lender and borrower, e.g., degree of personal interactions, or a dummy variable indicating banking in person. Source: own data set

Lending outcome proxies

RATE: Price of credit. Source: own data set

VOL: Credit availability. Source: own data set

COLL: Collateral requirements. Source: own data set

MAT: Loan maturity. Source: own data set

Country-level lending environment

We calculate country-level variables for each study, country, and sampling window as equally weighted averages of those country-year observations that are available in our data sets within the sample period of the study. If study observations fall into time periods in which country-level series are available but no time overlap exists between the original sample period and the available country indicator, we use the closest available country-year observation.

Bank competition: Negative value of the assets of three largest banks as a share of assets of all commercial banks. Source: Beck T, Demirgüç-Kunt A (2010). Financial institutions and markets across countries and over time: data and analysis. World Bank policy

Bank deposits/GDP: Demand, time, and saving deposits in deposit money banks as a share of GDP. Source: Beck T, Demirgüç-Kunt A (2010). Financial institutions and markets across countries and over time: data and analysis. World Bank policy

Pct SME employment: Percentage of total employment by micro, small, and medium enterprises. Source: Kozak M, 2007. Micro, small, and medium enterprises: a collection of published data. International Finance Corporation (IFC). Washington, DC

Developed status: Equals 1 if the study data set is from a high income group as defined by the World Bank country classification system, 0 otherwise. The development status is determined in the median year of the sampling window. Source: World Bank

Legal system and security of property rights: Index of protection of persons and their rightfully acquired property. The index consists of seven components: judicial independence, impartial courts, protection of property rights, military interference in rule of law and the political process, integrity of the legal system, legal enforcements of contracts, and regulatory restrictions on the sale of real property. The index ranges from 0 (weak legal system) to 10 (strong legal system). Source: Economic Freedom of the World, Fraser Institute

Corruption index: Control of corruption index. The index measures the perceived corruption. Values range from -2.5 to 2.5, with higher values corresponding to lower corruption. Source: World Bank, World Governance Indicators

Bank cost-income ratio: Total costs as a share of total income of all commercial banks. Source: Beck T, Demirgüç-Kunt A (2010). Financial institutions and markets across countries and over time: data and analysis. World Bank policy

Inflation: Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. Source: World Bank

Legal origin: A set of five dummies that identifies the legal origin of the Company law or Commercial Code of each country. The five origins are English, French, German, Scandinavian, and Socialist. The reference dummy is English. Source: Djankov S, McLiesh C, Shleifer A (2007). Private credit in 129 countries. *Journal of Financial Economics* 84:299–329

Latitude: Absolute latitude of the country. Source: La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny R (1999). The quality of government. *Journal of Law, Economics and Organization* 15:222–279

Table A.2   (Continued)

Publication variables

Ln no. of observations: Logarithm of number of observations for each regression specification. Source: own data set

Method strength: Equals 1 if the original estimator uses instrumental variable or structural estimation and 0 otherwise. Source: own data set

Published: Equals 1 if the study appears in a refereed journal and 0 otherwise. Source: own data set

Author affiliation ranking: Author affiliation ranking is a five-year moving average of the Arizona State University Finance Rankings. The value is calculated for each author's affiliation and for each year of publication. For those authors, whose institution is not available in the ranking, we impute the value as the maximum of all rankings in our data set of selected publications $+1$. If the author is affiliated with more than one ranked institution, we use the one that is listed first. Source: Arizona State University Finance Rankings

Primary: Equals 1 if the relationship lending is the main focus of the paper and if relationship lending is not the main focus of the paper and serves in regressions as a control variable. Source: own data set

Firm survey: Equals 1 if the original sample is a survey where the respondents are representatives of borrowers. Source: own data set

Subsample: Equals 1 if the effect size is derived from a subsample in the original study. Source: own data set

Publication year: The year of the publication. If the paper is available online first, the year of the online publication is used. Source: own data set

No. of citations: Number of citations is obtained from Web of Science for each published paper. The value is set to 0 for publications that are not available in the Web of Science database. Source: Web of Science by Thomson Reuters

References

Acharya V, Saunders A, Hasan I (2006) Should banks be diversified? Evidence from individual bank loan portfolios. *J. Bus.* 79:1355–1412.

Agarwal S, Ben-David I (2013) Do loan officers' incentives lead to lax lending standards? Working Paper 2012-03-007, Fisher College of Business, Ohio State University, Columbus.

Agarwal S, Chomsisengphet S, Liu C, Souleles N (2009) Benefits of relationship banking: Evidence from consumer credit markets. Working paper, National University of Singapore, Singapore.

Agarwal S, Hauswald R (2009) The choice between arm's-length and inside debt. Working paper, Federal Reserve Bank of Chicago, Chicago.

Agarwal S, Hauswald R (2010) Distance and private information in lending. *Rev. Financial Stud.* 23:2757–2788.

Allen F, Gale D (2000) *Comparing Financial Systems* (MIT Press, Cambridge, MA).

Beck T, Demirgüç-Kunt A, Maksimovic V (2005) Financial and legal constraints to growth: Does firm size matter? *J. Finance* 60:137–177.

Berger A, Udell G (1995) Relationship lending and lines of credit in small firm finance. *J. Bus.* 68:351–381.

Berger A, Udell G (2006) A more complete conceptual framework for SME finance. *J. Banking Finance* 30:2945–2966.

Berlin M, Mester L (1999) Deposits and relationship lending. *Rev. Financial Stud.* 12:579–607.

Bharath S, Dahiya S, Saunders A, Srinivasan A (2011) Lending relationships and loan contract terms. *Rev. Financial Stud.* 24:1141–1203.

Bijmolt T, Pieters R (2001) Meta-analysis in marketing when studies contain multiple measurements. *Marketing Lett.* 12:157–169.

Black S, Strahan P (2002) Entrepreneurship and bank credit availability. *J. Finance* 57:2807–2833.

Boot A (2000) Relationship banking: What do we know? *J. Financial Intermediation* 9:7–25.

Boot A, Thakor A (2000) Can relationship banking survive competition? *J. Finance* 55:679–713.

Borenstein M, Hedges L, Higgins J, Rothstein H (2009) *Introduction to Meta-Analysis* (John Wiley and Sons, Chichester, UK).

Brick I, Palia D (2007) Evidence of jointness in the terms of relationship lending. *J. Financial Intermediation* 16:452–476.

Card D, Kluve J, Weber A (2010) Active labour market policy evaluations: A meta-analysis. *Econom. J.* 120:452–477.

Cooper H, Hedges L, Valentine J (2009) *The Handbook of Research Synthesis and Meta-Analysis*, 2nd ed. (Russell Sage Foundation, New York).

Degryse H, Ongena S (2005) Distance, lending relationships, and competition. *J. Finance* 60:231–266.

Degryse H, Ongena S (2008) Competition and regulation in the banking sector: A review of the empirical evidence on the sources of bank rents. Thakor A, Boot A, eds. *Handbook of Financial Intermediation and Banking* (Elsevier, Amsterdam), 483–-554.

Dennis S, Nandy D, Sharpe I (2000) The determinants of contract terms in bank revolving credit agreements. *J. Financial Quant. Anal.* 35:87–110.

Edgington E (1972) A normal curve method for combining probability values from independent experiments. *J. Psych.* 82:85–89.

Elsas R (2005) Empirical determinants of relationship lending. *J. Financial Intermediation* 14:32–57.

Elyasiani E, Goldberg L (2004) Relationship lending: A survey of the literature. *J. Econom. Bus.* 56:315–330.

Greene W (2008) *Econometric Analysis*, 6th ed. (Prentice Hall, Upper Saddle River, NJ).

Hedges L, Olkin I (1985) *Statistical Methods for Meta-Analysis* (Academic Press, Orlando, FL).

Hedges L, Tipton E, Johnson M (2010) Robust variance estimation in meta-regression with dependent effect size estimates. *Res. Synthesis Methods* 1:39–65.

Ioannidou V, Ongena S (2010) "Time for a change": Loan conditions and bank behavior when firms switch banks. *J. Finance* 65:1847–1877.

Kirschenmann K, Norden L (2012) The relationship between borrower risk and loan maturity in small business lending. *J. Bus. Finance Accounting* 39:730–757.

Koetse M, de Groot H, Florax R (2009) A meta-analysis of the investment-uncertainty relationship. *Southern Econom. J.* 76:283–306.

Krahnen J, Schmidt R (2004) *The German Financial System* (Oxford University Press, Oxford, UK).

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny R (1998) Law and finance. *J. Political Econom.* 106:1113–1155.

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny R (1999) The quality of government. *J. Law, Econom. Organ.* 15:222–279.

Lipsey M, Wilson D (2001) *Practical Meta-Analysis* (Sage, Thousand Oaks, CA).

Norden L, Weber M (2010) Credit line usage, checking account activity, and default risk of bank borrowers. *Rev. Financial Stud.* 23:3665–3699.

Petersen M, Rajan R (1994) The benefits of lending relationships: Evidence from small business data. *J. Finance* 49:3–37.

Petersen M, Rajan R (1995) The effect of credit market competition on lending relationships. *Quart. J. Econom.* 110:406–443.

Presbitero A, Zazzaro A (2011) Competition and relationship lending: Friends or foes? *J. Financial Intermediation* 20:387–413.

Standard & Poor's (2006) A Guide to the loan market. Report, Standard & Poors, New York. https://www.lcdcomps.com/d/pdf/LoanMarketguide.pdf.

Stanley T (2001) Wheat from chaff: Meta-analysis as quantitative literature review. *J. Econom. Perspect.* 15:131–150.