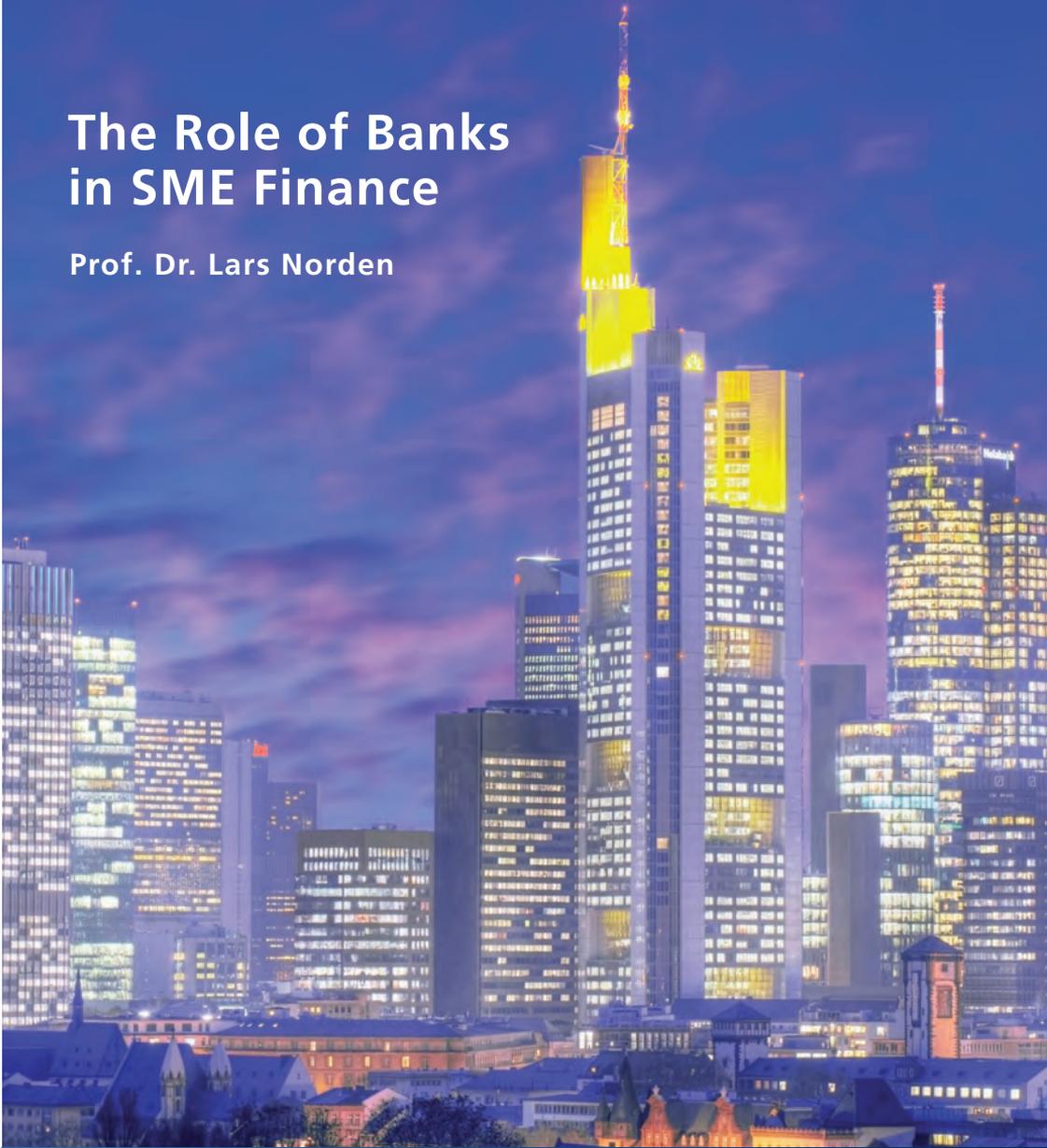


# The Role of Banks in SME Finance

Prof. Dr. Lars Norden



Inaugural Address Series  
Research in Management

# **The Role of Banks in SME Finance**

### **Bibliographical Data and Classifications**

Library of Congress Classification

HG4001+; HG4027.7; HD2340.782;  
HF5681.F54

(LCC)

[http://lcweb.loc.gov/catdir/cpsolcco/lcco\\_h.pdf](http://lcweb.loc.gov/catdir/cpsolcco/lcco_h.pdf)

Journal of Economic Literature (JEL)

G21, G24, O16, E22, L11, L25

[http://www.aeaweb.org/journal/jel\\_class\\_system.html](http://www.aeaweb.org/journal/jel_class_system.html)

Free keywords

Banks,  
SME Finance,  
Bank Lending,  
Banking,  
Finance,  
Credit,  
Lending Technology,  
Relationship Lending,  
Trade Credit

### **Erasmus Research Institute of Management - ERIM**

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Internet: [www.irim.eur.nl](http://www.irim.eur.nl)

### **ERIM Electronic Series Portal:**

<http://hdl.handle.net/1765/1>

### **Inaugural Addresses Research in Management Series**

Reference number ERIM: EIA-2015-062-F&A

ISBN 978-90-5892-400-1

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**Design and layout:** B&T Ontwerp en advies ([www.b-en-t.nl](http://www.b-en-t.nl))

**Print:** Haveka ([www.haveka.nl](http://www.haveka.nl))

This publication (cover and interior) is printed by haveka.nl on recycled paper, Revive®.  
The ink used is produced from renewable resources and alcohol free fountain solution.  
Certifications for the paper and the printing production process: Recycle, EU Flower, FSC, ISO14001.  
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# **The Role of Banks in SME Finance**

Address delivered in shortened form at the occasion  
of accepting the appointment as  
extraordinary Professor of Banking and Finance  
on behalf of Vereniging Trustfonds EUR  
at the Rotterdam School of Management, Erasmus University  
on Friday, February 20, 2015

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## Samenvatting

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Banken spelen een cruciale rol in de financiering van het midden- en kleinbedrijf (MKB). Het MKB representeert een grote fractie van alle bedrijven in veel economieën en levert aanzienlijk bij aan werkgelegenheid en groei. Echter, het MKB is minder transparant met betrekking tot informatievoorziening, meer risicovol, meer financieel beperkt en meer afhankelijk van banken dan grote bedrijven, wat leidt tot serieuze uitdagingen in de financiering van het MKB. In deze oratie focus ik op de middelen die zijn ontwikkeld met betrekking tot kredietverschaffing om om te gaan met belangrijke uitdagingen in de financiering van het MKB. Ik presenteer bewijs uit twee recente empirische studies. De eerste conclusie is dat het aangaan van kredietrelaties werkt. Door gebruik te maken van een meta-analyse tussen landen laten we zien dat kredietnemers over het algemeen voordeel ondervinden van een kredietrelatie. Het MKB ontvangt meer krediet en / of lagere rentes via kredietrelaties. Bovendien bieden kredietrelaties grotere voordelen als de concurrentie tussen banken hoger is. De tweede conclusie is dat handelskrediet slechts beperkte mogelijkheden biedt om bankkrediet te vervangen, wanneer het laatst genoemde onderworpen is aan een schok. Europese midden- en kleinbedrijven hebben een schok aan het bankkrediet tot op zekere hoogte kunnen opvangen met handelskrediet. Substitutie tussen deze twee vormen van krediet is echter moeilijker geworden gedurende de financiële crisis en was slechts mogelijk voor een beperkt aantal bedrijven: die met een betere kredietwaardigheid en een gemiddelde financiële beperking. Kortom, het begrijpen van de middelen tot kredietverschaffing, zoals kredietrelaties en handelskrediet, is essentieel voor kredietverstrekkers, kredietnemers en beleidsmakers om het functioneren van MKB financiering te waarborgen.

## Abstract

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Banks play a crucial role for the financing of small and medium-sized enterprises (SMEs). SMEs represent a large fraction of all firms in many economies and contribute significantly to employment and growth. But, SMEs are more informationally opaque, more risky, more financially constrained, and more bank-dependent than large firms, which creates serious challenges in SME finance. In this inaugural address, I focus on lending technologies to cope with key challenges in SME finance. I present evidence from two recent empirical studies. The first conclusion is that relationship lending works. Applying meta-analysis in a cross-country context, we show that, on average, borrowers benefit from relationship lending. SMEs obtain more credit and / or lower loan rates under relationship lending. Furthermore, bank competition makes benefits for borrowers more likely. The second conclusion is that trade credit has limited scope to replace bank debt when the latter is subject to a shock. SMEs in Europe have countered a shock to their bank debt to some extent with trade credit. However, substitution has become increasingly difficult during the financial crisis and was only possible for a subset of firms: the ones with better credit quality and intermediate financial constraints. Overall, a comprehensive understanding of lending technologies such as relationship lending and trade credit is critical for lenders, borrowers, and policymakers to ensure the proper functioning of SME finance.



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## 1. Introduction

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*Dear Rector Magnificus and Dean,  
Distinguished colleagues and guests,  
Dear friends and family,*

In this inaugural address, I reflect on the role of banks in SME finance. From an academic perspective there are at least two objective reasons why this topic is interesting. First, SMEs are highly relevant for economic activity. Second, SME finance faces serious challenges because these firms have special characteristics.

In addition, there are some subjective reasons why I decided to talk about this topic. I have substantial personal experience with SMEs since my father has had his own small business for 25 years. Moreover, before starting my academic career, I was a banker at a local savings bank that focused on SME lending. At that time, I developed a profound interest in bank lending, credit markets, and credit risk, and this interest has grown over time.

Today I am accepting the Chair of Banking and Finance, which is endowed by Erasmus Trust Fund. I am happy and proud that I can continue to contribute to academic research and teaching, and can have an impact on society in this position.

I will start my talk with a motivation that leads to the key questions I am raising today: Do lending technologies work? Who benefits? Are there differences across countries? What do SMEs do when banks cut lending? I summarize two recent empirical studies that provide evidence on these questions and draw two main conclusions. Then, I briefly outline the activities of the Chair of Banking and Finance. I end with words of thanks and would like to invite you to a reception afterwards.



## 2. Banks, SMEs, and Lending Technologies

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Banks exist because capital markets are not perfect. The theory of financial intermediation has shown that frictions in capital markets, especially asymmetric information and transaction costs, are the *raison d'être* for financial intermediaries (Boot, 2000). Banks help alleviate the costs arising from these frictions. A bank's core activities are deposit taking and lending. Banking research has shown that banks provide liquidity and intertemporal insurance; they act as information producers and delegated monitors, relationship lenders, and as a bridge between optimists and pessimists in the economy (Diamond and Dybvig, 1983; Diamond, 1984; Petersen and Rajan, 1994; Coval and Thakor, 2005). Banks transform the risk of financial contracts, the maturity, and the lot size. For example, think of demand deposits, which can be withdrawn at any time, that are transformed into investment loans for companies. Demand deposits are usually small, short-term, and safe, while investment loans are usually large, long-term, and risky. Furthermore, banks are essential for monetary transmission from the central bank and they operate a large part of the cash and non-cash payment system in the economy. Banks have added many more activities, and they have become increasingly interconnected, complex, and therefore systemically important.

SMEs are of key importance for the economy in many countries. SMEs are bakers, butchers, electricians, and many other professions. According to the definition of the European Commission (2006), SMEs are firms with fewer than 250 employees, with turnover of less than 50 million euro, and total assets less than 43 million euro. SMEs represent 98% of all firms, and contribute 67% to total employment and 56% to total gross value added in the European Union. Last year there were approximately 21 million SMEs in EU. In the Netherlands, for example, 99% of all firms are SMEs, and a recent report states (MKB in Beeld, 2014): "Het midden en kleinbedrijf (MKB) is de motor van de Nederlandse economie." The same holds for many other countries.

SME finance is challenging because these firms are more informationally opaque, more risky, more financially constrained, and more bank-dependent than large firms. They cannot access capital markets or issue stocks or bonds. They largely depend on bank loans and trade credit to raise external finance. On average, the default risk of SMEs is as high as that of non-investment grade rated firms with credit ratings in the range from BB to B (e.g., Dietsch and Petey, 2004).

Berger and Udell (2006) have proposed a framework to describe and analyze modes of SME finance, focusing on the concept of lending technologies and various country-specific overall environments. They define a lending technology as “*a unique combination of primary information source, screening and underwriting policies / procedures, loan contract structure, and monitoring strategies / mechanisms.*”

The following major lending technologies are used in practice: (i) financial statement lending, (ii) small business scoring, (iii) asset-based lending, (iv) factoring, (v) fixed-asset lending, (vi) leasing, (vii) relationship lending, and (viii) trade credit. The first six lending technologies can be classified as transactional lending, relying on hard information about the financial conditions of the borrower and / or on collateral. While relationship lending is based on private and soft information, trade credit cannot be easily classified, sharing features of relationship and transactional lending. Berger and Udell (2006) argue that the lending technology, together with the financial institution structure (large vs. small, foreign vs. domestic, state-owned vs. privately-owned, competition) and the lending infrastructure (information, legal, judicial, bankruptcy, social, tax, and regulatory environments), influence the credit availability and lending terms for small businesses in a country.

### 3. Benefits of Relationship Lending<sup>1</sup>

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#### 3.1 Motivation

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 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 provide country-level explanations for differences in relationship lending outcomes.

Early research on financial intermediation examined the role of banks in information production (Leland and Pyle, 1977; Diamond, 1984; Ramakrishnan and Thakor, 1984; Boyd and Prescott, 1986). Further theoretical work created the foundations for a more focused examination of bank monitoring (e.g., Sharpe, 1990; Diamond, 1991; Rajan, 1992; Boot and Thakor, 2000; Hauswald and Marquez, 2006). Empirical studies on relationship lending have produced evidence that focuses primarily on the benefits of a banking relationship (e.g., Petersen and Rajan, 1994; Berger and Udell, 1995; Berlin and Mester, 1999). However, there is no clear consensus on whether, and under which conditions, relationship lending is beneficial for the borrower, the bank, or both.

Relationship lending is one of the most important lending technologies (e.g., Berger and Udell, 2002; Berger et al., 2005; Bharath et al., 2011) and for many private firms, especially SMEs, it is the key source of external financing (e.g., Petersen and Rajan, 1994; Beck, Demirgüç-Kunt, and Maksimovic, 2005; De la Torre, Martinez Peria, and Schmukler, 2010; Berger and Black, 2011; Beck, Demirgüç-Kunt, Martinez Peria, 2011). Close bank-borrower relationships might create benefits for both sides if the inefficiencies stemming from informational

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1 This chapter is based on Kysucky, V., Norden, L., 2014. The Benefits of Relationship Lending in a Cross-Country Context: A Meta-Analysis. *Management Science*, forthcoming.

problems are reduced. Hence, 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, while 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 but then raising the loan rates and fees for subsequent business. Since the bank observes proprietary information about the borrower, and the borrower cannot transfer this private information to another lender, the bank acquires an informational monopoly over the borrower. In particular, a close bank-borrower relationship might create a lock-in effect (hold up, ex-post monopoly power) if the borrower does not have sufficient alternative banking relationships (e.g., Degryse and Ongena, 2005), or if the borrower faces high switching costs (e.g., Ioannidou and Ongena, 2010; von Thadden, 2004; Kim, Kliger, and Vale, 2003; Rajan, 1992; Sharpe, 1990; Greenbaum, Kanatas, and Venezia, 1989).

However, borrowers might have incentives for moral hazard in both strong and weak bank relationships. If an important borrower is in financial distress and the relationship with the bank is relatively strong, the borrower has an incentive to rely on a “too-big-to-fail” effect. Instead of making an effort to improve its financial conditions, the borrower might simply gamble on getting more funds from the bank. Or, a relatively risky borrower has an incentive to hide private knowledge about the risk of default in a weak bank relationship, as long as there is a possibility to benefit from lending terms that are more favorable compared to the true default risk.

In this study we examine whether the bright side or the dark side of relationship lending dominates and which factors drive the effects in a cross-country context. We carry out a meta-analysis to summarize and explain the heterogeneity of results in the literature and identify the factors that influence the likelihood of borrower benefits. Meta-analysis has several advantages over field evidence-based empirical research or qualitative surveys. It provides a set of formal quantitative tools to summarize the results on a common topic and explains differences in study-to-study variation in outcomes. Moreover, it offers objective perspective and avoids potential biases of individual judgment. Combining outcomes from different studies provides greater explanatory power. Meta-analysis has been used in medical sciences and has found increasing application in social sciences (e.g., Hedges and Olkin, 1985; Hunter and Schmidt, 1990; Stanley, 2001; Lipsey and Wilson, 2001; Doucouliagos and

Ulubasoglu, 2008; Borenstein et al., 2009; examples of applications in finance: Capon, Farley, and Hoenig, 1990; Coggin, Fabozzi, and Rahman, 1993; van Ewijk, de Groot, and Santing, 2012).

Meta-analysis is especially useful in our setting. The data used in empirical studies on relationship lending range from country-specific firm surveys or samples to proprietary credit file data from individual banks. Moreover, there are substantial differences in measurement approaches, focus on relationship dimensions, and empirical methods. Such heterogeneity in research makes it challenging to compare and generalize the findings in a qualitative literature review. By combining evidence from a large number of different studies, 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. Importantly, we identify the sources of disagreement among the studies and introduce new country-level data to test the hypotheses on economic drivers that account for the differences in relationship lending outcomes among the economies.

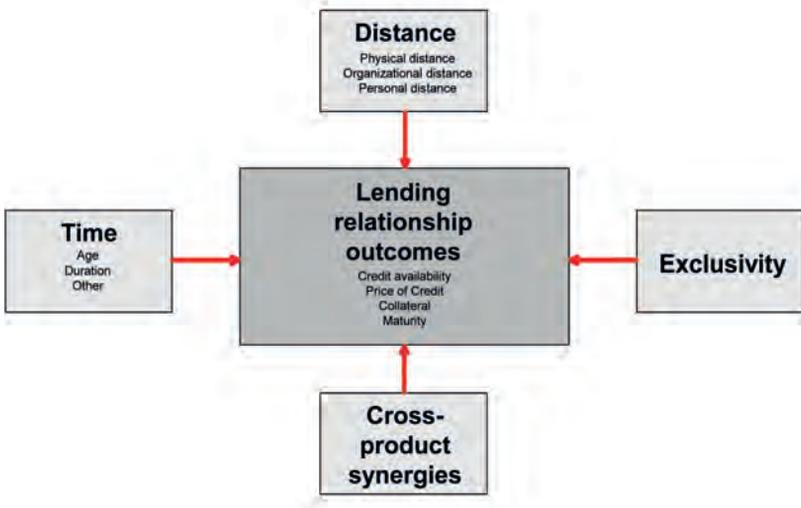
### **3.2 Conceptual Framework**

We develop a multi-dimensional conceptual framework that links the strength of lending relationships with lending outcomes. Key dimensions of the strength of the lending relationships are: time, distance, exclusivity, and cross-product synergies (Norden, 2009). The lending outcomes in our framework are: loan rates, credit volume, collateral, and maturity. These dimensions are microeconomic in nature because they depend on the borrower, the bank, and bank-borrower relationship characteristics. Figure 1 presents the framework.

*Time* represents a relationship dimension that is characterized by repeated interactions between contracting parties, validation of the interactions, potential learning, and collection of public and private information (e.g., Boot, 2000). The age of the borrower is considered as a proxy for public information about a firm. Older firms are more likely to pay lower interest rates (Petersen and Rajan, 1994; Harhoff and Körting, 1998; Degryse and Van Cayseele, 2000) and obtain more credit (Cole, 1998). However, other studies fail to find a significant effect on borrowing costs (Angelini, Di Salvo, and Ferri, 1998; Lehmann and Neuberger, 2001). Duration of the relationship is the proxy for production of private information. Lenders obtain more private information about the borrower the longer the relationship. Empirical evidence does not provide a

clear answer whether longer relationships are beneficial for borrowers. Berger and Udell (1995) find that borrowers in longer relationships pay lower loan spreads, whereas Angelini, Di Salvo, and Ferri (1998) report the opposite effect, implying the hold-up problem by the bank. A number of studies do not find a clear outcome in either direction (Petersen and Rajan, 1994; Blackwell and Winters, 1997; Elsas and Krahn, 1998; Harhoff and Körting, 1998; Machauer and Weber, 1998; Lehmann and Neuberger, 2001). In addition, continuous and long-term interaction between a loan officer and a borrower allows a bank to produce more private information over time (Scott, 2004; Uchida, Udell, and Yamori, 2012; Howorth and Moro, 2012). But, the scope and usage of the information is affected by loan officers' incentives and the internal organization of the lending process (Hertzberg, Liberti, and Paravasini, 2010).

Figure 1: Conceptual Framework for the strength of bank relationships



*Distance* is a relationship dimension that has important implications for the type and usage of information produced by banks. We consider physical, organizational, and personal distance. A further category could be cultural distance (Giannetti and Yafeh, 2012). However, given that the vast majority of studies on relationship lending are based on single-country data, we cannot consider this aspect. In general, earlier studies find a negative correlation between loan rates and physical distance, but the overall outcome depends on the proximity of competing banks (Degryse and Ongena, 2005) and the availability of soft and hard information (Agarwal and Hauswald, 2010). Furthermore, studies show that technological change has increasingly facilitated

lending at distance (e.g., Petersen and Rajan, 2002; DeYoung, Glennon, and Nigro, 2008). Banks' organizational structure and the separation from decision-making also influence the strength of relationships (e.g., Stein, 2002). Closer organizational distance increases credit availability (Alessandrini, Presbitero, and Zazzaro, 2009), but the effect is ambivalent for collateral requirements. Whereas Cowling (1999) finds a positive relation between organizational distance and collateral, Jimenez, Salas, and Saurina (2009) report a negative relation. Organizational distance and the use of information vary with firm and bank size. Personal interaction and soft information production are relatively more important for small banks (Cole, Goldberg, and White, 2004; Berger et al., 2005; Uchida, Udell, and Watanabe, 2008; Uchida, Udell, and Yamori, 2012), but the comparative advantages between small and large banks vary across lending technologies and firm sizes (Berger and Udell, 2011).

*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. 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 (e.g., Jiménez and Saurina, 2004). Empirical studies show that more exclusive relationships are associated with beneficial credit terms for borrowers (e.g., Petersen and Rajan, 1994; Machauer and Weber, 1998; Harhoff and Körting, 1998; Degryse and Van Cayseele, 2000; Lehmann and Neuberger, 2001; Degryse and Ongena, 2005), although exclusive banks might be prone to take advantage of their monopoly position (e.g., Machauer and Weber, 1998). More generally, the bargaining power of banks and borrowers affect how benefits from close bank relationships are distributed between both sides (Grunert and Norden, 2012).

*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 (e.g., Calomiris and Pornrojngkool, 2009). A key source of informational synergies for commercial banks might be the simultaneous provision of lending, payment services, and deposit taking (e.g., Nakamura, 1993; Mester, Nakamura, and Renault, 2007; Norden and Weber, 2010; and Kano et al., 2011). Concurrent use of information about credit line usage and checking account activity is related to improved default predictions (Norden and Weber, 2010) and longer maturities (Kirschenmann and Norden, 2012). Chakraborty and Hu (2006) find that collateral requirements decrease as the number of financial services provided by the lender increases.

### 3.3 Data

We identify the original studies that we use as input for the meta-analysis in two ways. 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. 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 a language other than English, and historical studies with data prior to 1970. Since we focus on corporate borrowers, we also remove 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, 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 75 published and 26 unpublished papers.

We ensure that our selection criteria do not create a systematic bias by checking three potential sources of biases: language selection, time period, and inclusion 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 1970, both from the industrialization era. We do not consider these two banking history studies because the socio-economic, legal,

and regulatory environment has significantly changed since then. In addition, consistent with the current practice in meta-analysis, 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.). The studies in our sample are based on data from Europe (43 studies), the US (35), Asia (18), and Latin America (5), and span the period from 1970 to 2008. 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 US and 161,000 from other regions.

We obtain country-specific variables 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 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 is within two years of the original sample availability. We note that these indicators are persistent and do not have effect on our analysis when we estimate the empirical models without the filled data.

### **3.4 Results**

We differentiate the effects by lending relationship proxies and lending outcome proxies. Table 1 shows the frequency distribution of the discrete effects. Positive sign (+) denotes positive and significant effects, (-) denotes negative and significant effects, and (ns) denotes not significant effects.

**Table 1: Distribution of discrete effects**

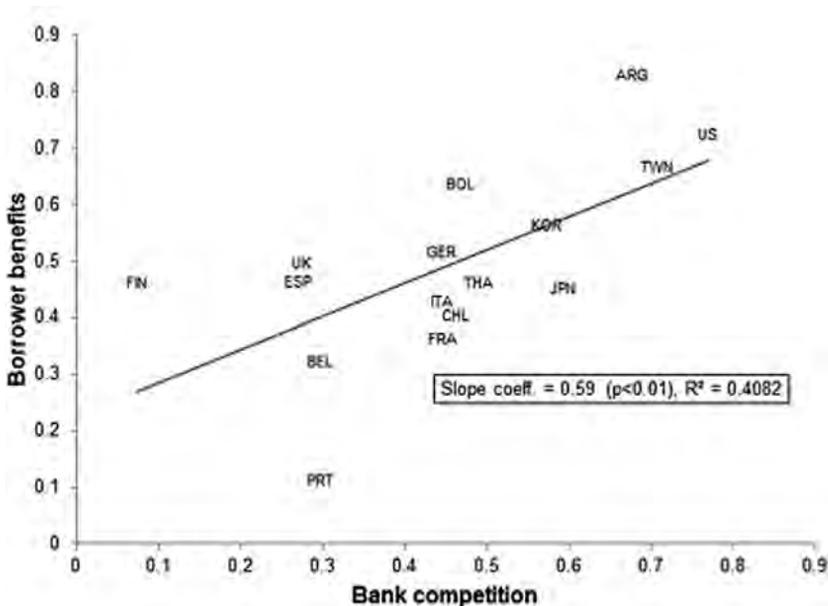
		Relationship lending outcomes					
	Strength of relationship lending	Coeff sign	RATE	VOL	COLL	MAT	
TIME	TDUR	+	67	74	17	2	
		-	102 ***	27 ***	33 **	11 ---	
		ns	114	56	58	10	
	TAGE	+	17	70	17		
		-	48 ***	20 ***	21	---	
		ns	135	93	37	13	
	TOTIME	+	7	31		7	
		-	14	20	6 ---		
		ns	39	36	3	1	
EXCL	+	137	132	46			
	-	225 ***	99 **	22 ***	2 ---		
	ns	188	177	49	9		
CROSS PROD	+	4	72	9	4		
	-	114 ***	15 ***	12	---		
	ns	86	59	17	11		
DISTANCE	DISTPHYS	+	5	29			
		-	31 ***	23	---	---	
		ns	31	44		5	
	DISTORG	+	1	31	2		
		-	1 ---	14 **	9 ---		
		ns	4	22	1		
	DISTPERS	+		7			
		-	4 ---	---	---		
		ns	1	2			

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.

We now investigate which country characteristics affect 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 US, 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 argue 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 33% more likely in countries with competitive banking markets. Specifically, when competition is high, 76% of all effects are beneficial for the borrower. However, when competition is low, only 43% of effects are beneficial. This finding is consistent across all relationship dimensions. Figure 2 displays the average link between the borrower benefits from relationship lending and bank competition by country.

Figure 2: Borrower benefits and bank competition



We find a significantly positive and robust linear relationship between borrower benefits and bank competition. A simple bivariate cross-sectional OLS regression has a slope coefficient of 0.59 (p-value < 0.01 based on robust standard errors) and an R<sup>2</sup> of 41%. The largest benefits accrue to borrowers in the US, Argentina, and Taiwan where bank competition is the highest. The smallest borrower benefits are observed in Europe, especially in countries with low levels of bank competition.

We now continue with multivariate meta-regressions in Table 2. Model (1) reports results with simple region effects. We find that the relationship lending benefits for borrowers are stronger in the US compared to Europe, Asia, and Latin America. The contrast is the largest in 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.

**Table 2: Meta-Regression**

Method:	Logit, pooled		Logit, pooled		Meta-regression, mixed effects		Robust meta-regression	
Dep. Var:	Discrete borrower benefits (1 = yes, 0 = no)		Discrete borrower benefits (1 = yes, 0 = no)		Continuous / Fisher's z-score		Continuous / Fisher's z-score	
	Coeff.	sig.	Coeff.	sig.	Coeff.	sig.	Coeff.	sig.
<i>Lending environment</i>								
Bank competition			3.12	***	0.07	***	0.06	**
Bank deposits / GDP			-1.62	***	-0.03	**	-0.03	**
Pct SME employment			0.00		0.00		0.00	
Developed status			0.19		0.03		0.02	
Legal system and property rights			0.03		0.00		-0.01	
Corruption index			0.10		-0.01		0.001	
Inflation			-0.10		0.00		0.00	
Bank cost-income ratio			-0.95		-0.03		-0.02	
<i>Regions</i>								
Region = Europe	-1.97	***						
Region = Asia ex Japan	-1.31	***						
Region = Japan	-2.40	***						
Region = Latin America	-1.54	**						
<i>Publication controls</i>	Yes		Yes		Yes		Yes	
<i>Rel. lending outcomes</i>	Yes		Yes		Yes		Yes	
<i>Rel. lending dimensions</i>	Yes		Yes		Yes		Yes	
Number of studies	94		92		93		93	
Number of observations	1,599		1,582		2,821		2,821	
Pseudo R <sup>2</sup>	0.19		0.19					
Tau <sub>2</sub>							0.009	

In Models (2) – (4) we explain the results of the studies with country-level variables. The meta-regressions confirm the strong positive relation between bank competition and benefits. 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 evidence provided by Black and Strahan (2002) who document the impact of policy changes fostering competition in the US banking sector on new incorporations and entrepreneurial activity.

We also find that borrowers in bank-based economies are less likely to obtain relationship benefits. 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 banks to maintain relatively larger borrower benefits. Moreover, we examine whether the importance of SMEs in the economy, considered as lower bound proxy for the prevalence of relationship lending in the country, matters. We find that the prevalence of relationship lending does not automatically come along with relationship lending benefits for borrowers.

The rest of the lending environment characteristics are not significantly related to relationship benefits. Specifically, we find no evidence that relationship benefits for borrowers consistently differ in developing countries, in countries with more developed legal systems, higher levels of corruption, or in inflationary environments. Furthermore, we do not find that a higher level of aggregate bank cost-efficiency is related to relationship lending benefits for borrowers.

While Models (1) and (2) of Table 2 are based on Logit analysis that considers only the significant (discrete) effects, we include both significant and insignificant (continuous) effects in Models (3) and (4). The results remain robust when we repeat the analysis using a mixed-effects meta-regression (Model 3) and a robust variance meta-regression (Model 4).

### 3.5 Summary

The meta-analysis summarizes and explains the heterogeneity of the results in the literature on relationship lending in a cross-country context. First, we find that strong relationships are generally beneficial for borrowers, but that 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. The 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.

Second, the meta-regressions show that the likelihood of borrower benefits has a significant relation to the structure of banking markets. The benefits of relationship lending for 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 US compared to the other regions. Interestingly, the prevalence of relationship lending, as found in the bank-based financial systems in Europe and Japan with a large fraction of SME borrowers, does not automatically come along with benefits for these borrowers.

## 4. The Interplay of Bank Debt and Trade Credit<sup>2</sup>

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### 4.1 Motivation

SMEs cannot raise external finance in capital markets. In other words, in contrast to large firms, they cannot issue stocks or corporate bonds. Instead, they have to rely on private debt: loans from banks or trade credit from suppliers. Unfortunately, little is known about the interplay of bank debt and trade credit at the firm level. This is surprising since trade credit represents the second largest source of credit for SMEs after bank debt (e.g., Petersen and Rajan, 1994; Petersen and Rajan, 1997; Mian and Smith, 1994). Furthermore, trade credit varies significantly across countries and over time. For instance, the median of the ratio of accounts payables to total assets of SMEs between 2005 and 2011 is 26% in Italy, 19% in Spain, 18% in France, 13% in the UK, and 9% in Germany. Research has only recently started to examine the importance of trade credit for corporate finance in different contexts, such as effects of the financial crisis, liquidity chains, and cost of capital (e.g., Garcia-Appendini and Montoriol-Garriga, 2013; Boissay and Gropp, 2013; Giannetti, Burkart, and Ellingsen, 2011).

In this study, we investigate whether SMEs increase trade credit after they have experienced a shock to their bank debt. Stated differently, we study whether there is a substitution relationship between firms' use of bank debt and trade credit and how this relationship can be explained over time and across countries. This question is relevant because a high or low availability of debt finance can amplify or weaken the business cycle, as documented in the finance-growth and finance-development literature (e.g., King and Levine, 1993a; King and Levine, 1993b; Beck, Levine, and Loayza, 2000; Beck and Demirgüç-Kunt, 2006). If firms counter a shock to their bank debt with trade credit, they stabilize their access to credit through the cycle. However, if bank debt and trade credit are complementary (i.e., they increase or decrease at the same time), then booms and recessions are amplified, resulting in a higher volatility of economic activity over time. Hence, gaining a better understanding of the interplay between bank debt and trade credit over time and across countries has important policy implications.

Some studies provide support for a substitution relationship between bank debt and trade credit (e.g. Petersen and Rajan, 1997; Biais and Gollier, 1997). This is because trade credit represents external finance for firms that are unable to attract sufficient bank debt because of severe financial constraints stemming from informational asymmetries. Moreover, there is evidence that financially

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2 This chapter is based on Illueca, M., Norden, L., van Kampen, S., 2014. Do SMEs counter a shock to their bank debt with trade credit? Working Paper, December 2014.

unconstrained firms redistribute part of their bank debt to financially constrained client firms by offering trade credit (Love, Preve, and Sarria-Allende, 2007; Garcia-Appendini and Montoriol-Garriga, 2013).

However, there is also evidence that bank debt and trade credit do not exhibit a substitution relationship. First, the relationship between bank debt and trade credit is time-varying. Bastos and Pindado (2013) and Kestens, Van Cauwenberge, and Van der Bauwhede (2012) show that trade credit extension has declined during the recent financial crisis due to the risk of credit contagion in the supply chain. Firms become more constrained during recessions and therefore we should see an increase in trade credit extension if the substitution relationship holds in all states of economy. Second, there are also studies showing that firms accumulate trade credit although they are unconstrained and / or sufficiently liquid. Petersen and Rajan (1997) report a U-shaped relationship between trade payables and profitability, but this relationship would be monotonically decreasing under the substitution hypothesis. Similarly, Fisman and Love (2003) show that firm age is positively related to trade credit, but theoretically we would expect a negative relationship under the substitution hypothesis.

Based on the evidence from the literature, it is not clear whether there is a substitution or complementary relationship between trade credit and bank debt and which factors drive the relationship between these two sources of credit. The goal of this study is to provide comprehensive evidence on these issues. We measure substitution effects with a novel Substitution Indicator that allows us to identify a causal relationship. The analysis is based on an international panel dataset on SMEs covering the period from 2006 to 2011.

#### **4.2 Data**

We collect firm data from the Orbis / Amadeus and SABI database from Bureau van Dijk. It contains firm-year observations from the five largest countries in the European Union (Germany, France, Italy, Spain, and the United Kingdom). Data for Spain come from the SABI database, while data for the other four countries are derived from Orbis / Amadeus. We restrict our analysis to firms that are not publicly listed and that have total assets less than 43 million euro in the last available year, following the definition of SMEs according to the European Commission (European Commission, 2006). We exclude financial firms, which is standard practice in empirical corporate finance research. Moreover, in Orbis there are many data points that report values of zero,

potentially having an ambiguous meaning; they can either mean zero, “missing”, or “unknown”. To prevent this ambiguity in our dataset, we include firms where the value of accounts payables, accounts receivables, and short-term bank debt equals at least 1,000 euro in any of the years in our sample period.

Applying these selection criteria results in a balanced panel dataset with yearly data from 2006 to 2011 (2006 to 2010 for Spain). It is crucial to have a balanced panel for three reasons. First, we need to have firm-specific time series data from the pre-crisis, the crisis period, and the post-crisis period to be able to estimate the impact of the crisis on the substitution of trade credit. Second, the substitution effect is captured by the yearly changes in short term bank debt and trade credit, which requires time series data without gaps for both variables. Third, an unbalanced sample would make the interpretation of the results difficult. In Orbis, the number of firms included in the database differs for each country, which results in certain countries being heavily over-represented or under-represented in the dataset. Therefore, we construct the dataset so that each country is given a weight that is proportional to its average GDP over the sample period. The final dataset comprises 1,186 firms from Germany (28%), 922 from France (22%), 920 from the UK (21%), 751 from Italy (17%), and 501 from Spain (12%).

### ***4.3 Empirical Strategy***

Our empirical strategy relies on three elements to identify a causal effect. First, we consider SMEs that have demand for credit. We note that a complementary relationship could mean two things: either firms cannot substitute or they do not want to substitute. It is therefore crucial to investigate the substitution between different sources of credit for firms that have demand for external finance (Becker and Ivashina, 2014). We follow Rajan and Zingales (1998) by considering only firm-year observations where the value of a firm’s investments exceeds the value of its cash flows to ensure that the firm has demand for external finance. Second, we examine what happens when these firms experience a negative shock to their bank debt. Third, we focus on the years of the recent financial crisis when banks were forced to contract their credit supply.

We define our dependent variable – the Substitution Indicator – conditional on the firm experiencing a negative shock to its bank debt in the previous year. It has three possible outcomes: both bank debt and trade credit decreases (complementary); bank debt decreases and trade credit increases, but it does not

fully compensate for the decrease in bank debt (partial substitution); and bank debt decreases and trade credit fully compensates for the decrease in bank debt (perfect substitution).

The most important independent variable is credit quality of the firm, measured by the Altman Z-score ( $Z$ ) for private firms (Altman, 1968). The Altman Z-Score is a widely used composite measure of credit quality (firm default risk) and includes several factors that are related to credit quality such as liquidity, retained earnings, profitability, leverage, sales, and size.

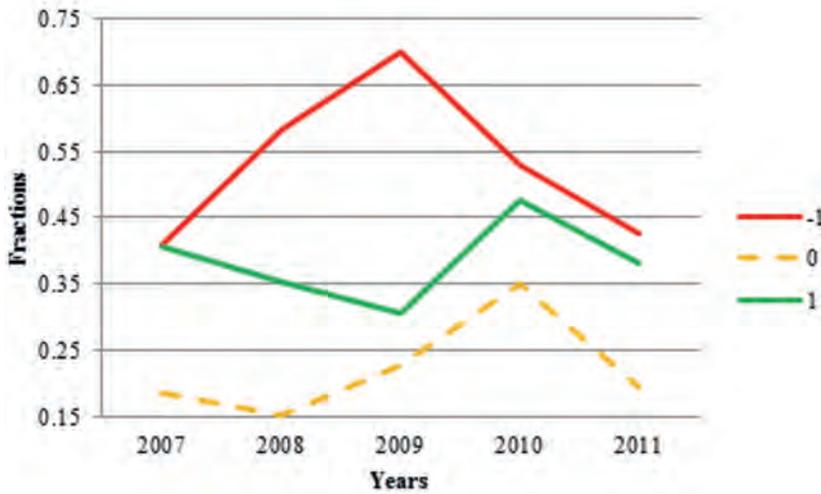
Moreover, we consider SMEs' financial constraints. Financial constraints tend to be different from financial distress. They mainly arise because of a mismatch between firms' investments and funding, which could be due to growth opportunities and / or high costs of external finance. We measure financial constraints by the Kaplan-Zingales Index (KZ; Kaplan and Zingales, 1997). In order to measure a potential non-monotonic relationship between the Altman Z-Score and the KZ-Index, we group the KZ-Index into quintiles. We further consider the impact of the financial crisis with a set of dummy variables that indicate different stages of the crisis. In continental Europe, the first (second) stage of the crisis,  $D\_Crisis1$  ( $D\_Crisis2$ ), is a dummy equal to 1 in 2008 (2009) and 0 otherwise. We mark 2009 as the second stage of the crisis because Lehman Brothers collapsed in September 2008, which is considered as the start of a deep global recession (Kahle and Stulz, 2013). In the UK, we mark 2007 (2008) as the first (second) stage as the crisis started earlier in the UK because of its strong ties to the US. The last stage is a dummy variable that equals to 1 ( $D\_Aftermath$ ) in 2010-2011 (2009-2011 for the UK), which is the period directly after the crisis in which the world economy experienced growth again. We also add several control variables that could explain the substitution indicator. We consider firm size ( $\ln TA$ ), measured by the natural logarithm of total assets, collateral (long-term collateral is measured by fixed tangible assets ( $TangFA$ ); short-term collateral by inventories ( $Inv$ )), cash and cash equivalents divided over total assets ( $Cash$ ), and firm profitability measured by  $RoA$ . In all regressions, we control for industry and country fixed effects.

#### 4.4 Results

Figure 3 displays the average outcomes of the Substitution Indicator across countries over time. Category (-1) refers to firm-year observations in which bank debt and trade credit decreased (negative complementary relationship). Category (0) refers to firm-year observations in which bank debt decreased and

trade credit partially increased (partial substitution). Category (1) refers to firm-year observations in which bank debt decreased and trade credit increased at least as much (perfect substitution).

Figure 3: Evolution of the average Substitution Indicator



We can see that the outcome (-1) significantly increased from approximately 40% in 2007 to approximately 70% in 2009. This finding shows that SMEs were increasingly cut off from external finance as the financial crisis unfolded. Furthermore, partial substitution (outcome (o)) increased from 2008 to 2010. Finally, full substitution continued to decrease in 2008 and in 2009, and only turned around in 2010.

We now investigate which factors influence whether and how SMEs counter a shock to their bank debt with trade credit with a multinomial logit model. We regress the Substitution Indicator on the Altman Z-Score, the dummy variables for the different stages of the crisis, and the control variables. Table 3 reports the odds ratios (instead of coefficients) as their magnitude can be more easily interpreted.

**Table 3: Cross-country regression results for the probability of substitution**

Dep. Var:	(1) Full Sample		(2) External finance- dependent firms	
	Partial	Perfect	Partial	Perfect
Z(t-1)	1.033 (0.258)	1.153 (0.000) ***	1.078 (0.019) ***	1.190 (0.000) ***
D_Crisis1	0.711 (0.003) ***	0.763 (0.002) ***	0.674 (0.003) ***	0.738 (0.002) ***
D_Crisis2	0.540 (0.000) ***	0.392 (0.000) ***	0.516 (0.000) ***	0.363 (0.000) ***
D_Aftermath	1.230 (0.030) **	0.847 (0.028) **	1.248 (0.045) **	0.819 (0.018) **
LnTA(t-1)	0.849 (0.000) ***	0.873 (0.000) ***	0.812 (0.000) ***	0.841 (0.000) ***
Cash(t-1)	0.682 (0.210)	1.068 (0.764)	0.679 (0.275)	1.008 (0.975)
Inv(t-1)	1.376 (0.063) *	0.884 (0.383)	1.469 (0.042) **	0.897 (0.477)
TangFA(t-1)	1.538 (0.003) ***	1.268 (0.045) **	1.602 (0.003) ***	1.174 (0.234)
RoA(t-1)	2.318 (0.073) *	1.434 (0.315)	1.107 (0.852)	1.327 (0.515)
Industry dummies	Yes		Yes	
Country dummies	Yes		Yes	
Pseudo R <sup>2</sup>	0.027		0.035	
Firm-Years	8,831		7,049	

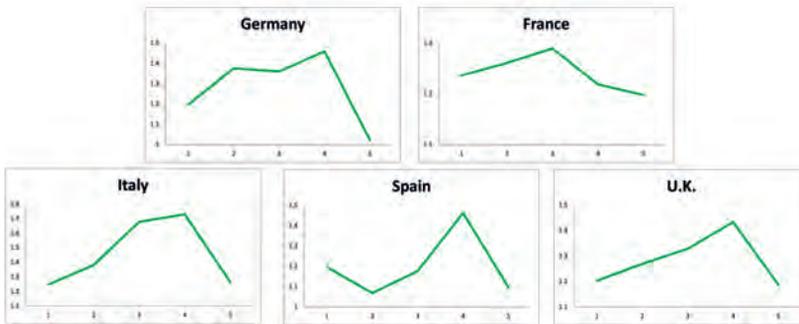
Column (1) of Table 3 shows that the credit quality measure Z-Score has a significantly positive effect on the probability of partial and perfect substitution in the full sample. A one-percentage increase in the Altman Z-Score is associated with a 15% increase in the probability of perfect substitution. This result implies that substitution for high-risk firms is not as easy as suggested in the literature. We further find that the probability of substitution dropped significantly during the financial crisis and increased again after the crisis. The probability of perfect and partial substitution is lower during the first stage of the crisis and decreases even more during the second stage. After the crisis, the willingness of

suppliers to provide trade credit to their customers increased again. The probability of partial substitution is higher compared to the pre-crisis period. The probability of perfect substitution also improved, but it is still lower than before the crisis.

The results become stronger if we only consider firms that have demand for credit. In column (2), the relationship between the Z-Score and partial substitution becomes significant, but stays smaller than the one for perfect substitution. We thus conclude that – all else equal – the relationship between credit quality and substitution is monotonic; the best credit quality firms perfectly substitute, the intermediate firms partially substitute, and the worst credit quality firms experience a decrease in bank debt and trade credit. We further repeat the analysis for the crisis years only, with variables demeaned at the country-level median, and with a modified substitution indicator that takes into account the payback time for trade credit instead of its volume. We obtain results that are similar to the reported ones in all three tests.

Finally, we examine the possibility that the effect of the Altman Z-Score on the probability of substitution has a non-monotonic relationship with the level of financial constraint. For this purpose, we interact the Z-Score with dummies for the KZ-Index quintiles. The results are shown in Figure 4.

Figure 4: Sensitivity of perfect substitution to firm credit quality by financial constraints



The results indicate an inversely U-shaped relationship between the sensitivity of the probability of substitution to the Z-Score and financial constraints. The pattern is broadly consistent across the five countries. The evidence shows that the credit quality matters most for firms with intermediate financial constraints. Credit quality is less relevant for firms with low financial constraints because they can attract external finance from other sources, or they can afford to deleverage because of sufficient internal finance. Moreover, credit quality is also less relevant for firms with high financial constraints because they tend to be credit rationed anyway.

#### ***4.5 Summary***

We investigate whether SMEs can counter a shock to their bank debt with trade credit and which factors influence their response over time and across countries. We focus on SMEs because they are credit-constrained and bank-dependent. Our analysis is based on a firm-specific time-varying multinomial measure, the Substitution Indicator, which we apply to data on SMEs from the five largest countries in the European Union between 2006 and 2011.

We find that substitution and complementary relationships are almost equally likely to occur in terms of firm-year observations. However, this relationship varies substantially with firm characteristics and over time. The probability of a negative complementary relationship doubled from 2006 to 2009. The main driver of the probability of substitution after a negative shock to bank debt is the credit quality of the firm. Moreover, the probability of substitution decreased after the crisis unfolded. Interestingly, the impact of credit quality on the probability of substitution is non-monotonically related to the level of financial constraints. Firm default risk is most crucial for firms with intermediate financial constraints, while it is less important for the least and most constrained firms.

## 5. Conclusions

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In this inaugural address, I focus on the role of banks in SME finance. SMEs are of key importance for the economy in many countries. They represent a large fraction of all firms and contribute significantly to employment and economic activity. However, financing SMEs creates serious challenges for lenders because of the special characteristics of these firms. Lending technologies have evolved to cope with these challenges in SME finance. Relationship lending and trade credit are the most important ones in the context of SME finance. Based on the evidence from two recent empirical studies, I would like to draw two main conclusions.

The first conclusion is that relationship lending works. The first study shows that, on average, borrowers benefit from relationship lending. Importantly, bank competition makes the benefits for borrowers more likely: they obtain more credit and / or lower loan rates. However, the prevalence of relationship lending, as in Europe or Japan, does not automatically imply that borrower benefits are high.

The second conclusion is that trade credit has limited scope to replace bank debt. Trade credit is an alternative to bank debt, but little is known whether and to what extent SMEs use trade credit to counter a shock to their bank debt. This question is especially relevant in times of a systemic crisis when all banks cut lending. The second study shows that there is substantial time and cross-country variation in the interplay between bank debt and trade credit. SMEs with a better credit quality are more likely to counter a shock to their bank debt with trade credit. However, this substitution was less likely when it was most needed, i.e., during the financial crisis.

Overall, a comprehensive understanding of lending technologies such as relationship lending and trade credit is critical for lenders, borrowers and policymakers to ensure the proper functioning of SME finance.



## 6. Words of Thanks

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I would like to express my gratitude to various people who helped me to arrive at this stage of my career. In particular, I would like to thank

- All my colleagues in the Finance Department at RSM. Let me also mention a few: Marno and Mathijs who hired me. Marno and Abe, who gave me the opportunity to contribute as Academic Director of the MSc F&I Programme and as teaching coordinator of the department. Moreover, as a member of the management team and as Vice-chair of the Finance Department, I very much appreciate the collegial and professional collaboration with Peter Roosenboom, Peter Neuteboom, and Marta. I would also like to thank Myra and Flora for their great support in organizational and administrative matters.
- The members of the Erasmus Finance Group, who contribute to the great research environment at Erasmus University.
- My evaluation committee chaired by Rene de Koster, and the external referees for their time and efforts.
- ERIM for the excellent research support at Erasmus University. Everybody here knows what I mean by that.
- Erasmus Trust Fund for endowing the Chair of Banking and Finance.
- Many co-authors and academic friends. In particular, I would like to mention two. I am especially grateful to my PhD advisor, Martin Weber from the University of Mannheim, and my co-author and host, Gregory Udell, from Indiana University. These are probably the two people who have had the largest influence on my academic development.
- Außerdem möchte ich meinen Eltern, Friedhelm und Gerda Norden, ganz herzlich danken. Ihr habt mich in allen Phasen meiner Karriere uneingeschränkt unterstützt und es ist großartig, dass Ihr heute hier seid. Ebenso freue ich mich, dass mein Bruder Frank und seine Frau Kristina hier sind.
- Finally, I would like to thank Luciana, my love. You probably had the longest way to travel to Rotterdam. I am very happy that you came into my life and that you are sharing this important moment with me.

*Thank you very much to all of you.*



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