



The effect of banking regulation on cross-border lending

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ARTICLE INFO

Article history:

Available online 21 September 2012

JEL classification:

G21
G18
F23

Keywords:

Bank regulations
Cross-border lending
SMEs
Difference-in-difference estimation

ABSTRACT

Banking regulations often differ between countries: Some regulators require banks to document their evaluation of firms' creditworthiness, which determines the banks' choice of lending technology. In a theoretical model, we study how differences in regulation influence competition between domestic and foreign banks and analyze the effect of regulatory harmonization on cross-border lending. We predict that lending rates are lower and access to credit is easier for firms in a border region if the national regulations differ. Using unique bank- and firm-level data from Germany, we show that firms in a border region have better access to credit if regulation differs.

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1. Introduction

The credit market in the European Union (EU) is one of the EU's least integrated markets.¹ Small and opaque firms still face significant barriers to accessing EU-wide financing opportunities, and problems stemming from information asymmetries are severe. As a result, relationship banking plays an important role, and therefore, the physical distance between banks and firms is an influential variable. Small and opaque firms are also most strongly affected by EU-wide regulatory differences (ECB, 2010). Therefore, policy attempts to harmonize banking regulations. In this paper, we analyze how harmonization affects the credit market and the financing opportunities available to firms. We address this issue both theoretically and empirically using the example of regulatory harmonization between Germany and Austria for our empirical identification strategy.

In the European Union, banks have been allowed to operate abroad for several years, be it by market entry through new branches or acquisitions or through cross-border lending. However, legal provisions and, in particular, banking regulations differ

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¹ Several analyses and reports try to quantify the degree of integration by measuring interest rate convergence, cross-border capital flows, or mergers. These surveys include Baele et al. (2004), Barros et al. (2005), Dermine (2006), Kleimeier and Sander (2007), and Heuchemer et al. (2009).

between European countries despite efforts to harmonize them. For example, Germany and Austria both require banks to document how they assess the creditworthiness of firms above a certain threshold for the national supervisory authority. The threshold above which documentation is required was higher in Austria than in Germany (Hahn and Rößler, 2009). Until May 2005, banks had to document their assessment of creditworthiness for loans exceeding EUR 250,000 in Germany and EUR 750,000 in Austria. German (cooperative and savings) banks complained about competition from Austrian banks through cross-border lending, and the threshold value in Germany was subsequently adjusted to the Austrian level (Economist, 2005).²

Our paper begins with a theoretical analysis of regulatory differences between states and the effect of regulatory harmonization on cross-border lending. The theoretical model consists of a domestic and foreign bank, both of which choose their lending technologies. Both banks evaluate the creditworthiness of firms by using either 'private' or 'verifiable' information. We define 'private information' as information obtainable only from personal interaction between the bank and the firm. 'Verifiable information' is objective, and it does not depend on personal interaction and is thus independent of the physical distance between the bank and

² This type of regulation is used only in Germany and Austria, and the difference in thresholds has existed for a long period of time. However, after the introduction of a common currency, banks began to engage in cross-border lending. The adjustment of the threshold value in Germany is in line with the Lamfalussy approach, which aims to reduce the difference in financial regulation and supervision.

the firm. Most importantly, only verifiable information can be reported to the supervisory authority. In our empirical analysis, we then test the theoretical model using unique firm-level and bank-level data from Germany. We exploit surveys on firms' perceptions of banks' lending behavior, and we apply a difference-in-difference estimator to identify the effect of a regulatory difference on cross-border lending. By conducting a robustness analysis, we discuss the possible impact of cross-border lending on regional banks.

We obtain three main findings. First, the model predicts that for the foreign bank, cross-border lending is especially attractive if the domestic bank is facing stricter regulations; i.e., if it must use verifiable information. Correspondingly, the domestic bank suffers from regulation differences. Indeed, we observed that German banks lobbied for regulatory provisions to match those in Austria.

Secondly, our model shows that the probability of a firm located in the border region receiving loan offers from banks in both states depends on whether the regulation between these states differs. If the domestic bank is subject to stricter regulations than the foreign bank, there is a parameter range in which a firm's proximity to the Austrian bank increases the probability that it will receive loan offers from both banks. A difference-in-difference estimation shows that firms located closer to the Austrian border are more likely to perceive access to credits as accommodating as long as regulatory differences exist. This result is consistent with the research of [Presbitero and Zazzaro \(2011\)](#), who find that more competition (in our case, through regulatory differences) increases relationship lending in markets dominated by small local banks.

Finally, we show that the lending rate offered by the domestic bank depends on its proximity to the foreign bank. A German bank located relatively close to an Austrian bank demands lower lending rates when regulation differs; lending rates also increase with the distance from the Austrian bank. The robustness analysis for an alternative data set of regional banks documents that the lending rates of German banks actually increase with the distance of these banks to Austria.

The paper is organized as follows. The next section presents a review of the related literature. Then, in Section 3, we develop a theoretical model that captures the situations with and without regulation between two neighboring countries. Section 4 presents the difference-in-difference estimation for the firms' perception of access to credit, and we present similar results for lending rates taken from bank balance sheets in the robustness analysis. Finally, Section 5 presents the conclusion.

2. Literature review

Our paper is related to several lines of research, including the role of financial deregulation, the relationship between distance in lending and foreign bank entry. The effects of regulatory changes are usually studied in the context of branching deregulation in some US states.³ This literature (as summarized by [Strahan, 2003](#)) suggests that deregulation leads to faster growth and reduces volatility in the business cycle by fostering entrepreneurship. However, other authors propose that deregulation may negatively affect entrepreneurship in some regions ([Wall, 2004](#)) or that it does not significantly affect growth ([Huang, 2008](#)). [Rice and Strahan \(2011\)](#) show that small and medium enterprises (SMEs) in states with intense interstate banking benefit from lower interest rates. They suggest that deregulation causes banks to be more competitive, and this manifests itself in the form of lower interest rates. However, other

³ Note that in contrast to the US, banks in Europe have been free to operate abroad for several years. However, legal provisions and, in particular, banking regulation differ between European countries despite efforts to harmonize these and thus provide a level playing field.

features of the loan contract and access in general do not change.

[Petersen and Rajan \(2002\)](#) document that the physical distance between borrowers and banks in the US has increased significantly over the last decades; they attribute this development to advances in information technology. Better information processing systems allow banks to access more hard information, and thus the need to collect soft information decreases. Hard information is usually recorded and does not have to be collected in person ([Petersen, 2004](#)). By contrast, soft information typically is gathered through personal interaction between a firm and a bank or as a result of geographical proximity to a firm ([Stein, 2002](#)).⁴ As a result, hard information is more amenable to comparative analyses ([Petersen, 2004](#)).

In most theoretical models, differences in lending technology are captured in the cost of acquiring information. In these models, the bank always obtains a perfect signal and therefore will finance only creditworthy firms. Due to the hold-up problem, the interest rate is higher for firms located closer to a bank because they are farther away from the competitor (see, for example, [Degryse et al., 2008](#)). Lending technologies may also differ in their assessment of the creditworthiness of firms. In [Hauswald and Marquez \(2006\)](#) the quality of the signal decreases with the distance between a bank and a firm. In such models, banks are not always active on the credit market. However, there is no definitive prediction about the effect of distance on the overall probability of receiving a loan offer. Regarding interest rates, the result is the same as before. The closer a firm is to the informed bank, the higher the interest rate ([Hauswald and Marquez, 2006](#)).⁵

This relationship between distance and the availability of soft information explains why price discrimination exists. Empirical studies by [Degryse and Ongena \(2005\)](#) and [Agarwal and Hauswald \(2010\)](#) find that as the distance between a borrower and his bank increases, the interest rate on loans decrease; however, as the distance between the borrower and the competing bank increases, the interest rate also increases. These results are due to the hold-up problem a borrower faces with its incumbent bank as it exploits its proprietary information to extract rents. [Agarwal and Hauswald \(2010\)](#) show that distance influences the loan rate and the availability of loans. The probability that a borrower gets an offer from his bank decreases with the distance from his bank, but the probability of an offer from a competing bank increases with this distance. Therefore, [Agarwal and Hauswald \(2010\)](#) conclude that price discrimination is due to asymmetric information between banks and is not caused by transportation costs (as suggested by [Degryse and Ongena, 2005](#)).⁶ All of these papers study distance between a borrower and a bank operating in a single country. By contrast, we investigate the role of distance in cross-border lending.

So far, the empirical evidence on the effects of foreign banks (as a result of entry through either greenfield investment or acquisition) is mixed. Most of the existing research focuses on emerging markets, and – even more importantly – these papers do not discriminate between the modes of foreign bank entry.

To the best of our knowledge, our theoretical and empirical analysis of the effects of regulatory differences on cross-border lending is a novel contribution to the existing literature. Market entry via cross-border lending increases bank competition in the

⁴ The literature often refers to hard and soft information in similar contexts. However, we focus on whether information can be communicated between the bank and the financial supervisor agency.

⁵ [Casolaro and Mistrulli \(2008\)](#) obtain the same result in a model in which they allow banks to choose between granting relational or transactional loans. In their model, functional distance, which depends on the organizational structure of the bank, is the crucial determinant of this choice.

⁶ Evidence from Italy ([Alessandrini et al., 2009](#)) confirms that a borrower's financing constraint increases in functional distance, which is the distance between a borrower's and a bank's location (where decisions about loans are made).

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