The Fourteenth Dubrovnik Economic Conference

Organized by the Croatian National Bank

Sylvia Heuchemer, Stefanie Kleimeier and Harald Sander

The Determinants of Cross-Border Lending in the Euro Zone

Hotel "Grand Villa Argentina",
Dubrovnik
June 25 - June 28, 2008

Draft version

Please do not quote

Draft: 5 June 2008

The Determinants of Cross-Border Lending in the Euro Zone

by

Sylvia Heuchemer[a,*], Stefanie Kleimeier[b,c] and Harald Sander[a,c]

[a] *Faculty of Economics and Business Administration, Cologne University of Applied Sciences Claudiusstr.1, 50678 Köln, Germany*
[b] *Limburg Institute of Financial Economics, FdEWB, Maastricht University, Tongersestraat 53, 6211 LM Maastricht, The Netherlands.*
[c] *METEOR, Maastricht University, Tongersestraat 53, 6211 LM Maastricht, The Netherlands.*

Abstract:
We investigate the determinants of cross-border lending in the euro zone with a focus on the potentially limiting role of cultural and political factors. Employing a unique data set of European cross-border loans, the study uses various specifications of gravity models which are subsequently augmented by societal proxies. While trade-theoretic and financial development reasoning can explain part of the surge in cross-border lending, we demonstrate that distance and borders still matter. Moreover, we identify cultural differences and different legal family origin as important barriers to further integration in the euro zone.

Keywords: cross-border loans, banking market integration, gravity model, culture, European single market
JEL Classification: C21, F34, F36, K20, Z10

* Corresponding author: Tel: +49-221-8275-3431, fax: +49-221-8275-3135, E-mail address: Sylvia.Heuchemer@fh-koeln.de (Sylvia Heuchemer).

1. Introduction

In the recent years European financial market integration has made a big leap forward. Yet, retail banking is lagging far behind. Most researchers and practitioners agree that banking markets are still least integrated, regardless whether they base their assessment on quantity-based indicators such as cross-border loans and mergers and acquisitions (M&As), price-based indicators such as interest rate convergence or new-based indicators such as reaction of the banking market to common shocks.[1] Most recently, however, some quantity-based indicators such as cross-border M&As reveal that banking market integration is gaining momentum - prompting some observers to conclude that the single European banking market is finally arriving (Schoenmaker and van Laecke 2006). Likewise, cross-border banking has been increasing rapidly, albeit starting from a very low base. Inside the euro zone cross-border loans have more than doubled from € 152 billion (bn) in 1999 to € 361 bn in 2006. This paper takes a fresh look at these developments by exploring the determinants of cross-border banking in the euro zone by means of a gravity equation approach. This research strategy allows us to not only document the state and progress of integration, but also to identify important drivers of and barriers to banking market integration with a particular emphasis on the limiting role of cultural and political differences.

Tinbergen (1962) and Pöyhönen (1963) independently introduced the gravity equation framework for empirical analyses of bilateral trade and foreign investment. Since then it has been extensively and successfully applied to a larger number of policy issues such as the effect of regional integration, a common currency or trade policies. Most recently, researchers have started to expand the scope of the gravity equation framework by studying the role of political and cultural differences. (Flörkemeier 2002, Guiso et al. 2005, Heuchemer and Sander 2007, Kalemli-Ozcan and Sørensen 2007). Theses studies show that cultural

[1] Baele et al. (2004) suggest this classification of the empirical literature on financial integration. For a recent overview of the evidence see Kleimeier and Sander (2007).

differences, trust in others and confidence in institutions can be important drivers and barriers to economic exchange. Trust, culture and institutions might well be even more pertinent in cross-border banking. Berger (2003: 460), summarizing the findings of a well-known study on the globalization of the banking industry (Berger et al. 2003), concludes "that foreign banking organizations may be at significant competitive disadvantage in providing price, quality, and mix of services *that best suit bank customers*, and that such disadvantages may limit the integration of the banking industry" (italics are ours).

To our knowledge no study has yet investigated the role of cultural and political affinities in European retail banking in a gravity model setting. The authors have been granted access to a set of otherwise confidential bilateral data for the time period 1999 to 2006 which for the first time allows the (panel) estimation of a gravity model for cross-border loans. We begin our investigation by developing a baseline gravity model. This model starts with the classical Newton-inspired variables, economic size (as indicator for masses) and distance, and is then augmented to explore the basic determinants of the trade structure in the light of trade theory. Such augmentation captures the effects of comparative advantage (the "old" trade theory) as well as the role of product differentiation and economies of scale (the "new" trade theory). This baseline model is subsequently used to explore the impact of political and cultural factors on cross-border lending. For this reason we have collected a large number of political and cultural proxies. We consider a variety of specifications, including least square dummy variables (LSDV), fixed effects and dynamic panel estimation in order to obtain the best possible estimation.

Our baseline gravity model suggests that the direction of cross-border lending can be explained by the economic size of the trading partners as well as by comparative advantages in financial sector development and product heterogeneity as suggested by the "new trade theory". Moreover, as it is well documented for merchandise trade, we can show that distance and borders also matter considerably for cross-border loans. However, specification tests as

well as theoretical considerations suggest the presence of strong country-pair fixed effects. Unfortunately, including country-pair fixed effects eliminates just these coefficients as well as those of other relatively time-invariant cultural and political variables that we are interested in. Our innovation to overcome this problem is to replace country-pair fixed effects by country-pair specific economic, cultural and political variables defined as country differences and measured as Euclidean distances between the individual values. In fact, cross-border banking, just like all international transactions, must be viewed as a response to differences that call for arbitrage processes. These variables are successively included into our LSDV model. Doing so, the importance of distance and borders as well as the trade-theoretic conclusion mentioned before remain robust. This model is then augmented for political and cultural factors. We find relatively little evidence for the importance of political factors and can demonstrate that cultural differences are a more important barrier to cross-border lending than differences in "governance". In particular we single out differences in trust levels and legal system heritage as cultural barriers to cross-border loans.

The plan of the paper is as follows. Section 2 describes the methodology of our gravity modeling approach. Section 3 gives a detailed description of the data with a special reference to our measurement of cultural and political differences. Section 4 reports the results. Section 5 concludes.

2. Methodology

We examine European banking market integration by analyzing the determinants of bilateral cross-border loans in the euro zone for the period 1999 to 2006 by means of a gravity model. Gravity equations have become the workhorse for analyzing bilateral trade flows and are arguably the best and most popular way to study the impact of third factors on trade, such as political, cultural and legal differences. The basic version of a gravity model explains trade flows between a pair of countries as a function of their respective economic masses (GDP)

and the square of the geographical distance (DISTANCE) separating them. The model is completed by the gravitational constant (G):

$$(1a) \qquad X_{ijt} = G \cdot \frac{GDP_{it} \cdot GDP_{jt}}{(DISTANCE_{ij})^2}$$

where X_{ijt} denotes bilateral exports of country i to country j in year t. In order to obtain a linear relationship between the trade flows and the explanatory variables, the equation is converted into a logarithmic version:

$$(1b) \qquad \ln(X_{ijt}) = \alpha_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DISTANCE_{ij}$$

Geographical distance is considered to be a proxy of all bilateral information and transaction costs, ranging from pure transportation and information costs to hidden transaction costs like cultural or political differences. Since geographical distance can only be a rough measure of all different frictions in international trade the basic gravity model is usually been augmented by various factors such as to capture natural barriers (common border), political barriers (trade agreements, currency unions, etc.) and cultural barriers (common language, etc.).[2]

Even though gravity models are able to explain more than half of the variation in international trade, they were considered for a long time as pure physical analogues without any theoretical foundation. Since Anderson (1979), who was the first to provide a micro foundation, many efforts have been put in the theoretical foundation of gravity models (e.g. Bergstrand 1985, 1989, Deardorff 1998, Anderson and van Wincoop 2003). In response to the theoretical foundation the naïve version of the gravity model has been improved steadily and adopted to the different trade theories. A popular version in the empirical trade literature (see Baltagi et al. 2003) is:

$$(2) \qquad \begin{aligned} \ln X_{ijt} = {} & \alpha_0 + \beta_1 \ln SIZE_{ijt} + \beta_2 \ln REL_{ijt} + \beta_3 \ln SIMILAR_{ijt} + \beta_4 \ln DISTANCE_{ij} \\ & + \beta_5 BORDER_{ij} + \sum_{k=6}^{K} \beta_k \ln Y_{ijt} + u_{ijt} \end{aligned}$$

[2] See e. g. Baxter and Kouparitsas (2006).

with:

$$(3) \qquad SIZE_{ijt} = \ln(GDP_{it} + GDP_{jt})$$

$$(4) \qquad REL_{ijt} = \left| \ln(\frac{GDP_{it}}{POP_{it}}) - \ln(\frac{GDP_{jt}}{POP_{jt}}) \right|$$

$$(5) \qquad SIMILAR_{ijt} = \ln\left[1 - (\frac{GDP_{it}}{GDP_{it} + GDP_{jt}})^2 - (\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}})^2 \right]$$

The variables SIZE, REL and SIMILAR are motivated by the recent advances of trade theory as suggested by Helpman and Krugman (1985) and Krugman (1980). SIZE is a measure of the economic masses and either defined as the product or the sum of the GDPs of the trading partners.[3] The so-called new trade theory considers the coefficient β_1 to be positive as a larger economic mass is expected to lead to more trade particularly in form of intra-industry trade under the conditions of heterogeneous products and economies of scale. REL measures the differences in GDP per capita as a proxy for relative factor endowments. Thus a positive coefficient for β_2 indicates that bilateral trade is inter-industry and driven by comparative advantage as suggested by the "old" trade theory of the Ricardo-Heckscher-Ohlin-Samuelson type. In contrast, a negative value for β_2 would indicate support for the Linder hypothesis which suggests that trade volumes are larger the more similar the trading partners are in terms of factor proportions and thus development. Finally, the new trade theory hypothesizes that trade is the higher the more similar the countries are. This latter point is additionally investigated by using the variable SIMILAR which is defined as a similarity index of two trading partners' GDP and used to measures the relative country size. The variable increases in value with more similarity and is defined in a range from 0 to 0.5. A positive value of β_3

[3] A strict interpretation in the sense of Newton would demand to calculate SIZE as the product of the GDPs. Many empirical papers use however the (log of) the sum of the GDPs (e.g. Baltagi et al. 2003). This proxy allows an easier direct interpretation of the coefficients as the elasticity of bilateral trade with respect to their joint GDP.

would therefore indicate that increased similarity would lead to more trade and also thus support the new trade theory hypothesis.

However, since our analysis focuses only on a single good, bilateral loans, we have to take into account that these bilateral transactions may possibly be less sensitive to overall economic conditions as indicated by their GDPs or per-capita GDPs but more influenced by national banking market conditions. We thus adjust the gravity model also to banking market analysis. We retain SIZE as an indicator of relative masses, but use an indicator for relative financial development (REL_FD) and of the overall similarity of the size of the financial sector (SIMILAR_FD). There is some debate on how financial development is best been measured, for example as a ratio of broad money (MO) to GDP, deposits (DE) to GDP or private credit (CRE) to GDP[4]. Consequently our SIMILAR- and REL-variables are defined as follows with "FD" being proxied by "MO", "DE" or "CRE", respectively:

$$(4') \qquad REL\_FD_{ijt} = \left| \ln\left(\frac{FD_{it}}{GDP_{it}}\right) - \ln\left(\frac{FD_{jt}}{GDP_{jt}}\right) \right|$$

$$(5') \qquad SIMILAR\_FD_{ijt} = \ln\left[1 - \left(\frac{FD_{it}}{FD_{it} + FD_{jt}}\right)^2 - \left(\frac{FD_{jt}}{FD_{it} + FD_{jt}}\right)^2 \right]$$

Since transportation as well as information costs play an important and restricting role in international exchange, DISTANCE, typically measured as the great circle distance in kilometers between two countries' capital cities, is regularly included as a proxy for bilateral trading costs. In line with the traditional gravity approach, β_4 is therefore expected to be negative. Because distance is only an imperfect measure of transaction costs, BORDER is often added as second proxy of trading cost and is measured as 1 if two countries share a common border and 0 otherwise. As common borders are expected to boost bilateral trade, β_4 should be positive. In order to control for further different frictions in international trade, the

[4] For a discussion in the context of the finance-and-growth literature see e.g. Wachtel 2003.

gravity model is finally augmented by various factors as e.g. cultural and political similarities, Y_{ijt}.

In principle, our baseline model (2) could be estimated by OLS. However, the estimation results are possibly biased due to omitted variable effects. These could reflect effects that are (i) common to all country-pairs but specific to any year t and (ii) effects that are country-pair specific but common to all years respectively. We therefore apply panel data techniques and define the error term u_{ijt} as follows:

$$(6) \qquad u_{ijt} = \lambda_{ij} + \tau_t + \varepsilon_{ijt}$$

with τ_t capturing time effects and λ_{ij} reflecting any time-invariant bilateral idiosyncratic effect. These unobserved effects may be considered as fixed or random. Since our sample consists of almost all countries that have introduced the euro as their common currency, we cannot treat our sample as a random draw from a large population. Therefore we hypothesize that it is best to consider λ_{ij} as a separate intercept to be estimated for each country-pair. Because all countries belong to the euro zone, we also see the time effect as fixed, capturing economic shocks or changes in macroeconomic environment. In addition, year-specific effects may account for important regulatory and behavioral changes in the first years of the currency union. In order to substantiate our priors in favor of a fixed effects model we also estimate random effects models and run different Hausman tests.

Next to the static version of our fixed effect baseline model, we also estimate a dynamic specification, thus abandoning the assumption that the ε_{ijt} are not serially correlated, since it may be likely that the current level of loans may depend on the previous levels. In fact, habit persistence may be very likely in banking, which is often characterized by high switching and information costs. Therefore we include the lagged-dependent variable as an additional explanatory variable in our model. However, since the lagged-dependent variable is correlated with the country-pair effects and therefore with the error term, the estimators are biased. In order to deal with this problem we use instrumental variables and estimate by

means of the generalized methods of moments (GMM) following Arellano and Bond (1991). Based on the estimation of the static and the dynamic fixed effects model we try to identify the best baseline model which should thus inform us correctly about the impact of the trade-theoretic variables in explaining cross-border loans.

The fixed effects approaches, however, come at the cost of not being able to estimate the impact of time-invariant determinants such as DISTANCE, BORDER or the cultural factors that we are especially interested in. In addition, country-pair fixed effects control only for bilateral trade resistance, e.g. the barriers to trade between two countries. In order to estimate a gravity model appropriately it is also essential to analyze not just bilateral trade resistance but also multilateral trade resistance, i.e. the barriers to trade that each country faces with all its trading partners. A widely used approach in literature to deal with multilateral resistance is to use country dummies (see e.g. Anderson and van Wincoop 2003, Baldwin and Taglioni 2006).[5] This approach has also the advantage of controlling for incomplete homogenization of the bilateral loan data. We therefore will finally use a least square dummy variable (LSDV) estimation approach that controls only for bank countries (δ_i) and bank-customer countries (γ_j), but exclude country-pair idiosyncratic effects. We then define the error term u_{ijt} as[6]:

$$(7) \qquad u_{ijt} = \delta_i + \gamma_j + \tau_t + \varepsilon_{ijt}$$

Unfortunately, the exclusion of country-pair idiosyncratic effects is also not without cost because the country-specific effects are not able to account for specific bilateral factors so that the omitted variable bias is still an issue.[7] Our innovation to the literature here is to model country-pair-specific differences. The reasons are theoretical and methodological. With respect to the latter, we strive to keep the omitted variable bias as small as possible.

[5] According to the theoretical derivation of Feenstra (2002) and Anderson and van Wincoop (2004), the country fixed effects reflect also prices.
[6] Since we are primarily interested in estimation the influence of the time-invariant determinants we focus on the static approach and assume that the ε_{ijt} are not serially correlated.
[7] See Baldwin and Taglioni (2006).

Theoretically, cross-border banking makes only sense and should thus respond to "differences" which call for cross-border arbitrage. We distinguish and investigate the impact of a large number of country-pair specific differences, most – but not all – of them measured by means of non-time varying variables which proxy political and cultural differences. In order to create country-pair specific measures of these variable to substitute for the country-pair specific effects we first measure each of our cultural and political proxies on a country-(and if possible year-) specific level and then calculate Euclidean distances between two countries for a set of variables as:

$$(8) \qquad ED_{ijt} = \sqrt{\sum_{k=1}^{K} \left(V_{itk} - V_{jtk}\right)^2}$$

where ED is the Euclidean distance and V are the different variables that are taken into account.

Our modeling strategy is thus as follows: First we develop a baseline gravity model employing both, the pure trade-theoretic explanatory variable (3) to (5) as well as the financial development adjusted variables (4') and (5') using the various measures of financial development. Secondly, we test these models for fixed, random and dynamic panel effects and with then, thirdly, select the most appropriate model. Finally, based on the specification of this "best model", we try to identify the impact of non-time varying cultural and political differences by augmenting a LSDV approach by bilateral factors measured as Euclidean distances as well as other factor when appropriate.

3. Data

As independent variables we use data on outstanding cross-border loans. Cross-border banking data, when publicly available, are typically aggregated in one of two ways: (1) Cross-border banking data is aggregated to show the position of a single country's banks vis-à-vis all foreign borrowers; (2) cross border banking data is aggregated to show net foreign claims

of loans minus deposits. In contrast, our data are disaggregated so that we are able to distinguish cross-border loans from deposits and focus our analysis on lending activities. Furthermore, our data are bilateral, e.g. disaggregated by counterpart-country so that we can identify the banks' as well as customers' residence.[8] Our dataset allows us to analyze the EMU member-countries Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain but data on cross-border loans made by banks in Luxembourg and Portugal are not disclosed. However, cross-border loans made to borrowers in Luxembourg and Portugal are known. We observe volumes of outstanding loans from 1999 to 2006 and are thus able to include a time-dimension in our analysis. In sum, our unit of observation is defined as the outstanding volume of loans between banks of country i to borrowers of country j in year t ($BILOANS_{ijt}$). A first impression of the dynamics of European cross-border lending can be gained from Table 1. Between 1999 and 2006, the total amount of outstanding cross-border loans more than doubled from € 152 bn to € 361 bn. Annual growth rates, ranging from 3.4% to 20.1%, are not only substantial but exceed growth rates for domestic loans in the euro zone by a factor 1.7 (for 2000) up to 2.6 (for 2005). The only year in which cross-border loans are slightly slower at 3.4% versus 4.1% domestically is 2002. For the average (median) country in the euro zone, cross-border loans rose from € 1,747 m to € 3,341 m (€ 854 m to € 1,304 m) in nominal terms indicating an overall increase in banking market integration. However, when we compare the average and median country over time we can observe that the distribution of cross-border loan granting is still highly right-skewed, indicating that the lending activities are obviously concentrated in a few countries. A look at cross-border lending relative to GDP of either the bank or customer country, however, provides a more differentiated impression of the dynamics of cross-border

[8] Examples of aggregated data include the 'Locational Banking Statistics' and 'Consolidated Banking Statistics' provided by the BIS, the 'Estimates of Foreign Assets and Liabilities' provided by Lane and Milesi-Feretti (2006), and – specifically for Europe – the 'Domestic and cross-border positions of euro area monetary financial institutions' provided by the central banks in the Eurosystem. Our disaggregated data is confidential and has been made available to us by a financial market supervisory institution(s).

activities: Lending appears to be stable except when looking at the average (rather than median) country and when measuring cross-border loans in percent of customer-country GDP. This leads us to conclude that only some but not all customer countries benefited from increased banking market integration in form of more cross-border loans. Furthermore, cross-border loans are more important in terms of GDP in borrower-countries than in lender-countries indicating that funds flow predominantly from larger to smaller economies.

[Insert Table 1 about here]

As we are particularly interested in investigating the role of cultural and political differences, we measure the impact of these factors as Euclidean distances. To arrive at them we collected a large number of such indicators. With respect to cultural proxies it is a common, though rather vague strategy to use a dummy variable for the existence of a common language (LANGUAGE). A more sophisticated, and in financial integration studies successfully applied[9] dummy is based on La Porta et al. (1998) which identifies countries that belong to the same legal family (LEGALFAM). A third measure of culture is the extent to which citizens of one country trust those of another country. Guiso et al. (2005) use such a directly measured bilateral trust variable based on Eurobarometer surveys. While this variable would be particularly appealing for our analysis, the latest data available date back to 1996. As Guiso et al. (2005) indicate, this variable is potentially endogenous, as more bilateral transactions are likely to breed more bilateral trust. We therefore conclude that this variable is unfortunately of no value for our analysis for the 1999-2006 period.[10] We thus had to search for alternatives. A first alternative is to use the overall trust level in a society. Such data are

[9] See e.g. Cecchetti (1999) and Sander and Kleimeier (2004) who identify differences in legal family heritage as a factor limiting European monetary and financial integration.
[10] We nevertheless have tried this bilateral trust variable with the 1996 values in our gravity approach. However, no significant effects could be detected.

available from the World Value Survey and have also been used by Kalemli-Ozcan and Sørensen (2007) in a study to identify the limits to financial integration. While these authors are using the level of trust as a determinant, we will here focus at differences in trust level between countries pairs, thus highlighting the – in our view – more important cultural differences. We thus measure TRUST as the Euclidean distance in trust levels across countries. A second alternative to measure cultural differences could be derived from Hofstede's four cultural dimensions, a measure that figures prominently in the management literature. Based on the result of a broad questioning in more than 50 countries, Hofstede (1980) conducted a factor analysis to identify four different dimensions that can be used to describe national cultures. *Power distance* measures the extent to which the unequal distribution of power in organizations and institutions is accepted, *individualism* deals with the relationship of individuals with groups, *masculinity* expresses to which extend the distribution of roles between genders is predominant and *uncertainty avoidance* indicates a culture's tolerance to unknown, surprising situations. According to the results of Hofstede's factor analysis, each country can be characterized by a score on each of the four dimensions and these scores are the basis for our cultural proxy. Casson (2006) identifies as the four major dimensions of culture *individualism*, *pragmatism*, the *level of tension* and the *degree of trust*. He admits partial correspondence between his and Hofstede's cultural dimensions, except for *power distance* which may in his view better be replaced by *degree of trust*. For our study we therefore define three alternative measures of cultural distances: First, we calculate cultural distance as the Euclidean distance based on four cultural dimensions of Hofstede (CULTURE). Additionally we define cultural differences in line with Cassen (2006) and calculate the Euclidean distance for the Hofstede factors where *power distance* is replaced by *trust* (TRUST&CULTURE3) and where the all Hofstede factors are augmented by *trust* (TRUST&CULTURE4). To capture the impact of political factors, we utilize the six time-varying dimension of governance as defined by the World Bank: *voice and accountability*

(VOICE), *political stability* and *absence of violence* (POLSTAB), *government effectiveness* (GOVEFF), *regulatory quality* (REGQAL), *rule of law* (LAW), and *control of corruption* (CORRUP) and calculate the Euclidean distance. In addition, we also aggregate all these dimensions into an overall political risk proxy (POL) that measures the general political dissimilarity between countries in one Euclidean distance.

Furthermore we also investigate the role of potentially explanatory time-variant economic variables such as bilateral trade (TRADEVOL) and foreign participation in the banking industry (FRGBNK). TRADEVOL is a bilateral variable per se. The role of FRGBNK is investigated for the bank country, for the customer country and also defined as a Euclidean Distance. Details regarding the exact measurement of and data sources for all our variables can be found in Table A1 of the Appendix.

4. The Determinants of Cross-Border Loans in the Euro Zone

4.1. From Descriptive Statistics to the Baseline Gravity Model

A first insight into the potential determinants of cross-border banking can be gained from studying the differences between country-pairs with a large versus small amount of cross-border loans (Table 2). Looking at the beginning and end of our sample period and comparing country-pairs which fall into the top versus bottom quartile with respect to cross-border loans reveals that larger economies fund as well as receive more cross-border loans. We therefore hypothesize the SIZE matters. Furthermore, high levels of cross-border lending are typically associated with higher financial development (here proxied by our favorite financial development measure, the credit-to-GDP-ratio) in both bank and customer countries, while the role of the trade-theoretic variables SIMILAR and REL is less clear-cut. Cross-border lending and cross-border bank-FDI appear to be substitutes as more cross-border lending takes place when the market share of foreign banks is low in the customer-country. Finally, regarding our various geographic, cultural and political measures we find that cross-

border lending is high for countries with a common border, common language, a common legal family, where differences in culture and trust are smaller and where political risks are more similar. Interestingly, the geographic reach of cross-border loans has increased over time as the increasing mean for DISTANCE indicates.

[Insert Table 2 about here]

The starting point of our empirical analysis of the cross-border loans is equation (2) to which we apply panel data techniques that take into account country-pair and time specific effects. Thus the error term u_{ijt} is defined as given in equation (6). As trade-theoretic variables we employ both, the traditional GDP-based definitions (3) to (5) as well as the financial development adjusted definitions (4') and (5') using the various financial development proxies. Regardless which definition of these variables is employed, the result of the Hausman test confirms the existence of fixed rather than random effects (see Table A2 in the Appendix). We thus continue with static and dynamic fixed effects estimates in order to determine the best baseline model. The full details of the estimates can be found in Table A3 in the Appendix, while we report our preferred regressions in Table 3.

In order to relate to the traditional trade-theoretic specification we start with the GDP-based definitions of the variables (3) to (5). In contrast to results of gravity models for international trade, none of our explanatory variables are statistically significant, neither in the static nor in the dynamic estimation. However, in the static fixed effects model we obtain a high R-squared which is typical for gravity models. We therefore conclude that a large part of the variation in cross-border loans can be explained by factors that are country-pair and time specific. Moreover, the positive and highly significant coefficient for the lagged loans indicates that the data generating process is dynamic rather than static and that the cross-border lending is to some extent habit persistent. Finally, both the static and the dynamic

fixed effects model perform better when time dummies are included. For that reason we conclude, that regulatory changes over the investigated period have an impact on cross-border loans.

Given the relatively low explanatory power of the GDP-based proxies for trade determinants, we hypothesize that cross border lending is possibly more influenced by national banking market conditions than by overall economic factors. Thus we investigate the role of relative development and similarity of the financial sector as defined in equation (4') and (5'). We conduct all fixed effects estimates by using all three financial development proxies. The general message from this exercise is firstly, that loans clearly show habit persistence. This result holds regardless of which proxy for financial development is used. Secondly, when investigating the various proxies further by comparing parameter stability between the fixed effect and LSDV regression as well as by looking into the data properties of deposits and broad money, we clearly favor the credit proxy for the loan regressions.[11] Thirdly, the inclusion of time dummies in the dynamic loan regressions is methodologically no longer necessary. Probably, regulatory changes are already captured in our proxies.

The regression results are reported in Table 3. Our reference regression is the dynamic model without time dummies. It shows a plausible 0.7, though only marginally significant, elasticity of bilateral loans with respect to the sum of the partner GDPs. The implied (marginal) support for the financial variant of the new trade theory-hypothesis is reinforced by the positive and significant coefficient for SIMILAR_CRE, which indicates that country-pairs with a more similar financial sector are also having more bilateral loans. A financial comparative advantage hypothesis is not supported as financial development differences are not found to promote cross-border loans.

[11] In addition, since the distribution of deposits is even more right-skewed than the distribution of credits, we prefer as an explanatory variable a variable based on credit. The same explanation holds for money, as deposits are part of the broad definition of money.

In sum, loans seem to follow an autoregressive process. Country-pairs with equally developed and sized financial markets have more bilateral cross-border lending activities, possibly indicating that customers search for variety rather than exploit financial development differences. Nevertheless, there is very strong evidence for country-pair fixed effects and we can conclude that the variation in cross-border loans can largely be explained by country-pair and/or time specific factors. This clearly indicates the important role of bilateral determinants such as e.g. geographical distance, common border, culture, trust, legal system origin etc. which unfortunately remain unexplored in a fixed effects model. Moreover, these country-pair fixed effects may also be responsible for the insignificance of the pair-wise defined trade-theoretic variables that show little variation over time. We conclude that the results of the fixed effects models suggest that country-pair specific factors are primarily important in explaining cross-border loan granting. Unfortunately, most of these factors are time-invariant and can thus not be investigated in a fixed effects model. Instead, we will now investigate these factors in LSDV model specifications that build on our fixed effects reference models.

[Insert Table 3 about here]

4.2. The Geography of Cross-Border Loans

In order to identify the main driving or impeding forces, we next apply several LSDV specifications to the loan regression. In contrast to the static and dynamic panel approaches, we will model the country-pair effects separately as Euclidean distances in order to identify arbitrage promoting and arbitrage impeding factors. Moreover, in order not to misread a general "multilateral resistance" to cross-border banking for bilateral resistance, we will in the following control for bank and customer specific effects by including country dummies. These dummies serve as a proxy for barriers to cross-border lending that each country's banks face with all their customers. Finally, the country dummies will also control for all

unobserved country differences in regulation, taxation etc. as well as for differences in the data, which are not fully homogenized. In the following LSDV models the error term in equation (2) is therefore defined as indicated in equation (7).

The baseline version of the LSDV gravity model (Table 3) already explains 83 percent of the variation of cross-border loans, regardless of whether the trade-variables are defined with GDP or credit proxies. However, the estimates with the credit proxies are the more promising ones in our view. Consequently we concentrate our description here on the estimation in the last two columns using credit as proxy. Economic SIZE has a positive impact and the elasticity is above one, signaling both an important role for intra-industry trade and a potential for an expanding share of cross-border banking in a growing euro zone. Likewise the positive and significant coefficient of SIMILAR lends also support for the new trade theory. However, our conclusion remains that comparative advantage still plays a role as countries with deeper credit market appear to grant more loans to countries with less liquid markets as can be interfered from the positive and significant coefficient of REL. Although the parameter estimates of the trade-theoretic variables are somewhat smaller than those found in typical merchandise trade estimations[12], they indicate that cross-border loans may increasingly become an intra-industry phenomenon in the euro zone with product heterogeneity and economies of scale playing a bigger role. As in merchandise trade, bilateral trading costs play an important role. The usual proxies, DISTANCE and BORDER are of significant influence. The coefficient for DISTANCE is with 0.59 somewhat lower than those regularly obtained for merchandise trade, which are closer to one. Our estimate is however still substantial and clearly indicates the existence of an economic geography in cross-border lending. Likewise, a common border increase cross-border loans by 100*(exp(0.54)-1)=71.6%.

[12] However, these results seem to be generally in line with the results Baltagi et al. (2003) have obtained from merchandise trade estimates when employing a similar model and using – like our model here – importer, exporter and time dummies.

The strong presence of country-pair fixed effects, however, warrants further investigation as such effects point to country-pair specific differences as potential barriers to cross-border loans. We have therefore defined all political and cultural variables as well as the foreign bank penetration variable as Euclidean distances. We first report their role when adding them alone to the baseline model and then include them cumulative in the order of statistical significance (Table A4), With respect to the role of foreign bank participation in cross-border loan granting, we find a small substitutive rather than complementary effect as the presence of foreign banks in the borrowers' countries reduces the amount of imported foreign loans. Turning to the cultural proxies, a language dummy (LANGUAGE) is regularly employed to measure cultural differences. We tried this dummy but found it less convincing (i.e. insignificant) compared to the alternative and richer cultural variables. For cultural variables we use the Hofstede variable CULTURE, the modified Hofstede variables (TRUST&CULTURE3, TRUST&CULTURE4), the "distance-of-trust-level" variable TRUST and the legal family origin variable (LEGALFAM). All these culture proxies have a significantly limiting impact on cross-border loans. LEGALFAM origin has the most significant impact, followed by TRUST and the Hofstede variable and its modification. Replacing the power distance dimension by trust does not improve the estimation while adding TRUST to CULTURE yield a marginal improvement. However, TRUST and LEGALFAM are the most significant cultural variables. We favor them for two additional reasons: First they are easy and reliable to measure and second they cover independent, important straits of cultural differences. This is not true for the Hofstede variable and its variation which is highly correlated with legal origin and will loose all its explanatory power when used together with LEGALFAM. The governance indicators are, however, not very successful in explaining cross-border loans, regardless whether they are introduced separately or as an overall political risk variable. There is only some evidence that differences in

"regulatory quality" will reduce cross border loans while "voice and accountability"-differences will promote them.

Adding the significant variables increases the goodness of fit while the coefficients of the baseline equation remain remarkably stable. Our preferred gravity estimation is reported in Table 3: The elasticity of cross-border loans with respect to economic SIZE is now slightly below 1 and more in line with the estimates for merchandise trade. A common BORDER is estimated to increase trade by 61.6% instead of 71.6% in the baseline model. Explained cultural proximity may account for this difference. A similar TRUST level across countries, a similar degree of foreign bank penetration (FRGBNK) and larger differences in voice and accountability (VOICE) all increase cross-border loans. Finally, belonging to the same legal family system (LEGALFAM) increases cross-border loans by 73.3%. Thus, the evidence suggests that cultural (rather the governance) factors may continue to play an important limiting role in European Banking market integration.

4.3. Robustness of the Results

We have further investigated the role of bilateral trade in promoting cross-border loans (see Table A5 in the Appendix) and could indeed establish that bilateral trade promotes bilateral loans. However, since trade is highly correlated with distance, the coefficient of the latter will then become insignificant. Moreover, as trade may also be correlated with other cultural variables as suggested by Guiso et al. (2005) we have been concentrating our investigation on gravity models without the trade variable as our prime interest is in estimating the impact of cultural, political and other limiting factors on cross-border lending. Nevertheless, we crosscheck the sensitivity of our analysis to various specifications. In particular we investigate to what extent the use of the trade-theoretic variables or the credit proxy has an impact on the estimated coefficients and whether a specification which includes the merchandise trade volume alters the results. The simple and very clear answer is that the

estimates of the coefficients are rather stable across all specifications as can be seen from Table 4.

Insert Table 4 here

5. Conclusions

Cross-border lending in the euro zone is still exhibiting a clear economic geography and the evidence clearly points to country-pair specific determinants of cross-border banking. A first innovation of our paper is to modify the trade-theoretic formulated gravity model to allow for financial development effects. The modified version clearly indicates that cross-border loan granting is mainly promoted by similarity of financial systems rather than financial development differences. This hypothesis is particularly supported by our dynamic gravity model which takes into account the strong evidence for habit persistence in cross-border lending. The second innovation in this paper is to model country differences as Euclidean distances and investigating their quantitative impact. This way we show that not only distance and border effects, but also cultural differences and legal heritage differences, rather than differences in governance are important in shaping the bilateral pattern of cross-border loans and may well continue to exercise a limiting impact on banking market integration in the coming years.

References

Anderson, J., 1979. A theoretical foundation for the gravity equation. American Economic Review 69, 108-116.

Anderson, J., van Wincoop, E., 2004. Trade costs. Journal of Economic Literature 42, 691-751.

Anderson, J., van Wincoop, E., 2003. Gravity with gravitas: A solution to the border puzzle. American Economic Review 93, 170-192.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58(2), 277-297.

Baele, L., Ferrando, A., Hördahl, P., Krylova, E., Monnet, C., 2004. Measuring financial integration in the euro area. Oxford Review of Economic Policy, 20(4). 509-530.

Baldwin, R., Taglioni, D., 2006. Gravity for dummies and dummies for gravity equations. NBER Working Paper No. 12516.

Baltagi, B.H., Egger, P., Pfaffermayr, M., 2003. A generalized design for bilateral trade flow models. Economics Letters 80, 391–397.

Baxter, M., Kouparitsas, M., 2006. What determines bilateral trade flows? NBER Working Paper No. 12188.

Berger, A., 2003. Global integration in the banking industry. Federal Reserve Bulletin, November, 451-460,

Berger, A., Dai, Q., Ongena, S., Smith, D.C., 2003. To what extent will the banking industry be globalized? A study of bank nationality and reach in 20 European Nations. Journal of Banking and Finance, 27(March). 383-415.

Bergstrand, J., 1985. The gravity equation in international trade: Some microeconomic foundations and empirical evidence. Review of Economics and Statistics 67, 474-481.

Bergstrand, J., 1989. The generalized gravity equation. Monopolistic competition, and the factor proportions theory in international trade. Review of Economics and Statistics 71, 143-153.

Casson, M. 2006. Culture and Economic Performance. In: Ginsburgh V.A. and Throsby, D., Handbook of the Economics of Arts and Culture. Elsevier: North Holland. 359-397.

Cecchetti, S.G., 1999. Legal structure, financial structure, and the monetary transmission mechanism. Federal Reserve Bank of New York Economic Policy Review, 5, 9-28.

Deardorff, A., 1998. Determinants of bilateral trade: Does gravity work in a neoclassical world? In Frankel, J. (ed. 1998), "The Regionalization of the World Economy", University of Chicago Press, 7-28.

European Central Bank, 2006. EU Banking Structure. European Central Bank, Frankfurt, October.

European Central Bank, 2004. Report on EU Banking Structure. European Central Bank, Frankfurt, November.

Feenstra, R., 1998. Integration of trade and disintegration of production in the global economy. Journal of Economic Perspectives, Fall, 31-50.

Feenstra, R. 2002. Border effects and the gravity equations: consistent methods for estimation. Scottish Journal of Political Economy 49, 491-506.

Flörkemeier, H., 2002. Limits to globalization? The regional pattern of world trade. INFER Discussion Paper No. 6.

Guiso, L., Sapienza, P. and Zingales, L., 2005. Cultural Biases in Economic Exchange, NBER Working Paper No. W11005.

Helpman, E., Krugman, P.R., 1985. Market structure and foreign trade: Increasing returns, imperfect competition and the international economy. MIT Press, Cambridge, MA.

Heuchemer, S., Sander, H., (2007): Do cultural affinities influence international trade? In Balimoune-Lutz, M., Nowak, A., Steagall, J. (ed. 2007), Global Economy. Exploring new Capabilities, 203-217.

Hofstede, G. 1980. Culture's Consequences. International Differences in Work-Related Values", Sage.

Kalemli-Ozcan, S., Sørensen, B.E., 2007. How integrated are European financial markets? And what's trust got to do with it? VOX Research-based policy analysis and commentary from Europe's leading economists, 28 November 2007, available at http://www.voxeu.org/index.php?q=node/751

Kleimeier, S., Sander, H., 2007. Integrating Europe's banking market. Where do we stand? Center for European Policy Studies Research Report on Finance and Banking. Brussels.

Krugman, P.R., 1980. Scale economies, product differentiation, and the pattern of trade. American Economic Review 70, 950–959.

Lane, P.R., Milesi-Ferretti, G.M., 2006. The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. IMF Working Paper WP/06/69.

La Porta, R., Lopez-de-Silane, F., Shleifer, A., Vishny, R.W., 1998. Law and Finance. Journal of Political Economy 106(6), 1113-1155.

Pöyhönen, P., 1963. A tentative model for the volume of trade between countries. Weltwirtschaftliches Archiv 90(1), 93-100.

Sander, H., Kleimeier, S. 2004. Convergence in euro-zone retail banking? What interest rate pass-through tells us about monetary policy transmission, competition and integration. Journal of International Money and Finance, 23, 461-492.

Schoenmaker, D., van Laecke, C., 2006. Current state of cross-border banking. Paper presented at the International Banking Conference "International Financial Stability: Cross-Border Banking and National Regulation. Federal Reserve Bank of Chicago, 5-6 October.

Tinbergen, J., 1962. Shaping the world economy: Suggestions for an international economic policy. New York: The Twentieth Century Fund.

Wachtel, P., 2003. How much do we really know about growth and finance? Federal Reserve Bank of Atlanta Economic Review, First Quarter, 34-47.

Appendix

[Insert Tables A1 to A6 here]

Table 1: The growth of bilateral cross-border lending in the euro zone over time

	bilateral cross-border loan volume							
	total	mean			median			
year	in millions of euro	in millions of euro	in % of GDP of bank country	in % of GDP of customer country	in millions of euro	in % of GDP of bank country	in % of GDP of customer country	number of country-pairs
1999	151.976,3	1.746,9	5,1	10,6	854,0	1,5	2,2	87
2000	174.443,0	1.982,3	5,3	11,2	796,0	1,5	2,2	88
2001	205.113,3	1.991,4	4,8	11,1	647,0	1,2	2,3	103
2002	212.000,5	2.058,3	4,4	10,6	761,3	1,2	2,4	103
2003	228.407,3	2.175,3	4,3	11,8	850,0	1,3	2,1	105
2004	251.659,8	2.352,0	4,7	11,7	861,8	1,2	2,1	107
2005	302.286,3	2.851,8	5,3	15,0	1.165,0	1,7	2,0	106
2006	360.896,0	3.341,6	5,7	16,6	1.304,7	1,8	2,4	108
1999 to 2006		2.338,0	4,9	12,4	920,5	1,4	2,2	807

Note: Descriptive statistics are based on full information sample of countrypair- and year-specific observations used in the regressions. Means and medians are calculated across all country-pairs which have non-zero bilateral loan volumes.

Table 2: National differences in bilateral cross-border lending

	cross-border loans			
	1999		2006	
mean across all observations in cross-border-loan-quartile for variable:	bottom quartile	top quartile	bottom quartile	top quartile
cross-border loans				
loans as bilateral, annual cross-border loan volume (in millions of euro)	52,60	4.971,92	31,06	10.443,36
economic mass				
GDP of bank country (in billions of euro)	386,36	1.022,35	342,27	1.407,47
GDP of customer country (in billions of euro)	438,65	855,45	551,86	912,91
total GDP of bank and customer country (in billions of euro)	825,01	1.877,80	894,14	2.320,37
financial development				
credit to the private sector in % of GDP in bank country	0,80	1,00	0,98	1,21
credit to the private sector in % of GDP in customer country	0,91	0,97	1,14	1,34
difference between credit to the private sector in bank versus customer country	1,48	1,30	1,46	1,45
similarity of credit to the private sector in bank versus customer country	0,30	0,27	0,33	0,33
market share of foreign banks in bank country	11,26	17,67	31,84	13,25
market share of foreign banks in customer country	20,78	19,17	32,05	24,88
market share of foreign banks$_{ED}$	19,40	23,91	26,30	20,99
geographic, cultural and political features				
common legal family$_{D}$	0,27	0,36	0,33	0,48
common border$_{D}$	0,05	0,50	0,00	0,56
common language$_{D}$	0,05	0,23	0,00	0,26
distance in km between capital cities	1.691,39	920,44	2.005,67	881,16
culture$_{ED}$	2,67	2,32	2,98	2,28
trust$_{ED}$	1,11	0,63	1,11	0,77
World Bank's worldwide governance indicators:				
overall political risk$_{ED}$	0,01	-0,11	0,55	-0,01
control of corruption$_{ED}$	1,21	1,04	1,21	0,61
government effectiveness$_{ED}$	0,46	0,37	0,86	0,49
polical stability and absence of violence$_{ED}$	1,21	1,04	1,95	1,18
regulatory quality$_{ED}$	0,48	0,51	0,55	0,40
voice and accountability$_{ED}$	0,21	0,19	0,35	0,23
rule of law$_{ED}$	0,48	0,35	0,81	0,49
number of countrypair-specific observations in quartile	22	22	27	27

Note: Quartiles are formed based on the bilateral cross-border loan volume. Subscript D indicates a dummy variable, subscript ED indicates that the variable is measured as the Euclidean distance between the customer and bank country. Higher Euclidean distances indicate higher differences between countries.

Table 3: Determinants of cross-border lending

	Fixed effects		Dynamic		LSDV			
	GDP proxies for SIMILAR and REL	credit market proxies for SIMILAR and REL	GDP proxies for SIMILAR and REL	credit market proxies for SIMILAR and REL	GDP proxies for SIMILAR and REL		credit market proxies for SIMILAR and REL	
	baseline	baseline	baseline	baseline	baseline	preferred	baseline	preferred
constant					12,84	12,22	3,07	5,09
					2,18	2,33	1,15	2,00
SIZE	0,56	0,83	0,48	0,70	-0,45	-0,36	1,32	0,84
	0,81	1,18	0,43	1,67	-0,42	-0,38	2,90	1,97
SIMILAR	-0,45	-0,20	0,22	0,52	-0,24	-0,02	0,54	0,51
	-1,44	-0,92	0,31	2,20	-0,44	-0,04	2,38	2,31
REL	0,63	-0,07	0,75	-0,08	0,75	0,59	0,43	0,54
	1,51	-0,33	1,53	-0,24	2,60	2,27	2,00	2,45
ln(DISTANCE)					-0,65	-0,65	-0,59	-0,56
					-6,19	-6,43	-6,44	-6,10
$BORDER_D$					0,53	0,45	0,54	0,48
					5,48	5,04	5,79	5,46
$ln(TRUST_{ED})$						-0,24		-0,24
						-5,46		-5,11
$LEGALFAM_D$						0,56		0,55
						5,44		5,37
$ln(FRGBNK_{ED})$						0,10		0,13
						2,69		3,40
$ln(VOICE_{ED})$						0,16		0,14
						4,67		3,73
$ln(BILOANS_{t-1})$			0,37	0,62				
			3,37	6,56				
$country_{bank}$ dummies	No	No	No	No	Yes	Yes	Yes	Yes
$country_{customer}$ dummies	No	No	No	No	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Sargan test			22,17	28,62				
p-value			0,33	0,10				
m2			-0,71	-0,89				
p-value			0,48	0,37				
adjusted R^2	0,930	0,938			0,830	0,844	0,830	0,844
number of observations	842	807	618	603	842	842	807	807

Note: In each regression, the dependent variable is the log of bilateral cross-border loan volume. The two-way fixed effects model is estimated with White-robust standard errors. The dynamic model uses the Arellano-Bond (1991) 2-step generalised method of moments (GMM) estimator. The difference of the lagged dependent variable and its lags as well as the exogonous variables are used as instruments. For each coefficient, the first row shows the estimated coefficient and the second row the t- or z-statistic. Sargan test examines the overidentifying restrictions. If the null hypothesis is not rejected the instrumental variables are uncorrelated with the error term and therefore valid. The Arellano-Bond test (m2) examines the hypothesis that there is no second-order autocorrelation in the residuals. The Least Square Dummy Variable (LSDV) model is estimated as OLS with White-robust standard errors. For each coefficient, the first row shows the estimated coefficient and the second row the t-statistic. The subscript D indicates a dummy variable. The subscript ED indicates a variable measured as an Euclidean distance.

Table 4: Limiting or promoting factors on cross-border lending

	Loans			
	Credit market proxies for SIMILAR and REL		GDP proxies for SIMILAR and REL	
	without TRADEVOL	including TRADEVOL	without TRADEVOL	including TRADEVOL
$\ln(FRGBNK_{bank\ country})$	-0,05	-0,06	-0,09	-0,10
$\ln(FRGBNK_{customer\ country})$	-0,14 *	-0,12	-0,15 *	-0,15 *
$\ln(FRGBNK_{ED})$	0,11 *	0,12	0,08 *	0,10 *
$LANGUAGE_{D}$	0,11	0,00	0,02	-0,07
$\ln(CULTURE_{ED})$	-0,34 *	-0,28 *	-0,35 *	-0,33 *
$\ln(TRUST\&CULTURE_{3})$	-0,33 *	-0,19 *	-0,32 *	-0,25 *
$\ln(TRUST\&CULTURE_{4})$	-0,39 *	-0,29 *	-0,38 *	-0,33 *
$\ln(TRUST_{ED})$	-0,24 *	-0,18 *	-0,23 *	-0,20 *
$LEGALFAM_{D}$	0,66 *	0,54 *	0,67 *	0,59 *
$\ln(POL_{ED})$	-0,01 *	0,09	0,06	0,14
$\ln(CORRUP_{ED})$	-0,01	0,04	0,00	0,04
$\ln(GOVEFF_{ED})$	0,03	0,06	0,05	0,07 *
$\ln(POLSTAB_{ED})$	-0,03	-0,01	0,00	0,01
$\ln(REGQAL_{ED})$	-0,06	-0,02	-0,03	0,00
$\ln(VOICE_{ED})$	0,09 *	0,10 *	0,12 *	0,13 *
$\ln(LAW_{ED})$	0,00	0,05	0,02	0,06

Note: A Least Square Dummy Variable (LSDV) model is estimated as OLS with White-robust standard errors. The subscript D indicates a dummy variable. The subscript ED indicates a variable measured as an Euclidean distance. Each explanatory variable is included separately in the respective baseline model presented in Table 3. * indicates significance at least at 10%.

Table A-1: Description of variables

variable	description	variable format used in regressions	details and source
BILOANS	bilateral cross border loan volume	ln, variation across ijt	Outstanding bilateral, cross-border loan volume in millions of euros in year t. All loans from monetary and financial institutions (MFIs) in country i to non-MFI borrowers in country j are included.
GDP	gross domestic product	variation across it or jt	GDP in billions of euro of country i (or j) in year t. GDP is measured at current prices and is not seasonally adjusted except for Portugal for which the GDP is seasonally adjusted. Source: Eurostat's series ESNGDPA for all countries except Greece and Luxembourg. For these two countries, the series 99B..A from the IMF's IFS are used.
POP	$population_{it}$ $population_{jt}$		Population of country i (or j) in million in mid-year t. Source: Series I99Z..O from the IMF's IFS.
CREDIT	privat credit to GDP	variation across it or jt	Credit to private sector as percent of gdp for country i (or j) in year t. Source: IMF's IFS credit series Y32D..A and GDP as defined above.
MONEY	$money_{it}$ to GDP	variation across it or jt	Money of country i (or j) in year t is defined as currency plus deposits in percent of GDP. Source: IMF's IFS currency series Y34A.NA, demand deposit series Y34B.NA and other deposit series Y35..NA. GDP as defined above.
DEPOSIT	$deposit_{it}$ to GDP	variation across it or jt	Deposits as percent of GDP for country i (or j) in year t. Source: IMF's IFS demand deposit series Y3B.NA and other deposit series Y35..NA. GDP as defined above.
SIZE	combined economic masses	ln, variation across ijt	= $\ln(GDP_{it} + GDP_{jt})$. Total size of the economy of country i and j.
REL	absolute difference in per capita GDP	ln, variation across ijt	= $\lvert \ln(GDP_{it}/POP_{it})-\ln(GDP_{jt}/POP_{jt})\rvert$
SIMILAR	similarity index of country-pair GDPs	ln, variation across ijt	= $\ln(1 - (GDP_{it} /(GDP_{it}+GDP_{jt}))^2 - (GDP_{it}/(GDP_{it}+GDP_{jt})^2)$. The similarity of GDP in country i versus j.
REL_FD	relative size of credit markets	ln, variation across ijt	= $\lvert \ln(FD_{it}) - \ln(FD_{jt}) \rvert$. The absolute difference between financial development in country i versus j.
SIMILAR_FD	similarity of credit markets	ln, variation across ijt	= $\ln(1 - ((FD_{it}*GDP_{it}) /((FD_{it}*GDP_{it}) + (FD_{jt}*GDP_{jt})))^2 - ((FD_{it}*GDP_{it}) /((FD_{it}*GDP_{it}) + (FD_{jt}*GDP_{jt})))^2)$. The similarity index for financial developemnt in country i versus j. Alternative definitions for the financial development proxy FD are used: CREDIT, MONEY, DEPOSIT.
DISTANCE	distance	ln, variation across ij	Distance in km between the capital cities of countries i and j. Source: http://www.wcrl.ars.usda.gov/cec/java/lat-long.htm. New link: http://www.chemical-ecology.net/java/lat-long.htm
BORDER	common border	dummy, variation across ij	Dummy equal to 1 if countries i and j have a common border. The following countries have a common border: Austria-Germany, Austria-Italy, Belgium-France, Belgium-Germany, Belgium-Luxembourg, Belgium-Netherlands, Denmark-Germany, France-Germany, France-Italy, France-Luxembourg, France-Spain, Germany-Luxembourg, Germany-Netherlands, Portugal-Spain.
FRGBNK	asset share of foreign banks	ln, euclidean distance, variation across ijt	Asset share of foreign banks in banking market of country i (or j). Measured as total assets of foreign branches and subsidiaries of credit institutions (CIs) from EU and 3rd countries as percent of total assets of domestic CIs. Source for data for 1999 to 2000: ECB (2004), tables 8, 21, 23, 25 and 27 from annex 1. Source for data for 2001 to 2005: ECB (2006), tables 2, 11 and 13 from annex 1. Data for 2006 is not yet available and data for 2005 is used instead.

Table A-1: Description of variables

variable	description	variable format used in regressions	details and source
LANGUAGE	common language	dummy, variation across ij	Dummy equal to 1 if countries i and j have common language. The following country-pairs are considered to have a common language: Germany-Austria, Belgium-France, Belgium-Netherlands, Austria-Luxembourg, Belgium-Luxembourg, Germany-Luxembourg, France-Luxembourg.
CULTURE	culture	ln, euclidean distance, variation across ij	Four cultural dimensions of Hofstede. Estimated values are used for Luxembourg. Source: http://www.geert-Hofstede.com /hofstede_dimensions.php?culture1=86&culture2=18Appeal
TRUST	trust	euclidean distance, variation across ij	The extend to which citizens of country i trust country j. This time-invariant proxy is based on several Eurobarometer surveys from 1970 to 1995 and scaled from 1 to 4 with higher values indicating more trust. Source: Table 1 of Guiso, Sapienza and Zingales (2004).
$TRUST\&CULTURE_4$	trust and culture	ln, euclidean distance, variation across ij	Combination of trust and Hofstede's 4 cultural dimensions.
$TRUST\&CULTURE_3$	trust and culture excluding power distance	ln, euclidean distance, variation across ij	Combination of trust and Hofstede's cultural dimensions excluding Hofstede's power distance dimension.
LEGALFAM	legal family	dummy, variation across ij	Dummy equal to 1 if countries i and j belong to same legal family. Belgium, France, Italy, Netherlands and Spain are considered to be of French legal origin. Austria and Germany are of German legal origin. Source: La Porta et al. (1998).
VOICE	voice and accountabily	ln, euclidean distance, variation across ijt	World Bank's Worldwide Governance Indicators for country i (or j) in year t. The indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. Source: http://info.worldbank.org/governance/wgi2007/. Annual data is available for 1998, 2000, 2002, 2003, 2004, 2005, 2006. Thus, values for 1999 and 2001 are calculated as the average of two surrounding years.
POLSTAB	polical stabily and absence of violence		
GOVEFF	government effectiveness		
REGQAL	regulatory quality		
LAW	rule of law		
CORRUP	control of corruption		
POL	polical risk	ln, euclidean distance, variation across ijt	Euclidean distance between the political risk of countries i and j based on the six dimensions of the World Bank's Worldwide Governance Indicators dataset.
TRADEVOL	trade volume	ln	$=\ln(exports_{ijt} + imports_{ijt})$. Exports from country i to country j and imports into country i from country j in year t in millions of euros at current prices. Source: IMF's Direction of Trade Statistics. Exports and imports are originally reported in US dollar and are converted to euros using Datastream's the end-of-year exchange rate USOCC007.
D_YEAR	time dummy	dummy, variation across t	Dummy equal to 1 for loan volume outstanding in a given year and 0 otherwise. A separate dummy exists for each year from 1999 to 2006.
D_BANK	bank-country dummy	dummy, variation across i	Dummy equal to 1 for loans made by MFIs of country i. A separate dummy exists for each country: Austria, Belgium, Finland, France, Ireland, Italy, Netherlands and Spain.
D_CUSTOMER	customer-country dummy	dummy, variation across j	Dummy equal to 1 for loans made to borrowers of country j. A separate dummy exists for each country: Austria, Belgium, Finland, France, Luxembourg, Ireland, Italy, Netherlands, Portugal and Spain.

Table A2: Comparison of Estimators: Random Effects vs Fixed Effects Approach

	Credit market proxies for SIMILAR and REL								GDP proxies for SIMILAR and REL							
	Model 1				Model 2				Model 3				Model 4			
	One-way random effect	One-way fixed effects	One-way random effects with time dummies	Two-way fixed effects	One-way random effect	One-way fixed effects	One-way random effects with time dummies	Two-way fixed effects	One-way random effect	One-way fixed effects	One-way random effects with time dummies	Two-way fixed effects	One-way random effect	One-way fixed effects	One-way random effects with time dummies	Two-way fixed effects
Cross-border loans																
SIZE	2,10 *	2,42 *	1,56 *	0,83	1,57 *	2,15 *	0,70 **	0,67	1,83 *	1,90 *	1,39 *	-0,13	1,06 *	1,50 *	0,42	-0,49
	12,78	9,57	6,43	1,18	6,87	7,05	2,16	0,93	11,40	7,40	4,92	-0,18	4,82	4,95	1,22	-0,67
SIMILAR	0,27	0,18	0,02	-0,20	0,20	0,16	-0,14	-0,20	0,13	0,22	-0,17	-0,90 ***	-0,09	0,20	-0,51	-0,93 ***
	1,64	1,23	0,09	-0,92	1,21	1,12	-0,74	-0,92	0,48	0,52	-0,51	-1,67	-0,35	0,48	-1,58	-1,73
REL	-0,01	-0,06	-0,13	-0,07	0,00	-0,06	-0,12	-0,06	0,64	0,87 **	0,61 ***	0,98 **	0,89 *	0,90 **	0,77 **	1,01 **
	-0,03	-0,28	-0,63	-0,33	0,01	-0,31	-0,57	-0,30	1,96 **	2,17	1,81	2,46	2,72	2,27	2,30	2,54
ln(TRADEVOL)					0,37 *	0,23	0,48 *	0,14					0,53 *	0,32 *	0,54 *	0,27 **
					3,27	1,54	3,89	0,90					4,98	2,67	4,57	2,21
Hausman test statstics (HT)	6,65		48,60		29,35		51,72		4,46		35,25		28,43		41,42	
HT (p-value)	0,08		0,00		0,00		0,00		0,22		0,00		0,00		0,00	
Likelihood ratio test (LR)		2144,42		2158,34		1953,21		1964,86		2136,64		2159,16		1898,83		1909,17
LR (p-value)		0,00		0,00		0,00		0,00		0,00		0,00		0,00		0,00
number of observations		807	807	807		807	807	807	842	842	842	842	842	842	842	842

Note: In each regression, the dependent variable is the log of cross-border loan volume. For each coefficient, the first row shows the estimated coefficient and the second row the t-statistic. Random effects models are estimated with constant, not shown. Fixed effects estimation with White-robust standard errors. The subscript ED indicates a variable measured as an Euclidean distance where larger values indicate larger differences between bank country and customer country.*, **, and *** indicate significance at 1%, 5%, and 10% level, respectively. Hausman test examines the equivalence of the random and fixed effects estimates. If the null hypothesis has to be rejected fixed effects estimation is appropriate. Likelihood ratio test examines significant fixed effects. A rejection of the null hypothesis suggests significant fixed effects.

Table A3: Baseline model selection using different definitions of size, similarity and absolute differences in factor endowments

	Fixed effects				Dynamic								LSDV			
	GDP proxies for SIMILAR and REL	credit market proxies for SIMILAR and REL	deposit market proxies for SIMILAR and REL	money proxies for SIMILAR and REL	GDP proxies for SIMILAR and REL		credit market proxies for SIMILAR and REL		deposit market proxies for SIMILAR and REL		money proxies for SIMILAR and REL		GDP proxies for SIMILAR and REL	credit market proxies for SIMILAR and REL	deposit market proxies for SIMILAR and REL	money proxies for SIMILAR and REL
Cross-border loans																
constant													12,84	3,07	8,17	8,13
													2,18	1,15	2,17	2,00
SIZE	0,56	0,83	0,56	0,44	0,48	0,66	0,30	0,70	0,84	0,68	0,69	0,76	-0,45	1,32	-0,07	-0,04
	0,81	1,18	0,81	0,64	0,43	1,74	0,29	1,67	0,86	1,88	0,69	2,14	-0,42	2,90	-0,12	-0,06
SIMILAR	-0,45	-0,20	-0,45	-0,50	0,22	1,29	0,06	0,52	0,60	1,07	0,60	1,02	-0,24	0,54	-0,24	-0,21
	-1,44	-0,92	-1,44	-1,49	0,31	1,77	0,18	2,20	1,18	3,22	1,19	2,96	-0,44	2,38	-0,73	-0,60
REL	0,63	-0,07	0,63	1,02	0,75	1,14	-0,10	-0,08	-0,21	0,40	-0,01	0,38	0,75	0,43	1,31	1,29
	1,51	-0,33	1,51	1,98	1,53	2,02	-0,35	-0,24	-0,07	1,40	-0,04	1,15	2,60	2,00	4,48	4,09
ln(DISTANCE)													-0,65	-0,59	-0,48	-0,48
													-6,19	-6,44	-4,96	-4,90
$BORDER_D$													0,53	0,54	0,71	0,70
													5,48	5,79	7,27	7,10
$ln(BILOANS_{t-1})$					0,37	0,57	0,40	0,62	0,43	0,62	0,42	0,60				
					3,37	6,19	3,69	6,56	4,03	7,32	4,03	7,17				
$country_{bank}$ dummies	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
$country_{customer}$ dummies	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Sargan test					22,17	33,06	19,86	28,62	22,45	25,78	21,94	25,58				
p-value					0,33	0,03	0,47	0,10	0,32	0,17	0,34	0,18				
m2					-0,71	-0,72	-0,83	-0,89	-0,80	-0,89	-0,80	-0,89				
p-value					0,48	0,47	0,41	0,37	0,42	0,37	0,42	0,38				
adjusted R^2	0,930	0,938	0,938	0,938									0,830	0,830	0,834	0,833
number of observations	842	807	807	807	618	618	603	603	603	603	603	603	842	807	807	807

Note: In each regression, the dependent variable is the log of bilateral cross-border loan volume. The two-way fixed effects model is estimated with White-robust standard errors. The dynamic model uses the Arellano-Bond (1991) 2-step generalised method of moments (GMM) estimator. The difference of the lagged dependent variable and its lags as well as the exogonous variables are used as instruments. For each coefficient, the first row shows the estimated coefficient and the second row the t- or z-statistic. Sargan test examines the overidentifying restrictions. If the null hypothesis is not rejected the instrumental variables are uncorrelated with the error term and therefore valid. The Arellano-Bond test (m2) examines the hypothesis that there is no second-order autocorrelation in the residuals. The Least Square Dummy Variable (LSDV) model is estimated as OLS with White-robust standard errors. For each coefficient, the first row shows the estimated coefficient and the second row the t-statistic. The subscript D indicates a dummy variable.

Table A4: LSDV model selection

Panel 1: Credit market proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17	Reg 18	Reg 19	Reg 20	Reg 21	Reg 22	Reg 23
constant	3,07	3,27	3,82	3,46	2,88	1,71	2,00	1,56	3,47	2,38	3,00	2,99	3,27	2,63	1,95	4,27	3,08	1,93	2,81	3,25	4,99	3,97	5,09
	1,15	1,22	1,42	1,32	1,07	0,61	0,73	0,56	1,32	0,90	1,09	1,11	1,20	0,95	0,71	1,60	1,15	0,70	1,07	1,28	1,90	1,51	2,00
SIZE	1,32	1,31	1,31	1,18	1,32	1,57	1,56	1,65	1,34	1,20	1,32	1,32	1,31	1,39	1,49	1,15	1,32	1,31	1,24	1,09	0,86	0,97	0,84
	2,90	2,89	2,90	2,66	2,90	3,33	3,32	3,49	3,00	2,71	2,87	2,90	2,87	2,95	3,17	2,52	2,91	2,79	2,82	2,54	1,93	2,19	1,97
SIMILAR_CRE	0,54	0,54	0,54	0,56	0,55	0,67	0,67	0,71	0,62	0,52	0,54	0,54	0,54	0,57	0,61	0,46	0,54	0,57	0,59	0,61	0,52	0,57	0,51
	2,38	2,38	2,39	2,46	2,42	2,80	2,83	2,99	2,76	2,32	2,36	2,38	2,37	2,43	2,60	2,05	2,38	2,41	2,64	2,74	2,28	2,52	2,31
REL_CRE	0,43	0,42	0,40	0,54	0,43	0,44	0,41	0,43	0,39	0,43	0,43	0,43	0,44	0,44	0,43	0,45	0,43	0,43	0,40	0,52	0,54	0,51	0,54
	2,00	1,94	1,87	2,40	2,01	2,04	1,89	1,99	1,85	2,00	2,00	2,01	2,05	2,02	2,01	2,08	1,98	2,02	1,88	2,35	2,45	2,33	2,45
ln(DISTANCE)	-0,59	-0,60	-0,60	-0,58	-0,56	-0,58	-0,61	-0,60	-0,66	-0,47	-0,59	-0,58	-0,61	-0,59	-0,58	-0,60	-0,60	-0,47	-0,55	-0,54	-0,56	-0,54	-0,56
	-6,44	-6,47	-6,52	-6,27	-5,44	-6,30	-6,58	-6,55	-7,27	-4,90	-6,42	-6,45	-6,65	-6,41	-6,32	-6,74	-6,42	-4,97	-5,74	-5,60	-6,12	-5,73	-6,10
$BORDER_D$	0,54	0,54	0,54	0,53	0,52	0,49	0,48	0,48	0,48	0,52	0,54	0,54	0,53	0,53	0,53	0,56	0,54	0,50	0,48	0,46	0,48	0,47	0,48
	5,79	5,77	5,74	5,63	5,53	5,22	5,06	5,13	5,24	5,95	5,82	5,75	5,68	5,61	5,62	5,95	5,75	5,71	5,48	5,27	5,46	5,27	5,46
$ln(FRGBNK_{bank\ country})$		-0,05																					
		-0,67																					
$ln(FRGBNK_{customer\ country})$			-0,14																				
			-1,80																	0,12	0,13	0,12	0,13
$ln(FRGBNK_{ED})$				0,11																3,34	3,41	3,29	3,40
				2,79																			
$LANGUAGE_D$					0,11																		
					0,71																		
$ln(CULTURE_{ED})$						-0,34												-0,13					
						-3,30												-1,19					
$ln(TRUST\&CULTURE_3)$							-0,33																
							-3,10																
$ln(TRUST\&CULTURE_4)$								-0,39															
								-3,89															
$ln(TRUST_{ED})$									-0,24										-0,20	-0,20	-0,24	-0,22	-0,24
									-5,08										-4,32	-4,50	-4,75	-4,37	-5,11
$LEGALFAM_D$										0,66								0,61	0,56	0,56	0,54	0,59	0,55
										6,27								5,65	5,42	5,49	5,13	5,51	5,37
$ln(POL_{ED})$											-0,01												
											-0,16												
$ln(CORRUP_{ED})$												-0,01											
												-0,47											
$ln(GOVEFF_{ED})$													0,03										
													0,81										
$ln(POLSTAB_{ED})$														-0,03									
														-0,88									
$ln(REGQAL_{ED})$															-0,06						-0,01	0,04	
															-1,75						-0,19	1,01	
$ln(VOICE_{ED})$																0,09					0,14		0,14
																2,50					3,68		3,73
$ln(LAW_{ED})$																	0,00						
																	0,07						
$country_{lender}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$country_{borrower}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2	0,830	0,830	0,830	0,831	0,830	0,831	0,831	0,832	0,835	0,836	0,830	0,830	0,830	0,830	0,830	0,831	0,830	0,836	0,839	0,841	0,844	0,841	0,844
number of observations	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807

Note: In each regression, the dependent variable is the log of bilateral cross-border loan volume. The Least Square Dummy Variable (LSDV) model is estimated as OLS with White-robust standard errors. For each coefficient, the first row shows the estimated coefficient and the second row the t-statistic. The subscript D indicates a dummy variable and the subscript ED a variable measured as an Euclidean distance where larger values indicate larger differences between borrower and lender country.

Table A4: LSDV model selection

Panel 2: GDP proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17	Reg 18	Reg 19	Reg 20	Reg 21	Reg 22	Reg 23
constant	12,84	13,94	14,71	11,76	12,81	13,20	13,31	13,39	13,23	11,70	12,81	12,84	13,15	12,86	12,70	13,70	13,02	11,92	12,20	10,87	12,26	11,25	12,22
	2,18	2,32	2,52	2,02	2,17	2,26	2,28	2,30	2,33	2,07	2,18	2,18	2,23	2,18	2,16	2,38	2,21	2,11	2,20	1,99	2,34	2,09	2,33
SIZE	-0,45	-0,61	-0,66	-0,29	-0,45	-0,49	-0,49	-0,49	-0,42	-0,46	-0,42	-0,45	-0,45	-0,45	-0,44	-0,54	-0,46	-0,48	-0,44	-0,24	-0,36	-0,27	-0,36
	-0,42	-0,56	-0,62	-0,27	-0,42	-0,46	-0,46	-0,46	-0,41	-0,45	-0,39	-0,42	-0,42	-0,42	-0,41	-0,51	-0,43	-0,47	-0,44	-0,24	-0,38	-0,28	-0,38
SIMILAR_GDP	-0,24	-0,32	-0,35	-0,09	-0,24	-0,25	-0,24	-0,24	-0,15	-0,21	-0,22	-0,24	-0,24	-0,24	-0,23	-0,29	-0,24	-0,21	-0,14	0,05	-0,02	0,04	-0,02
	-0,44	-0,58	-0,65	-0,16	-0,44	-0,46	-0,45	-0,45	-0,29	-0,40	-0,41	-0,44	-0,44	-0,44	-0,44	-0,55	-0,44	-0,41	-0,28	0,09	-0,04	0,09	-0,04
REL_GDP	0,75	0,73	0,72	0,80	0,74	0,95	0,86	0,93	0,73	0,80	0,68	0,75	0,70	0,75	0,80	0,58	0,72	0,87	0,77	0,84	0,58	0,70	0,59
	2,60	2,54	2,51	2,73	2,54	3,30	2,98	3,22	2,60	2,79	2,32	2,59	2,40	2,56	2,75	2,12	2,46	3,05	2,77	2,95	2,19	2,51	2,27
ln(DISTANCE)	-0,65	-0,65	-0,65	-0,66	-0,65	-0,67	-0,68	-0,69	-0,73	-0,55	-0,67	-0,65	-0,68	-0,65	-0,65	-0,65	-0,66	-0,57	-0,63	-0,63	-0,65	-0,63	-0,65
	-6,19	-6,20	-6,19	-6,24	-5,32	-6,41	-6,46	-6,54	-6,89	-5,16	-6,59	-6,33	-6,62	-6,11	-6,12	-6,49	-6,53	-5,32	-5,82	-5,89	-6,42	-5,99	-6,43
$BORDER_D$	0,53	0,53	0,53	0,51	0,52	0,46	0,46	0,46	0,47	0,49	0,53	0,53	0,51	0,53	0,52	0,55	0,53	0,47	0,46	0,43	0,45	0,44	0,45
	5,48	5,49	5,49	5,25	5,39	4,78	4,74	4,74	4,99	5,39	5,49	5,42	5,35	5,31	5,31	5,75	5,42	5,14	5,03	4,71	5,03	4,77	5,04
$ln(FRGBNK_{bank\ country})$		-0,09																					
		-1,14																					
$ln(FRGBNK_{customer\ country})$			-0,15																				
			-1,99																				
$ln(FRGBNK_{ED})$				0,08																0,10	0,10	0,10	0,10
				2,16																2,84	2,66	2,67	2,69
$LANGUAGE_D$					0,02																		
					0,12																		
$ln(CULTURE_{ED})$						-0,35												-0,14					
						-3,69												-1,40					
$ln(CULT3\_TRUST_{ED})$							-0,32																
							-3,26																
$ln(CULT4\_TRUST_{ED})$								-0,38															
								-4,00															
$ln(TRUST_{ED})$									-0,23										-0,19	-0,20	-0,25	-0,23	-0,24
									-5,27										-4,42	-4,58	-5,15	-4,69	-5,46
$LEGALFAM_D$										0,67								0,62	0,57	0,58	0,56	0,62	0,56
										6,46								5,78	5,55	5,64	5,35	5,82	5,44
$ln(POL_{ED})$											0,06												
											0,76												
$ln(CORRUP_{ED})$												0,00											
												-0,11											
$ln(GOVEFF_{ED})$													0,05										
													1,36										
$ln(POLSTAB_{ED})$														0,00									
														-0,08									
$ln(REGQAL_{ED})$															-0,03						0,02	0,08	
															-0,84						0,37	1,87	
$ln(VOICE_{ED})$																0,12					0,16		0,16
																3,40					4,37		4,67
$ln(LAW_{ED})$																	0,02						
																	0,55						
$country_{lender}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$country_{borrower}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2	0,830	0,830	0,831	0,831	0,830	0,832	0,831	0,832	0,835	0,836	0,830	0,830	0,830	0,830	0,830	0,832	0,830	0,836	0,839	0,841	0,844	0,841	0,844
number of observations	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842

Table A5: Robustness check for LSDV model selection

Panel 1: Credit market proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 6	Reg 7	Reg 4	Reg 5	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17	Reg 18	Reg 19	Reg 20	Reg 21	Reg 22	Reg 23
constant	-3,03	-2,82	-2,30	-2,72	-3,03	-3,89	-3,30	-3,66	-1,44	-2,57	-2,81	-3,12	-2,89	-3,17	-3,26	-1,86	-3,18	-2,95	-1,27	-0,88	1,06	-0,06	0,98
	-1,05	-0,97	-0,80	-0,97	-1,06	-1,33	-1,14	-1,26	-0,49	-0,90	-0,98	-1,09	-1,00	-1,09	-1,13	-0,65	-1,11	-1,00	-0,44	-0,31	0,37	-0,02	0,35
SIZE	0,98	0,98	0,98	0,84	0,98	1,21	1,15	1,25	1,07	0,95	0,91	0,96	0,96	1,01	1,05	0,79	1,01	1,04	1,02	0,87	0,61	0,71	0,63
	2,24	2,23	2,24	1,94	2,24	2,60	2,46	2,66	2,42	2,18	2,00	2,16	2,17	2,20	2,22	1,77	2,30	2,26	2,34	2,03	1,34	1,56	1,46
SIMILAR_CRE	0,41	0,41	0,41	0,43	0,41	0,52	0,50	0,55	0,50	0,42	0,39	0,40	0,41	0,42	0,44	0,32	0,43	0,46	0,49	0,51	0,41	0,46	0,41
	1,84	1,84	1,85	1,92	1,84	2,19	2,06	2,27	2,18	1,86	1,67	1,76	1,81	1,83	1,84	1,43	1,94	1,95	2,15	2,24	1,73	1,93	1,82
REL_CRE	0,33	0,31	0,30	0,45	0,33	0,34	0,32	0,34	0,32	0,34	0,32	0,32	0,34	0,33	0,33	0,34	0,31	0,35	0,34	0,46	0,47	0,45	0,48
	1,50	1,44	1,38	1,94	1,50	1,55	1,47	1,52	1,49	1,57	1,43	1,44	1,56	1,50	1,51	1,58	1,37	1,59	1,55	2,03	2,12	1,99	2,13
ln(DISTANCE)	-0,08	-0,09	-0,09	-0,06	-0,08	-0,09	-0,12	-0,13	-0,24	-0,07	-0,09	-0,08	-0,09	-0,09	-0,09	-0,08	-0,10	-0,07	-0,21	-0,19	-0,22	-0,18	-0,22
	-0,56	-0,59	-0,64	-0,43	-0,55	-0,64	-0,80	-0,87	-1,56	-0,47	-0,61	-0,54	-0,65	-0,58	-0,59	-0,56	-0,68	-0,51	-1,35	-1,26	-1,49	-1,24	-1,51
$BORDER_D$	0,29	0,29	0,29	0,28	0,29	0,26	0,27	0,27	0,30	0,32	0,28	0,28	0,26	0,29	0,29	0,30	0,28	0,30	0,32	0,31	0,32	0,30	0,32
	2,54	2,52	2,52	2,42	2,58	2,30	2,40	2,38	2,70	2,86	2,40	2,45	2,24	2,52	2,55	2,67	2,50	2,74	2,98	2,85	3,03	2,84	3,04
$ln(FRGBNK_{bank\ country})$		-0,06																					
		-0,75																					
$ln(FRGBNK_{customer\ country})$			-0,12																				
			-1,66																	0,13	0,13	0,13	0,13
$ln(FRGBNK_{ED})$				0,12																3,44	3,49	3,37	3,51
				3,11																			
$LANGUAGE_D$					0,00																		
					0,03																		
$ln(CULTURE_{ED})$						-0,28												-0,11					
						-2,70												-1,08					
$ln(TRUST\&CULTURE_{3,ED})$							-0,19																
							-1,77																
$ln(TRUST\&CULTURE_{4,ED})$								-0,29															
								-2,74															
$ln(TRUST_{ED})$									-0,18										-0,15	-0,16	-0,20	-0,18	-0,19
									-3,40										-3,02	-3,16	-3,68	-3,31	-3,78
$LEGALFAM_D$										0,54								0,50	0,49	0,49	0,49	0,53	0,48
										4,84								4,46	4,52	4,59	4,44	4,76	4,49
$ln(POL_{ED})$											0,09												
											1,11												
$ln(CORRUP_{ED})$												0,04											
												1,30											
$ln(GOVEFF_{ED})$													0,06										
													1,55										
$ln(POLSTAB_{ED})$														-0,01									
														-0,33									
$ln(REGQAL_{ED})$															-0,02						0,01	0,06	
															-0,54						0,18	1,33	
$ln(VOICE_{ED})$																0,10					0,14		0,14
																2,84					3,50		3,68
$ln(LAW_{ED})$																	0,05						
																	1,23						
ln(TRADEVOL)	0,66	0,66	0,65	0,67	0,66	0,63	0,62	0,61	0,52	0,55	0,69	0,70	0,68	0,65	0,64	0,67	0,69	0,54	0,44	0,45	0,45	0,46	0,44
	4,02	4,04	3,99	4,19	3,97	3,86	3,69	3,66	3,05	3,32	3,98	4,00	4,10	3,96	3,74	4,14	4,04	3,31	2,59	2,70	2,72	2,79	2,74
$country_{lender}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$country_{borrower}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2	0,836	0,836	0,836	0,838	0,836	0,837	0,836	0,837	0,839	0,840	0,836	0,836	0,836	0,836	0,836	0,837	0,836	0,840	0,842	0,844	0,846	0,844	0,846
number of observations	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807

See notes to table A4.

Table A5: Robustness check for LSDV model selection

Panel 2: GDP proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 6	Reg 7	Reg 4	Reg 5	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17	Reg 18	Reg 19	Reg 20	Reg 21	Reg 22	Reg 23
constant	10,27	11,49	12,07	8,90	10,37	10,66	10,79	10,91	11,20	9,80	9,95	10,18	10,55	10,18	10,27	11,07	10,58	10,02	10,64	9,13	10,49	9,46	10,46
	1,69	1,85	2,00	1,48	1,70	1,76	1,78	1,80	1,89	1,67	1,63	1,67	1,73	1,66	1,69	1,86	1,75	1,71	1,84	1,61	1,93	1,70	1,92
SIZE	-1,08	-1,27	-1,28	-0,92	-1,09	-1,11	-1,07	-1,07	-0,91	-0,96	-1,06	-1,10	-1,13	-1,07	-1,08	-1,21	-1,14	-0,98	-0,83	-0,65	-0,79	-0,71	-0,78
	-1,07	-1,24	-1,27	-0,92	-1,08	-1,11	-1,06	-1,07	-0,92	-0,98	-1,05	-1,09	-1,11	-1,05	-1,07	-1,22	-1,13	-1,00	-0,86	-0,68	-0,86	-0,75	-0,84
SIMILAR_GDP	-0,52	-0,61	-0,62	-0,36	-0,53	-0,52	-0,50	-0,50	-0,38	-0,43	-0,50	-0,52	-0,54	-0,51	-0,52	-0,59	-0,54	-0,44	-0,33	-0,14	-0,21	-0,15	-0,21
	-1,02	-1,19	-1,22	-0,70	-1,03	-1,03	-0,99	-0,99	-0,76	-0,87	-0,98	-1,04	-1,05	-0,99	-1,02	-1,18	-1,07	-0,89	-0,67	-0,29	-0,45	-0,32	-0,45
REL_GDP	0,81	0,79	0,77	0,87	0,82	0,99	0,89	0,96	0,78	0,84	0,66	0,78	0,74	0,79	0,81	0,62	0,72	0,92	0,81	0,88	0,60	0,73	0,63
	2,76	2,70	2,68	2,90	2,75	3,45	3,07	3,31	2,74	2,90	2,21	2,64	2,50	2,64	2,73	2,26	2,43	3,21	2,87	3,06	2,28	2,58	2,40
ln(DISTANCE)	-0,27	-0,27	-0,27	-0,26	-0,29	-0,30	-0,32	-0,33	-0,42	-0,26	-0,27	-0,27	-0,28	-0,27	-0,27	-0,25	-0,28	-0,28	-0,39	-0,38	-0,39	-0,37	-0,40
	-1,70	-1,67	-1,69	-1,64	-1,74	-1,87	-1,96	-2,04	-2,57	-1,71	-1,69	-1,67	-1,78	-1,64	-1,63	-1,60	-1,77	-1,80	-2,45	-2,44	-2,59	-2,36	-2,63
$BORDER_D$	0,34	0,33	0,34	0,31	0,35	0,28	0,30	0,29	0,34	0,35	0,32	0,33	0,29	0,34	0,34	0,35	0,33	0,32	0,34	0,31	0,33	0,31	0,33
	2,85	2,84	2,88	2,61	2,98	2,37	2,55	2,50	2,97	3,08	2,73	2,80	2,50	2,84	2,85	3,03	2,84	2,81	3,17	2,88	3,14	2,93	3,15
$ln(FRGBNK_{bank\ country})$		-0,10																					
		-1,34																					
$ln(FRGBNK_{customer\ country})$			-0,15																				
			-1,92																	0,11	0,10	0,10	0,10
$ln(FRGBNK_{ED})$				0,10																3,06	2,86	2,87	2,91
				2,60																			
$LANGUAGE_D$					-0,07																		
					-0,45																		
$ln(CULTURE_{ED})$						-0,33												-0,15					
						-3,59												-1,62					
$ln(TRUST\&CULTURE_{3,ED})$							-0,25																
							-2,55																
$ln(TRUST\&CULTURE_{4,ED})$								-0,33															
								-3,45															
$ln(TRUST_{ED})$									-0,20										-0,16	-0,17	-0,22	-0,20	-0,22
									-3,94										-3,47	-3,61	-4,38	-3,93	-4,49
$LEGALFAM_D$										0,59								0,54	0,52	0,52	0,52	0,57	0,50
										5,21								4,56	4,81	4,88	4,71	5,14	4,69
$ln(POL_{ED})$											0,14												
											1,71												
$ln(CORRUP_{ED})$												0,04											
												1,18											
$ln(GOVEFF_{ED})$													0,07										
													2,01										
$ln(POLSTAB_{ED})$														0,01									
														0,27									
$ln(REGQAL_{ED})$															0,00						0,03	0,09	
															-0,01						0,61	2,09	
$ln(VOICE_{ED})$																0,13					0,16		0,17
																3,76					4,32		4,69
$ln(LAW_{ED})$																	0,06						
																	1,45						
ln(TRADEVOL)	0,50	0,51	0,50	0,53	0,51	0,49	0,47	0,47	0,39	0,40	0,55	0,53	0,53	0,50	0,50	0,53	0,54	0,40	0,31	0,33	0,35	0,35	0,34
	2,93	2,98	2,90	3,11	2,93	2,90	2,75	2,77	2,29	2,36	3,04	2,92	3,05	2,93	2,84	3,11	3,00	2,38	1,89	2,07	2,24	2,23	2,21
$country_{lender}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$country_{borrower}$ dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2	0,834	0,834	0,834	0,835	0,834	0,835	0,835	0,835	0,837	0,838	0,834	0,834	0,835	0,834	0,834	0,836	0,834	0,838	0,841	0,842	0,846	0,843	0,846
number of observations	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842

Table A6: Fixed effects model selection

Panel 1: Credit market proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg12	Reg 13	Reg 14	Reg 15
SIZE	0,83	0,84	0,78	0,77	0,82	0,83	0,80	0,80	0,94	0,76	0,83	0,68	0,74	0,88	0,77
	1,18	1,19	1,10	1,08	1,16	1,17	1,13	1,14	1,36	1,06	1,18	0,93	1,05	1,26	1,09
SIMILAR_CRE	-0,20	-0,20	-0,20	-0,20	-0,21	-0,20	-0,18	-0,18	-0,16	-0,20	-0,26	-0,20	-0,18	-0,17	-0,26
	-0,92	-0,94	-0,93	-0,92	-1,01	-0,94	-0,83	-0,85	-0,78	-0,94	-1,20	-0,92	-0,85	-0,78	-1,20
REL_CRE	-0,07	-0,10	-0,10	-0,18	-0,08	-0,07	-0,04	-0,09	-0,12	-0,06	-0,04	-0,06	-0,20	-0,24	-0,16
	-0,33	-0,50	-0,49	-0,93	-0,42	-0,36	-0,22	-0,45	-0,63	-0,31	-0,20	-0,30	-1,03	-1,25	-0,81
$\ln(FRGBNK_{ED})$		-0,02		-0,02											
		-0,59		-0,48											
$\ln(FRGBNK_{\text{bank country}})$			-0,05												
			-0,79												
$\ln(FRGBNK_{\text{customer country}})$				-0,17									-0,16	-0,17	-0,17
				-3,59									-3,50	-3,59	3,58
$\ln(POL_{ED})$					-0,09										
					-0,87										
$\ln(CORRUP_{ED})$						-0,02									
						-0,81									
$\ln(GOVEFF_{ED})$							0,02								
							0,84								
$\ln(POLSTAB_{ED})$								-0,05					-0,04		
								-1,89					-1,67		
$\ln(REGQAL_{ED})$									-0,11					-0,11	
									-2,69					-2,73	
$\ln(VOICE_{ED})$										0,04					
										1,02					
$\ln(LAW_{ED})$											-0,12				-0,11
											-1,93				-1,90
ln(TRADEVOL)												0,14			
												0,90			
adjusted R^2	0,938	0,938	0,938	0,939	0,938	0,938	0,938	0,938	0,938	0,938	0,938	0,938	0,939	0,939	0,939
number of observations	807	807	807	807	807	807	807	807	807	807	807	807	807	807	807

Note: In each regression, the dependent variable is the log of bilateral cross-border loan volume. The Fixed Effects model is a two-way fixed analysis with country-pair and time fixed effects and is estimated with White-robust standard errors. For each coefficient, the first row shows the estimated coefficient and the second row the t-statistic. The subscript ED indicates a variable measured as an Euclidean distance where larger values indicate larger differences between bank country and customer country.

Table A6: Fixed effects model selection

Panel 2: GDP proxies for SIMILAR and REL

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16
SIZE	-0,13	-0,18	-0,26	-0,32	-0,15	-0,16	-0,15	-0,18	-0,06	-0,23	-0,10	-0,49	-0,34	-0,25	-0,35	-0,63
	-0,18	-0,25	-0,35	-0,46	-0,22	-0,22	-0,21	-0,26	-0,08	-0,32	-0,15	-0,67	-0,49	-0,35	-0,49	-0,85
SIMILAR_GDP	-0,90	-0,96	-0,96	-1,04	-0,94	-0,95	-0,83	-0,95	-0,75	-0,96	-0,90	-0,93	-1,09	-0,89	-0,95	-0,97
	-1,67	-1,78	-1,75	-1,94	-1,76	-1,78	-1,53	-1,76	-1,38	-1,78	-1,68	-1,73	-2,05	-1,66	-1,78	-1,82
REL_GDP	0,98	0,94	0,92	0,86	0,98	0,98	0,98	1,06	0,79	1,07	0,92	1,01	0,87	0,67	0,76	0,78
	2,46	2,38	2,32	2,14	2,46	2,48	2,46	2,59	1,99	2,68	2,23	2,54	2,15	1,68	1,89	1,94
$\ln(FRGBNK_{ED})$		-0,03														
		-0,95														
$\ln(FRGBNK_{bank\ country})$			-0,08													
			-1,30													
$\ln(FRGBNK_{customer\ country})$				-0,16									-0,15	-0,15	-0,16	-0,15
				-3,22									-3,16	-3,19	-3,23	-3,1
$\ln(POL_{ED})$					-0,06											
					-0,55											
$\ln(CORRUP_{ED})$						-0,05							-0,04			
						-1,82							-1,68			
$\ln(GOVEFF_{ED})$							0,04									
							1,29									
$\ln(POLSTAB_{ED})$								-0,04								
								-1,29								
$\ln(REGQAL_{ED})$									-0,13					-0,12	-0,13	-0,12
									-2,86					-2,87	-2,9	-2,88
$\ln(VOICE_{ED})$										0,06					0,07	0,06
										1,80					1,84	1,7
$\ln(LAW_{ED})$											-0,05					
											-0,74					
ln(TRADEVOL)												0,27				0,21
												2,21				1,78
adjusted R^2	0,930	0,930	0,930	0,931	0,930	0,930	0,930	0,930	0,931	0,931	0,930	0,931	0,931	0,932	0,932	0,932
number of observations	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842