

Cross-border bank lending

Empirical evidence on further determinants from OECD banking markets

Oliver Mueller^{a*}

André Uhde^b

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Abstract: Employing data on bank claims from 13 OECD countries vis-à-vis 51 emerging markets between 1993 and 2007 this study provides empirical evidence that monopolistic banks from OECD countries tend to ration credit to emerging markets whereas increasing competitive pressure may spur cross-border bank lending. Furthermore, empirical results indicate that banks may arbitrage on costs arising from different regulatory requirements and may be more prone to higher risk-taking under a greater generosity of the local deposit insurance system. Finally, while higher capital buffers may act as an impediment to cross-border lending, pursuing a “gambling for resurrection” strategy tends to have a positive impact on the volume of OECD bank claims towards emerging markets. Further sensitivity analyses from splitting the entire data into subsamples of more-developed emerging markets and frontier markets as well as lending transactions during and beyond a common lender relationship reveal further important insights concerning the explanatory power of the determinants employed.

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a Oliver Mueller *(corresponding author), University of Bochum, Department of Economics, 44780 Bochum, Germany, email: oliver.mueller@rub.de.

b Dr. André Uhde, University of Bochum, Department of Economics, 44780 Bochum, Germany, email: andre.uhde@rub.de.

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1. Introduction

The incentive for OECD country banks to increasingly engage in cross-border lending to more-developed emerging markets and frontier markets primarily results from different effects of an ongoing process of financial globalization since the beginning of the 1990s. Hence, as regards mature countries, stronger financial globalization and integration have induced both fiercer banking market competition and an increasing level of financial disintermediation both resulting in a threat of decreasing domestic banks' profit margins (Claessens, 2006; Claessens et al., 2001). However, as many emerging countries have started liberalizing and deregulating their financial markets at the same time by eliminating controls on cross-border capital flows and abolishing market entry barriers, banks from industrialized countries have taken advantage of new investment opportunities in these countries in order to evade the challenges in own local markets (Arestis et al., 2002; Eichengreen, 2001). As a consequence, cross-border bank lending to emerging markets by OECD country banks has sharply increased since the beginning of the 1990s. While foreign claims on more-developed emerging and frontier markets added up to 464 bn USD in 1993, their amount grew roughly seven-fold to 2,958 bn USD in 2007, but has steeply declined since 2008 due to the global financial crisis that has been emerged in mid-2007 (BIS, 2008a).

Although some kind of analogy to research on bilateral trade and foreign direct investment (FDI) does exist, the number of comprehensive empirical studies explicitly evaluating significant determinants of cross-border bank lending is still small. Moreover, existing empirical research generally focuses on the source and the recipient countries' macroeconomic and institutional framework being important pull-factors to explain cross-border lending. To begin with, *Papaioannou (2009)* employs data on 40 lending and 140 recipient countries for the period from 1984 to 2002 providing empirical evidence that underperforming institutions in recipient countries, i.e. weak property rights, legal inefficiencies or a high risk of expropriation, may be major impediments to foreign bank lending to emerging markets.

Using data on international bank flows from 26 source countries to 120 recipient countries for the period from 1996 to 2007, *Houston et al. (2009)* find that regulatory arbitrage positively affects international bank flows between mature and developing countries. Moreover, the study reveals that recipient countries may encourage the inflow of capital by imposing stronger creditor rights. *Herrero and Pería (2007)* study the mix of Italian, Spanish and US foreign bank claims on more than 100 recipient countries worldwide for the period from 1997 to 2002. They find that regulatory barriers to banking as well as restricted business opportunities in borrowing countries have a significant negative impact on the share of a lending bank's local claims in favor of cross-border claims. Finally, *Jeanneau and Micu (2002)* analyze cross-border bank lending to large Asian and Latin-American countries. Focusing on the macroeconomic endowment between 1985 and 2000, their panel data analysis reveals that economic cycles in lending countries have a procyclical impact on international bank claims. Moreover, they find that fixed and intermediate exchange rate arrangements encourage foreign claims while floating rate agreements inhibit them.

Investigating cross-border bank lending between 13 OECD and 51 emerging markets for the period from 1993 to 2007, the empirical analysis at hand complements and extends previous studies for the following aspects. First, to the best of our knowledge this is the first study that employs specific characteristics of different OECD banking markets and lending banks as further important determinants being assumed to explain variation in cross-border lending. Second, building subsamples of cross-border lending to more-developed emerging markets vs. frontier markets as well as differentiating between common lender relationships and no common lender commitments between countries, the empirical analysis reveals further important insights concerning significances and the explanatory power of OECD banking markets' characteristics employed.

The remainder of this paper is organized as follows. Section 2 initially describes data and sources and then introduces our empirical model and strategy. Empirical results from

baseline regressions and further sensitivity analyses are presented and discussed in Section 3. Finally, Section 4 concludes.

2. Empirical analysis

2.1. Data and sources

A detailed exposition of all variables and data sources is presented in Table 2. While descriptive statistics for the entire dataset is provided in Table 3, correlation matrices are presented in Tables 12-14.

Foreign bank claims

We retrieve our measure of an OECD banking markets' *foreign bank claims* on the public, banking and non-banking private sector of recipient emerging countries from the "Consolidated Banking Statistics" provided by the Bank for International Settlements (BIS). Introduced in the late 1970s, the "Consolidated Banking Statistics" aims at providing detailed information on contractual claims of banks' domestic offices in reporting countries including their foreign affiliates on the rest of the world. Consolidated data is originally collected by national central banks in an aggregate form and reported to the BIS using them as a basis for calculating global data. The BIS statistics covers nearly 100 percent of the domestic banking systems' claims (Table 1) and thus provides a unique and comprehensive data source for time-series analyses.

The BIS distinguishes between international and foreign claims, comprising different on-balance sheet exposures. While international claims cover cross-border claims of domestic banks in all currencies plus local claims of foreign affiliates in foreign currency, foreign claims additionally include local claims of foreign subsidiaries in local currency. To avoid double-counting, inter-office positions between reporting banks and their foreign affiliates and branches are netted out. Additionally, claims which have been written off or have been

abated are excluded from the statistics since the revaluation indicates that the present or prospective value of the claim is expected to be zero. Our analysis focuses on foreign claims on an immediate borrower basis.³

Due to the hub-like pattern of international bank lending, we include 13 OECD lending countries which provide continuous information on their banking systems' financial claims on other countries for our period of interest from 1993 to 2007.⁴ Following related empirical studies, we restrict our analysis to emerging markets and do not include financial claims between developed markets on the recipient side. Consequently, our analysis encompasses 51 emerging markets, which are classified as more-developed and frontier markets in conformance with MSCI Barra as of April 2009. A list of countries included as well as information on the percentage coverage of foreign claims in the lending country's banking system is provided in Table 1.

Gravity measures

Following relevant previous empirical studies, we include well-accepted standard variables of the “*gravity model*” to explain differences in the volume of financial claims between source and recipient countries. The gravity model originates from trade theory in which it is commonly used to analyze bilateral trade flows (Deardorff, 1998; Bergstrand, 1985; Anderson, 1979; Tinbergen, 1962). In recent years, however, the gravity approach has also become popular in empirical studies on international banking and finance (Papaioannou, 2009; Rose and Spiegel, 2004; Jeanneau and Micu, 2002).

³ Foreign claims on an immediate borrower basis allocate claims to the country where the original risk is resident. However, as a reaction to financial crises in emerging markets in the late 1990s, the BIS enhanced its statistics. Since the third quarter of 2005, data on an ultimate risk basis are published, i.e. claims are allocated to the country where the final risk remains (e.g. due to risk mitigation). Unfortunately, the time horizon of this data is too short for a comprehensive empirical study employing panel analysis.

⁴ Our analysis focuses on the period from 1993 to 2007 since BankScope data being employed to build OECD banking sectors-specific measures is just available from 1993 onwards.

Accordingly, we employ the source and the recipient country's *log of real GDP* as a measure of national income, the *geographical distance* between the national capitals of both countries as well as a measure of *linguistic ties* being a dummy variable that takes on the value of one if the source and recipient country share a common language to account for cultural proximity. From an economic point of view, international bank lending may be positively related to the source and recipient countries' income and the existence of a common official language, whereas increasing distance and hence, increasing information asymmetries, transaction costs and investment risk (Ahearne et al., 2004) may be negatively related to cross-border bank lending.

OECD banking markets' characteristics

Turning to different OECD banking markets' characteristics that are assumed to be further important determinants to explain variation in cross-border financial flows, we initially investigate the market structure by employing a measure of *banking market concentration*. Using the *BankScope database* provided by *Fitch Ratings* concentration ratios are calculated as the fraction of assets of the total banking system's assets held by the five largest domestic banks per OECD country. In addition, we control for the level of *disintermediation* in domestic banking markets. Following Beck et al. (2000) disintermediation is measured by the proportion of the banking sector's total assets to stock market capitalization suggesting that the development of the capital market as well as a stronger evolvement of near- and non-banks may provoke fiercer competitive pressure on formal banks in mature markets.

Next to these market structure characteristics we further include differences concerning the implementation of *de jure and de facto banking regulation and supervision* between the source and the recipient country to address the opportunity of realizing regulatory arbitrage. While *de jure regulatory arbitrage* is measured as the difference between the source and recipient country's formal regulations on bank equity capital stringency by means of the

capital regulatory index, *de facto regulatory arbitrage* is measured as the difference between both countries' strength of external audits of banks. Both indices are built from combined data retrieved from three *World Bank Surveys on Bank Regulation and Supervision* conducted in 1997, 2001 and 2005 (Barth et al., 2008). The construction of each index is explained in detail in Table 2. Completing the regulatory endowment we employ an updated and modified version of the *moral hazard index* developed by Demirgüç-Kunt and Detragiache (2002). This index proxies the generosity of a source country's deposit insurance regime and is built by principal component analysis of combined data retrieved from the three *World Bank Surveys on Bank Regulation and Supervision* as mentioned above.

We finally control for the OECD banking systems' attributes and include each banking systems' *capital ratio*, *asset quality*, *profitability* and *cost efficiency*. Variables are described in detail in Table 2. We retrieve banking sector-specific variables from aggregated and consolidated balance sheet data from the *BankScope database* per country and year.⁵ We adjust all BankScope data with regard to the so called "survivorship bias", i.e. BankScope deletes historical information on banks that no longer exist in the latest release of the database (e.g. due to M&A). We remedy this bias by reassembling the panel data set from individual cross-sections using historical releases of the database based on archived CD-ROMs.

2.2. Empirical model

To study the impact of OECD banking markets' characteristics on the variation in cross-border lending to emerging markets, we estimate the following random-effects model on panel data:

⁵ We are aware of the fact that employing characteristics for each lending bank may be more appropriate with regard to our analysis. Unfortunately, the BIS Consolidated Banking Statistics (and related databases) do not provide information on single lending banks but rather retrieve aggregate data on cross-border claims from respective national central banks. However, since we employ bank-specific characteristics on a consolidated and aggregated level for each OECD banking sector, we are convinced that the data included almost exclusively comprise internationally operating banks.

$$y_{ijt} = a_{ij} + \sum \beta_k g_{ijt,k} + \beta_2 x_{ijt} + \mu_t + \varepsilon_{ijt}.$$

Y_{ijt} represents the log of total foreign claims by banks from OECD country i to all sectors of recipient emerging markets j in year t . The vector $g_{ijt,k}$ describes the gravity model which includes the log of GDP of the source and recipient country respectively as well as the log of distance between the capitals of both countries and a dummy variable that controls for the existence of a common official language. X_{ijt} either describes OECD countries' banking market structures, regulatory frameworks or banking systems' characteristics being employed in separate regressions. The variable a_{ij} represents country-pair random effects favoring or inhibiting cross-border lending between country-pairs; ε_{ijt} is the independent and identically distributed (iid) random error term. The model further includes time dummies μ_t to control for unobserved time-variant measures like expectations, trust and social attributes or common shocks, which are assumed to influence financial linkages between source and recipient countries over time. Moreover, to control for likely two-way error correlation across both the first and second country in our country-pairs, we employ the multi-clustering approach proposed by Cameron et al. (2009) and Cameron and Golotvina (2005) that enables us to include heteroskedastic-robust standard errors at the country-pair-level.

Estimating the model with random effects is a consequent strategy for two reasons. First, we discriminate between random and fixed effects by defining the target of inference (Wooldridge, 2002; Egger, 2002, 2000). A fixed effects model is more suitable if the data at hand is not sampled but almost covers the full population whereas random effects are more appropriate if the interest of inference relates to a population mean, i.e. units are viewed as sampled from an overall population as it is the case for our sample of source and recipient country-pairs. Thus, we are interested in the estimation of typical financial flows between a randomly drawn sample of countries rather than between an ex ante predetermined selection

of nations. Furthermore, employing the random-effects model is a consequent strategy for the study at hand since most variations should be observed over time and random effects allow for the inclusion of time-invariant variables among regressors like some important gravity elements as well as several measures of OECD banking markets' characteristics.

Second, from an econometric point of view, the issue of correlated errors is the key driver in discriminating between fixed and random effect models. The random effect assumption is that the individual specific effect is uncorrelated with the independent variables whereas the fixed effect assumes correlation between the individual effect and the exogenous measures. Since we include cluster-robust standard errors at the country-pair-level and the Hausman test (1978) is inappropriate under heteroscedasticity, we employ a generalization of the Hausman approach proposed by Arellano (1993) to test for the appropriateness of our model specification. Adopting this approach, the null hypothesis of "no correlation between the individual specific effect and the independent variables" cannot be rejected $p < 0.853$ suggesting that applying the random-effects model is appropriate for our analysis.

3. Empirical results

3.1. Baseline regressions

Regression results including gravity measures as well as different OECD banking markets' characteristics are reported in Table 4. Due to high correlations (Table 7) we include different banking market measures in turn in separate regressions.

To begin with, among the gravity variables both the source and recipient country's *GDP* enter each regression in Table 4 significantly positive at the one percent level respectively indicating that a prospering economy in both countries benefits cross-border bank lending which is in line with previous empirical studies by Papaioannou (2009), Alfaro et al. (2008) and Tornell and Velasco (1992). Moreover, since coefficient values of the recipient countries' *GDP* measure are systematically higher compared with the source country compan-

ion among all regressions, empirical results further suggests that an increase in the growth potential of the borrowing country may be a stronger determinant in explaining cross-border lending from OECD countries to emerging markets. Introducing *distance*, this variable turns out to be significantly negative at the one percent level throughout all regressions indicating a negative impact of an increase in geographical distance between two countries on the volume of cross-border lending. This result corresponds with empirical findings provided by Degryse and Ongena (2005) suggesting that the importance of distance might be due to rising information asymmetries, transaction costs and investment risk since geographical distance raises the difficulty to monitor creditors in more distant emerging markets. Taking into account the enormous advancements in the technology of communication, Buch (2005) additionally proposes that the negative effect of distance on international bank lending activities may also be a result of a possible home bias of lending banks. Finally, *linguistic ties* enters each regression in Table 4 significantly positive at the one percent level respectively suggesting that the presence of a common language in both countries favors bilateral bank lending to emerging markets. This result is in line with previous empirical findings (e.g. Papaioannou, 2009; Buch, 2005; Herrero and Pería, 2005; Stulz and Williamson, 2003) proposing that linguistic ties may diminish informational frictions for two reasons. First, the existence of a common language may reduce uncertainty and costs of communication during credit agreements. Second, ethnological ties may serve as a proxy for cultural proximity between two countries since sharing a common language regularly coincides with a common history and culture.

Turning to measures of OECD banking markets' structures presented in Table 4, *concentration* enters regression specification (1) significantly negative at the five percent level indicating that highly concentrated monopolistic banking systems in our sample do not engage in cross-border lending to emerging markets. Applying traditional industrial organization theory to banking, we suggest that granting monopolistic interest rates to local customers

prevents from operating cross-border in order to increase profitability and hence shareholder value (Repullo, 2004). Moreover, cross-border lending to emerging and frontier markets may not only be associated with higher expectations on investment returns but may also be accompanied by a higher level of investment risk resulting in higher “risk-return” patterns (Ongena et al., 2011; Buch et al., 2010a; Herrmann and Mihaljek, 2010). If this is true, our findings support theoretical assumptions on the “credit rationing” phenomenon (Cetorelli, 2004; Beck et al., 2000; Boot and Thakor, 2000) proposing that even monopolistic banks tend to limit credit risk by primarily selecting borrowers exhibiting the highest solvency (Boyd and Prescott; 1986; Ramakrishnan and Thakor, 1984). Since concentration and competition describe two different aspects in banking (even highly concentrated banking markets may be competitive) we further include *disintermediation* as a proxy for the level of competitive pressure in local mature banking markets induced by the capital market and the evolvement of non- or near-bank financial institutions (Claessens et al., 2006, 2001). As shown, the disintermediation measure enters regression specification (2) significantly positive at the one percent level. Hence, empirical evidence indicates that fiercer competition in OECD banking markets may encourage (or even force) domestic banks to stronger engage in cross-border lending in order to compensate declining domestic profit margins or diversify concentrated risk exposures. Thus, as many emerging countries have liberalized and deregulated own financial markets at the same time, banks from OECD countries may explore these new market niches and take advantage of resulting investment opportunities.

Addressing the regulatory endowment and in particular opportunities of regulatory arbitrage we distinguish between *de jure* and *de facto* regulatory arbitrage options resulting from a still disharmonized global transformation of the Basel II framework into national equity capital regulations on the one side and supervisory practices on the other side with regard to source and recipient countries in our sample (FSB, 2009). As shown, variables of *de jure* and *de facto* regulatory arbitrage enter regression specifications (3) and (4) significantly posi-

tive at the one percent level respectively. Thus, in line with Houston et al. (2009) we suggest that arbitraging on costs arising from different local regulatory requirements may be a determinant of cross-border lending to emerging markets. Moreover, as coefficients of both measures slightly differ in value, evidence suggests that de facto regulatory arbitrage may be, to a little extent, a stronger determinant for OECD country banks in our sample. Finally, introducing the *moral hazard index*, this variable turns out to be significantly positive at the one percent level in regression specification (5). Hence, evidence suggests that OECD country banking systems tend to stronger engage in more risky cross-border lending to emerging and frontier markets under a greater generosity of the local deposit insurance system. Our findings correspond with empirical results provided by Demirgüç-Kunt and Detragiache (2002) proposing that an explicit governmental deposit insurance may have a positive impact on higher risk-taking by banks.

Turning to OECD banking systems' attributes, *capital ratio* enters regression specification (6) significantly negative at the one percent level suggesting that better capitalized banking systems hold smaller amounts of foreign claims towards emerging countries. Our finding supports relevant empirical literature providing evidence that banks exhibiting higher capital buffers are less prone to risk taking ("charter value hypothesis", Keeley, 1990). As higher capital buffers and franchise values result in higher opportunity costs when going bankrupt, bank managers, or even more the bank's shareholders, may not accept risky investments towards less developed economies that could jeopardize their future profits (Hellmann et al., 2000). Introducing one period lagged *asset quality*, this variable enters regression specification (7) significantly positive at the five percent level indicating that OECD banking sectors exhibiting higher aggregated loan portfolio risks more intensively engage in cross-border lending. In addition, *profitability* enters regression specification (8) significantly negative at the one percent level whereas increasing *cost inefficiency* turns out to be significantly positive at the one percent level in regression (9). Thus, in line with the positive findings on moral

hazard empirical results indicate that “gambling for resurrection” (Rochet, 1992) by OECD banking systems may be a further significant determinant of cross-border lending to emerging markets.

3.2. Sensitivity analyses

3.2.1. *More-developed emerging markets and frontier markets*

In a first step, we investigate the sensitivity of our baseline results by splitting the entire sample into two subgroups of recipient countries in order to distinguish between foreign claims on more-developed emerging markets (MDEM) and frontier markets (FM) respectively (Table 5). While more-developed markets experience rapid economic growth and are becoming industrialized, frontier markets represent a subgroup of emerging markets which is investable but exhibits considerably higher risk-return patterns (Ongena et al., 2011; Buch et al., 2010b; Herrmann and Mihaljek, 2010). Thus, although 29 out of the 51 countries in our sample are classified as frontier markets, foreign claims on borrowers located in these markets exhibit a remarkably lower volume compared with the amount of cross-border lending to more-developed markets (Figure 1).

To begin with, compared to baseline regressions from Table 4 all gravity elements keep robust in signs and significances. However, since measures of *GDP*, *distance* and *linguistic ties* exhibit significantly higher coefficient values throughout all regressions on more-developed emerging markets compared with frontier markets evidence from subsample regressions further reveals that national income, geographical distance and cultural proximity tend to be stronger determinants of cross-border lending from OECD countries to more-developed emerging markets.

Turning to measures of OECD banking markets’ structures, *concentration* enters both regressions significantly negative at the ten and five percent level respectively. Since coefficient values in regressions on frontier markets turn out to be distinctly higher compared with

more-developed emerging markets, empirical results indicate that monopolistic banks primarily tend to ration credit supply for customers located in more risky frontier markets while debtors in economically prospering emerging countries may not face credit constraints of that strength. *Disintermediation* enters regressions on more-developed emerging markets significantly positive at the one percent level but remains insignificant within the frontier markets subsample. Hence, compared with baseline regressions from Table 4 empirical results further reveal that eroding local profit margins due to increasing competitive pressure may be compensated by exploring market niches in industrialized and rapidly economically growing more-developed emerging market whereas we do not find any significant evidence on this strategy with regard to frontier markets. The latter may be due to the fact that lending banks may face a trade-off between high risk and high return when lending to these markets.

Addressing *de jure and de facto regulatory arbitrage* both variables enter respective regressions significantly positive with coefficient values of de facto arbitrage being higher compared to the de jure measure which is in line with baseline findings. However, since coefficient values of the de facto arbitrage variable exhibit systematically higher values as against values of de jure arbitrage in each subsample regression, empirical results reveal that arbitraging on costs arising from different local regulatory requirements in the source and recipient country turn out to be considerably stronger accelerators of cross-border lending from OECD markets to frontier markets as compared with more-developed emerging countries. Thus, empirical results confirm that even though most of the frontier markets included in our sample have adopted the Basel II framework, a fully-fledged global harmonization of formal banking regulation rules and cross-border coordination of national banking supervisors has by no means been achieved yet which in particular is true for frontier markets. Introducing the *moral hazard index* this variable enters both subsample regressions significantly positive at the one percent level respectively while a considerably higher coefficient value is observed for the regression including frontier markets. Hence, in line with previous findings we suggest

that the threat of excessive risk-taking induced by a greater generosity of the local deposit insurance regime is more likely for higher risk-return credit agreements with borrowers located in more risky frontier markets.

Turning to OECD banking systems' attributes, *capital ratio* enters both subsample regressions significantly negative at the one percent level. However, though reconfirming baseline findings coefficient values turn out to be slightly higher with regard to the frontier markets subsample. Thus, evidence tends to support theoretical arguments and previous empirical findings suggesting that banks exhibiting higher capital buffers are less prone to risk taking which in particular holds for more risky credit investments towards frontier markets. Finally, signs and significances remain robust for measures of the OECD banking sectors' *asset quality*, *profitability* and *cost inefficiency* as compared with baseline regressions. However, since coefficient values are observed to be noticeably higher for regressions employing the frontier markets subsample, empirical results correspond with positive findings on moral hazard and thus, reveal that "gambling for resurrection" by OECD country banks may be a stronger determinant of cross-border lending to more risky frontier markets.

3.2.2. *Common lender relationship*

In a second step, we investigate the sensitivity of our baseline results by splitting the entire sample into two subgroups in order to distinguish between cross-border lending during a "common lender relationship" (CL) and those foreign claims growing without a common lender association (NCL) (Table 6). We define a "common lender" to be an OECD creditor country being most exposed to respective recipient emerging countries in our sample. Since it is assumed that a common lender may exhibit economies of scope and scale in cross-border lending, resulting in a decrease in information asymmetries, transaction costs and hence investment risk, we expect further important insights concerning the explanatory power of

OECD banking markets' characteristics employed. Figure 2 illustrates the development of the share of foreign claims on emerging markets that share a common lender in our sample.

To begin with, as Table 6 reports, each gravity element keeps robust in sign and significance compared with our baseline regressions. However, empirical results further reveal that source and recipient country *GDP* as well as *geographical distance* exhibit distinctly higher coefficient values with regard to the non-common lender subsample. In contrast, coefficient values of *linguistic ties* are observed to be considerably higher with regard to the common-lender subsample throughout all regressions.

Turning to measures of OECD banking markets' structures, *concentration* enters regressions on the common lender subsample significantly positive at the five percent level whereas this measure turns out to be significantly negative at the one percent level with regard to the non-common lender subsample. Hence, evidence from subsample regressions does not confirm baseline results from Table 4 but rather indicates that monopolistic OECD banking sectors may ration credit supply towards emerging markets if no common lender linkage exists whereas they may actually do engage in cross-border lending if they act as a common lender towards recipient countries. The latter might be traced back to the fact that credit rationing becomes less severe during a common lender relationship which is assumed to induce a decrease in information asymmetries, transaction costs and hence investment risk. From this point of view, results correspond with findings from previous sensitivity analyses in Table 5 suggesting that that monopolistic OECD banking sectors primarily tend to ration credit supply for customers located in more risky frontier markets. Similarly, *disintermediation* enters both subsample regressions significantly positive at the one percent level respectively confirming baseline findings. However, a higher coefficient value observed for the common lender subsample indicates that cross-border lending due to increasing competitive pressure in domestic markets is spurred by benefits of common lender linkages. Moreover, transferring parts of the credit business to markets that are linked to the home country in order to strengthen the rela-

tionship to familiar customers and increase customer loyalty has turned out to be a promising investment under increasing market competition.

Addressing *de jure regulatory arbitrage*, this variable enters the non-common lender subsample regression significantly positive at the weak ten percent level whereas we do not find any empirical evidence with regard to the common lender subsample. As compared to findings from our baseline regression, a slightly lower coefficient value of the arbitrage measure indicates that cross-border claims towards emerging markets without a common lender association may be benefited by *de jure regulatory arbitrage*, however on a considerably lower level. In contrast, *de facto regulatory arbitrage* turns out to be significantly positive at the one percent level in both subsample regressions with a higher coefficient value observed for cross-border lending under the framework of a common lender relationship. Since common lender commitments are assumed to describe long-term linkages between OECD source and emerging recipient countries we suggest that the common lender may be more able to realize and explore regulatory gaps in recipient countries' supervisory frameworks. Introducing the *moral hazard index* this variable enters the non-common lender subsample regression significantly positive at the one percent level whereas we do not provide any empirical evidence for an impact of moral hazard on cross-border lending under a common-lender relationship. Hence, taking into account that investment risk is assumed to decrease during a common lender relationship we suggest that the threat of excessive risk-taking induced by a greater generosity of the local deposit insurance regime is more likely beyond common lender commitments. From this point of view, empirical results additionally reconfirm findings from previous sensitivity analyses in Table 5 suggesting that moral hazard is predominantly associated with cross-border lending to more risky frontier markets.

Turning to OECD banking systems' characteristics, *capital ratio* enters the common lender subsample regression significantly positive at the five percent level whereas it turns out to be significantly negative at the one percent level with regard to the non-common lender

subsample. Thus, in line with previous findings on the impact of common lender linkages on risk taking in cross-border lending empirical results indicate that better capitalized OECD banking sectors avoid risky credit investments by channeling cross-border claims towards markets they are most exposed to. Finally, just with regard to the non-common lender subsample *asset quality*, *profitability* and *cost efficiency* keep respective signs and remain robust compared with baseline regressions. Furthermore, since considerably higher coefficient values are observed for each measure, we find that gambling for resurrection may be a stronger determinant when cross-border lending beyond a common lender relationship. While the latter is in line with previous positive findings on moral hazard we do not provide any conclusive evidence as regards the common lender subsamples. Though reverse signs of the asset quality and profitability measure may suggest that cross-border claims from common lenders may not be affected by moral hazard problems and gambling for resurrection, missing significances for these measures do not statistically support this conclusion.

4. Conclusion

Employing data on bank claims from 13 OECD countries vis-à-vis 51 emerging markets between 1993 and 2007 this study investigates further determinants of cross-border lending by analyzing the source countries' banking market structure, regulatory framework and banking sector characteristics.

Results from baseline regressions initially suggest that monopolistic banks from OECD countries tend to ration credit to emerging markets whereas increasing competitive pressure may spur cross-border bank lending. Furthermore, evidence indicates that banks may arbitrage on costs arising from different regulatory requirements and may be more prone to higher risk-taking under a greater generosity of the local deposit insurance system. Finally, while higher capital buffers may act as an impediment to cross-border lending, pursuing a

“gambling for resurrection” strategy tends to have a positive impact on the volume of OECD bank claims towards emerging markets.

Additional sensitivity analyses reveal further important insights concerning the explanatory power of the determinants employed. Thus, splitting the entire data into subsamples of more-developed emerging markets and frontier markets, we find that credit rationing is less likely for more-developed emerging markets additionally benefitting from an increasing competitive pressure in domestic OECD source country banking markets. In contrast, evidence suggests that regulatory arbitrage options, the moral hazard phenomenon as well as gambling for resurrection are stronger determinants of cross-border lending to more risky frontier markets. Furthermore, investigating common lender and non-common lender relationships separately, we find that credit rationing by monopolistic OECD banks is less likely under a common lender commitment while the positive impact of competitive pressure on cross-border lending increases under a common lender linkage. In contrast, evidence from subsample regressions further indicates that regulatory arbitrage, moral hazard in banking and gambling for resurrection strategies may be stronger determinants of bank claims towards emerging markets beyond a common lender relationship.

Against this background the analysis at hand complements and extends previous studies by providing evidence on a variety of further important source country banking market characteristics. Accordingly, our analysis conveys important implications for both home-country competition policy and banking regulation issues. Nevertheless, expanding our sample by the global financial crisis years 2008-2010 in order to investigate how significances and the explanatory power of each determinant react during this specific time-period, will be object of future research.

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Statistical appendix

Figure 1
Amount of foreign claims on more-developed emerging and frontier markets by year

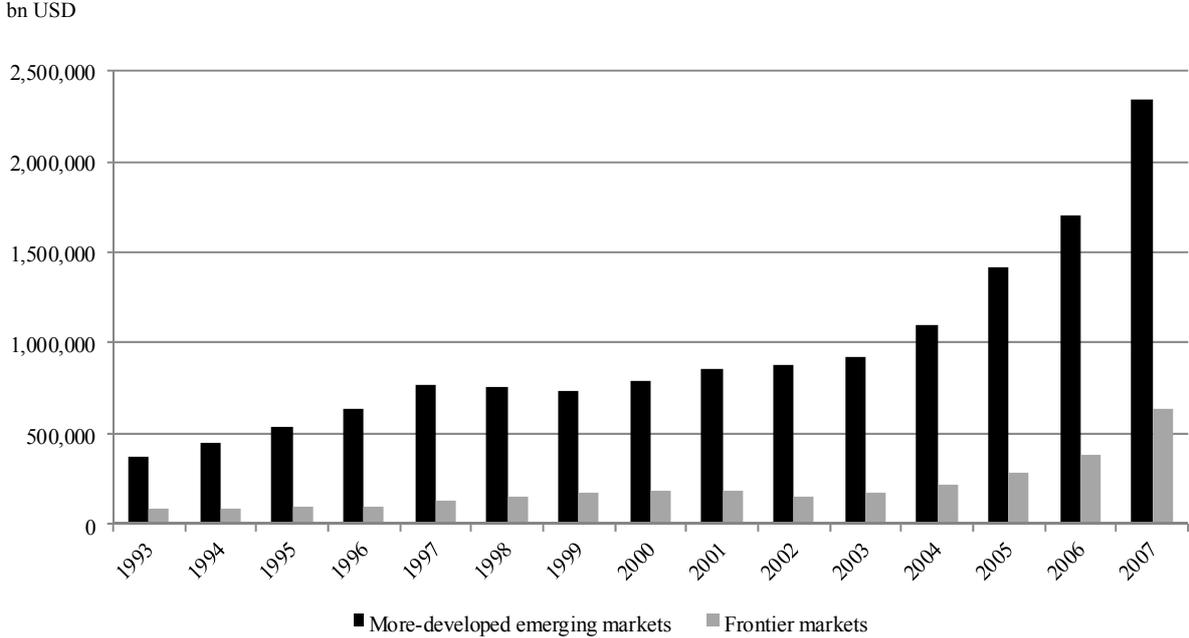


Figure 2
Share of foreign claims based on a “common lender relationship”

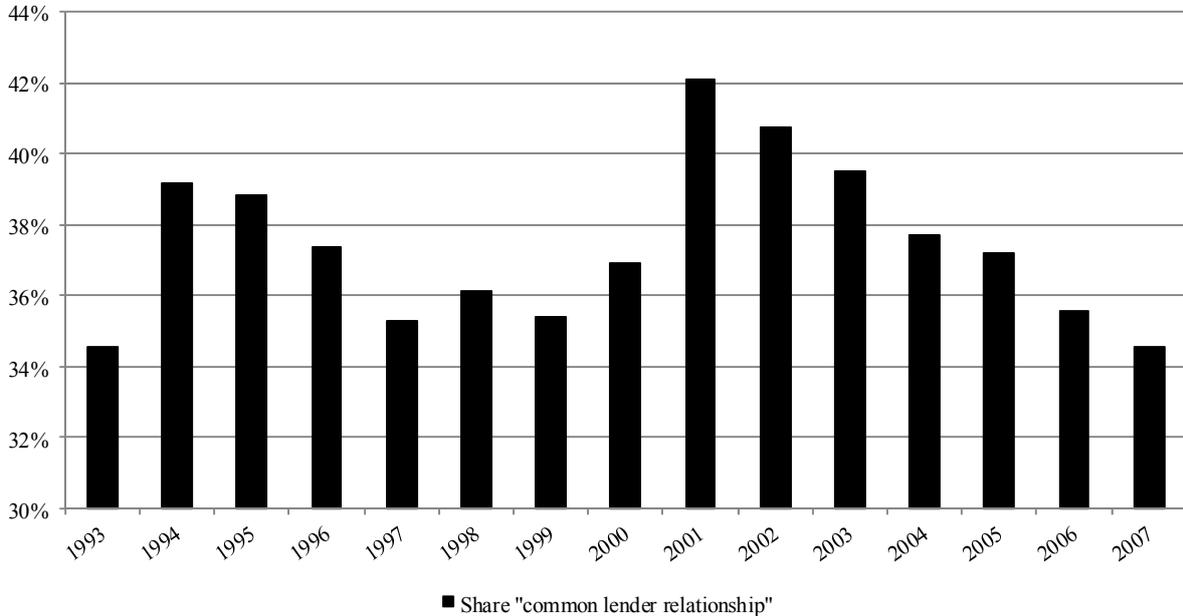


Table 1
Included source and recipient countries

OECD source country			Recipient country (emerging market)	
Name	Percentage coverage of foreign claims ^a	Number of reporting banks at end-2007 ^a	More-developed emerging markets ^b	Frontier markets ^b
Austria	nearly 100 %	57	Brazil	Argentina
Belgium	100 %	102	Chile	Bahrain
Finland	nearly 100 %	6	China	Botswana
France	nearly 100 %	347	Colombia	Bulgaria
Germany	nearly 100 %	2,000	Czech Republic	Croatia
Italy	100 %	806	Egypt	Estonia
Japan	nearly 100 %	158	Hungary	Ghana
Netherlands	100 %	101	India	Jamaica
Spain	nearly 100 %	177	Indonesia	Jordan
Sweden	nearly 100 %	11	Israel	Kazakhstan
Switzerland	approx. 95 %	60	Malaysia	Kenya
United Kingdom	98 %	190	Mexico	Kuwait
United States	nearly 100 %	150	Morocco	Lebanon
			Peru	Lithuania
			Philippines	Mauritius
			Poland	Nigeria
			Russia	Oman
			South Africa	Pakistan
			South Korea	Qatar
			Taiwan	Romania
			Thailand	Trinidad and Tobago
			Turkey	Saudi Arabia
				Serbia
				Slovenia
				Sri Lanka
				Tunisia
				Ukraine
				United Arab Emirates
				Vietnam

Notes: ^a BIS (2008b), pp. 35-39; ^b Classification according to MSCI Barra as of April 2009.

Table 2
Notes on variables and data sources

Variable	Definition	Source
Foreign claims (i, j, t)	Log of the sum of the OECD source country banking systems' cross-border claims on recipient countries in all currencies as well as local claims of their foreign affiliates in foreign and local currency.	Consolidated Banking Statistics (BIS)
GDP (i, t)	Log of the source country's GDP.	World Development Indicators (WDI)
GDP (j, t)	Log of the recipient country's GDP.	World Development Indicators (WDI)
Distance (i, j, t)	Log of the distance between the capitals of the source and recipient country.	CEPII Distance Database
Linguistic ties (i, j, t)	Dummy variable that takes on the value of one if the borrowing country shares a common language with the lending country.	CIA World Factbook
Concentration (i, t)	Fraction of assets of a source country's total banking system's assets held by the largest 5 domestic banks.	BankScope, own calc.
Disintermediation (i, t)	Proxy for the development of the source country's capital market. Proportion of the banking sector assets to stock market capitalization.	Beck et al. (2000)
Regulatory arbitrage (de jure) (i, j, t)	Difference between the source and recipient country's capital regulatory index (absolute index values). The index is built of initial capital stringency and overall capital stringency and thus, captures certain information as to (1) whether the bank capital requirements reflect risk elements, (2) if market value losses are to be deducted prior to the calculation of the capital adequacy ratio, and (3) which types of funds may be employed to establish a bank. The index reaches from 0 to 3 with higher index values indicating greater capital stringency. Data combined from three World Bank Surveys on Bank Regulation and Supervision conducted in 1997, 2001 and 2005.	Barth et al. (2008)

Table 2
Notes on variables and data sources (cont.)

Variable	Definition	Source
Regulatory arbitrage (de facto) (i, j, t)	Difference between the source and recipient country's strength of external audit (absolute index values). The index adds the value of one for an affirmative answer to each of the following questions: 1) Is an external audit required?; 2) Are specific requirements for the extent or nature of the audit spelled out?; 3) Are auditors licensed or certified?; 4) Do supervisors receive a copy of the auditor's report?; 5) Can supervisors meet with auditors without prior approval by the bank?; 6) Are auditors legally required to report bank misconduct to supervisors?; 7) Can supervisors take legal action against external auditors? The index ranges from 0 to 7 with higher index values indicating greater strength of external auditing. Data combined from three World Bank Surveys on Bank Regulation and Supervision conducted in 1997, 2001 and 2005.	Barth et al. (2008)
Moral hazard index (i, t)	Index that measures the generosity of the deposit insurance regime. Index is built by first principal component analysis of the following deposit insurance design features: coinsurance, coverage of foreign currency and interbank deposits, type of funding, source of funding, management, membership, and the level of explicit coverage. Higher index values indicate greater moral hazard.	Demirgüç-Kunt and Detragiache (2002); Barth et al. (2008)
Capital ratio (i, t)	Ratio of the source country banking system's equity capital to total assets.	BankScope
Asset quality $(i, t-1)$	Lag (1) of the log of the source country banking system's loan loss provisions.	BankScope
Profitability (i, t)	Return on average assets before taxes (ROAA) of the source country's banking system.	BankScope
Cost efficiency $(i, t-1)$	Lag (1) of the source country banking system's cost to income ratio.	BankScope

Table 2
Notes on variables and data sources (cont.)

Variable	Definition	Source
More developed emerging markets (MDEM)	Dummy variable that takes on the value of one if the recipient country is classified as a more-developed emerging market; zero otherwise.	MSCI Barra
Frontier markets (FM)	Dummy variable that takes on the value of one if the recipient country is classified as a frontier market; zero otherwise.	MSCI Barra
Common lender relationship (CL) _(i,j)	Dummy variable that takes on the value of one if the source country is a common lender for the recipient country; zero otherwise.	Own calc.
No common lender relationship (NCL) _(i,j)	Dummy variable that takes on the value of one if the source country is not a common lender for the recipient country; zero otherwise.	Own calc.

Table 3
Descriptive statistics

Variable	N	Mean	SD	Min	Max
Log of foreign claims $_{(i,j,t)}$	9,158	5.3341	2.4010	0	11.8293
Log of GDP $_{(i,t)}$	9,945	13.4593	1.2858	11.4040	16.2634
Log of GDP $_{(j,t)}$	9,763	10.8001	1.4456	8.0593	14.6761
Log of distance $_{(i,j,t)}$	9,945	8.4370	0.8691	4.4214	9.8189
Linguistic ties $_{(i,j,t)}$	9,945	0.0664	0.2489	0	1
Concentration $_{(i,t)}$	9,945	0.6929	0.1360	0.4085	0.9523
Disintermediation $_{(i,t)}$	9,945	0.8894	0.5974	0.1304	3.0344
Regulatory arbitrage (de jure) $_{(i,j,t)}$	8,280	-0.1812	2.6176	-1	3
Regulatory arbitrage (de facto) $_{(i,j,t)}$	9,360	-0.1314	1.4968	-1	6
Moral hazard index $_{(i,t)}$	7,650	0.256	2.899	-4.907	5.623
Capital ratio $_{(i,t)}$	9,894	4.5789	1.5027	2.5100	9.7500
Asset quality $_{(i,t-1)}$	9,027	7.8312	1.7089	2.8332	12.0792
Profitability $_{(i,t)}$	9,894	0.4765	0.3677	-0.8600	1.4300
Cost efficiency $_{(i,t-1)}$	9,231	63.9128	8.0693	43.8300	95.4300
More-developed emerging mar- kets (MDEM)	9,945	0.4314	0.4953	0	1
Frontier markets (FM)	9,945	0.5686	0.4953	0	1
Common lender relationship (CL)	9,945	0.0587	0.2351	0	1
No common lender relationship (NCL)	9,945	0.9413	0.2351	0	1

Table 4
Baseline regressions

	(1)	(2)	(3)	(4)	(5)
GDP _(i, t)	0.7651 *** (0.0519)	0.8159 *** (0.0456)	0.9179 *** (0.0475)	0.8532 *** (0.0471)	0.8968 *** (0.0464)
GDP _(j, t)	0.9954 *** (0.0599)	0.9999 *** (0.0598)	1.0000 *** (0.0660)	1.0182 *** (0.0580)	0.9523 *** (0.0620)
Distance _(i, j, t)	-0.5066 *** (0.0773)	-0.5370 *** (0.0758)	-0.6235 *** (0.0806)	-0.5362 *** (0.0770)	-0.4818 *** (0.0816)
Linguistic ties _(i, j, t)	1.2498 *** (0.2362)	1.2098 *** (0.2434)	1.5023 *** (0.2756)	1.3138 *** (0.2643)	0.9442 *** (0.2200)
Concentration _(i, t)	-1.0636 ** (0.4837)				
Disintermediation _(i, t)		0.2076 *** (0.0708)			
Regulatory arbitrage (de jure) _(i, j, t)			0.0712 *** (0.0261)		
Regulatory arbitrage (de facto) _(i, j, t)				0.0965 *** (0.0240)	
Moral hazard index _(i, j, t)					0.4845 *** (0.0759)
Time dummies	yes	yes	yes	yes	yes
Cluster country-pair	yes	yes	yes	yes	yes
Country-pair random effects	yes	yes	yes	yes	yes
No. of obs.	8,993	8,993	7,457	8,464	6,911
No. of groups	654	654	545	615	505
Adj. R ²	0.50	0.49	0.51	0.50	0.55

Notes: The panel model estimated is Foreign claims_(i=source country, j=recipient country, t=time) = $\alpha_{ij} + \beta_1 \text{GDP}_{i,t} + \beta_2 \text{GDP}_{j,t} + \beta_3 \text{Distance}_{i,j,t} + \beta_4 \text{Linguistic ties}_{i,j,t} + \mu_i + \epsilon_{i,j,t}$. OECD banking markets' characteristics are included in regressions (1)-(9). Constant term included but not reported. Country-pair heteroskedastic-robust standard errors are in parenthesis. ***, **, * statistically significant at the 1, 5 and 10% level.

Table 4
Baseline regressions (cont.)

	(6)	(7)	(8)	(9)
GDP _(i, t)	0.8717 *** (0.0458)	0.7810 *** (0.0472)	0.8099 *** (0.0456)	0.8384 *** (0.0439)
GDP _(j, t)	1.0070 *** (0.0552)	1.0215 *** (0.0557)	1.0027 *** (0.0580)	1.0282 *** (0.0513)
Distance _(i, j, t)	-0.5360 *** (0.0732)	-0.5438 *** (0.0758)	-0.5305 *** (0.0743)	-0.5505 *** (0.0739)
Linguistic ties _(i, j, t)	1.3329 *** (0.2345)	1.3488 *** (0.2352)	1.3597 *** (0.2371)	1.3370 *** (0.2413)
Capital ratio _(i, t)	-0.1316 *** (0.0254)			
Asset quality _(i, t-1)		0.0624 ** (0.0253)		
Profitability _(i, t)			-0.3509 *** (0.0755)	
Cost efficiency _(i, t-1)				0.0144 *** (0.0033)
Time dummies	yes	yes	yes	yes
Cluster country-pair	yes	yes	yes	yes
Country-pair random effects	yes	yes	yes	yes
No. of obs.	8,948	8,233	8,948	8,405
No. of groups	654	654	654	654
Adj. R ²	0.52	0.50	0.50	0.51

Table 5
More-developed emerging and frontier markets

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)
	MDEM	FR								
GDP _(i,t)	0.9154 *** (0.0706)	0.6599 *** (0.0717)	0.9201 *** (0.0619)	0.7496 *** (0.0630)	1.0406 *** (0.0604)	0.8229 *** (0.0706)	0.9529 *** (0.0628)	0.8669 *** (0.0731)	1.0068 *** (0.0613)	0.8228 *** (0.0644)
GDP _(j,t)	0.8674 *** (0.1026)	0.7531 *** (0.1235)	0.8712 *** (0.1012)	0.7604 *** (0.1241)	0.8442 *** (0.1042)	0.8066 *** (0.1394)	0.9655 *** (0.0861)	0.7947 *** (0.1232)	0.8776 *** (0.0993)	0.7176 *** (0.1307)
Distance _(i,j,t)	-0.4128 *** (0.0985)	-0.5822 *** (0.1061)	-0.4221 *** (0.1004)	-0.6443 *** (0.0991)	-0.5089 *** (0.0965)	-0.7390 *** (0.1142)	-0.4507 *** (0.0980)	-0.6279 *** (0.1090)	-0.3613 *** (0.1044)	-0.5982 *** (0.1081)
Linguistic ties _(i,j,t)	1.3540 *** (0.3641)	1.2341 *** (0.2899)	1.3020 *** (0.3816)	1.2247 *** (0.3037)	1.6564 *** (0.3923)	1.5264 *** (0.3429)	1.5159 *** (0.4171)	1.3318 *** (0.3381)	1.1678 *** (0.2497)	0.6493 *** (0.2810)
Concentration _(i,t)	-0.1711 * (0.6291)	-1.7254 ** (0.7021)								
Disintermediation _(i,t)			0.2713 *** (0.0889)	0.1528 (0.1068)						
Regulatory arbitrage (de jure) _(i,j,t)					0.0104 *** (0.0371)	0.1027 * (0.0359)				
Regulatory arbitrage (de facto) _(i,j,t)							0.0584 ** (0.0248)	0.3971 *** (0.0755)		
Moral hazard index _(i,j,t)									0.3906 *** (0.1001)	0.5537 *** (0.1071)
Time dummies	yes									
Cluster country-pair	yes									
Country-pair random effects	yes									
No. of obs.	4,211	4,782	4,211	4,782	3,701	3,756	4,016	4,448	3,221	3,690
No. of groups	286	368	286	368	252	293	273	342	220	285
Adj. R ²	0.46	0.34	0.47	0.33	0.52	0.34	0.48	0.35	0.56	0.41

Notes: The regression model and statistical parameters are described in Table 4. Abbreviations: MDEM: More-developed emerging markets, FM: Frontier markets.

Table 5
More-developed emerging and frontier markets (cont.)

	(6a)	(6b)	(7a)	(7b)	(8a)	(8b)	(9a)	(9b)
	MDEM	FR	MDEM	FR	MDEM	FR	MDEM	FR
GDP _(i,t)	0.9840 *** (0.0611)	0.7969 *** (0.0636)	0.9005 *** (0.0634)	0.6997 *** (0.0645)	0.9247 *** (0.0627)	0.7362 *** (0.0621)	0.9355 *** (0.0599)	0.7732 *** (0.0602)
GDP _(j,t)	0.8796 *** (0.0919)	0.7650 *** (0.1168)	0.8776 *** (0.0898)	0.7791 *** (0.1202)	0.8781 *** (0.0968)	0.7576 *** (0.1220)	0.8900 *** (0.0892)	0.7881 *** (0.1118)
Distance _(i,j,t)	-0.4176 *** (0.0955)	-0.6429 *** (0.0966)	-0.4240 *** (0.0999)	-0.6436 *** (0.1014)	-0.4166 *** (0.0975)	-0.6354 *** (0.0976)	-0.4308 *** (0.0987)	-0.6448 *** (0.0991)
Linguistic ties _(i,j,t)	1.4283 *** (0.3670)	1.3320 *** (0.2911)	1.4201 *** (0.3620)	1.3621 *** (0.2957)	1.4393 *** (0.3621)	1.3716 *** (0.2992)	1.4278 *** (0.3759)	1.3306 *** (0.2990)
Capital ratio _(i,t)	-0.1254 *** (0.0312)	-0.1315 *** (0.0402)						
Asset quality _(i,t-1)			0.0441 * (0.0300)	0.0739 * (0.0390)				
Profitability _(i,t)					-0.3169 *** (0.0859)	-0.3791 *** (0.1286)		
Cost efficiency _(i,t-1)							0.0098 ** (0.0040)	0.0188 *** (0.0052)
Time dummies	yes							
Cluster country-pair	yes							
Country-pair random effects	yes							
No. of obs.	4,189	4,759	3,825	4,408	4,189	4,759	3,911	4,494
No. of groups	286	368	286	368	286	368	286	368
Adj. R ²	0.49	0.36	0.46	0.34	0.47	0.34	0.47	0.36

Notes: The regression model and statistical parameters are described in Table 4. Abbreviations: MDEM: More-developed emerging markets, FM: Frontier markets.

Table 6
Common lender relationship

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)
	CL	NCL								
GDP _(i,t)	0.7004 *** (0.1153)	0.7235 *** (0.0538)	0.6743 *** (0.1289)	0.7750 *** (0.0472)	0.7169 *** (0.1190)	0.8834 *** (0.0499)	0.7681 *** (0.1420)	0.8115 *** (0.0492)	0.7487 *** (0.1267)	0.8745 *** (0.0477)
GDP _(j,t)	0.7127 *** (0.1639)	0.9382 *** (0.0648)	0.7421 *** (0.1636)	0.9444 *** (0.0645)	0.6822 *** (0.1510)	0.9397 *** (0.0725)	0.7587 *** (0.1220)	0.9578 *** (0.0629)	0.9067 *** (0.1042)	1.1408 *** (0.0655)
Distance _(i,j,t)	-0.5239 *** (0.1858)	-0.2719 *** (0.0828)	-0.5623 *** (0.1949)	-0.3066 *** (0.0811)	-0.4315 *** (0.1812)	-0.3771 *** (0.0906)	-0.5794 *** (0.1875)	-0.3038 *** (0.0823)	-1.0534 *** (0.1516)	-0.2311 *** (0.0834)
Linguistic ties _(i,j,t)	2.3392 *** (0.4921)	1.0974 *** (0.2230)	2.5342 *** (0.5385)	1.0509 *** (0.2332)	2.1550 *** (0.5213)	1.2712 *** (0.2753)	2.7854 *** (0.5954)	1.1316 *** (0.2555)	1.7509 *** (0.1362)	0.9500 *** (0.2182)
Concentration _(i,t)	1.9164 ** (0.8231)	-1.4409 *** (0.4802)								
Disintermediation _(i,t)			0.5530 *** (0.2093)	0.2288 *** (0.0733)						
Regulatory arbitrage (de jure) _(i,j,t)					0.0862 (0.0569)	0.0448 * (0.0264)				
Regulatory arbitrage (de facto) _(i,j,t)							0.1995 *** (0.0389)	0.0832 *** (0.0256)		
Moral hazard index _(i,j,t)									0.1817 (0.1910)	0.5178 *** (0.0764)
Time dummies	yes									
Cluster country-pair	no									
Country-pair random effects	yes									
No. of obs.	574	8,419	574	8,419	559	6,898	559	7,905	364	6,547
No. of groups	39	616	39	616	38	508	38	578	25	481
Adj. R ²	0.62	0.47	0.60	0.47	0.62	0.48	0.62	0.47	0.68	0.54

Notes: The regression model and statistical parameters are described in Table 4. Abbreviations: CL: “Common lender relationship”; NCL: No “common lender relationship”.

Table 6
Common lender relationship (cont.)

	(6a)	(6b)	(7a)	(7b)	(8a)	(8b)	(9a)	(9b)
	CL	NCL	CL	NCL	CL	NCL	CL	NCL
GDP _(i,t)	0.6680 *** (0.1244)	0.8501 *** (0.0469)	0.7030 *** (0.1499)	0.7403 *** (0.0482)	0.7109 *** (0.1083)	0.7728 *** (0.0475)	0.6252 *** (0.1176)	0.8026 *** (0.0448)
GDP _(j,t)	0.7444 *** (0.1561)	0.9552 *** (0.0584)	0.7325 *** (0.1569)	0.9650 *** (0.0589)	0.7317 *** (0.1557)	0.9485 *** (0.0625)	0.6996 *** (0.1468)	0.9750 *** (0.0532)
Distance _(i,j,t)	-0.5279 *** (0.1774)	-0.3166 *** (0.0764)	-0.4798 *** (0.1893)	-0.3058 *** (0.0807)	-0.5116 *** (0.1757)	-0.3109 *** (0.0789)	-0.4418 *** (0.1717)	-0.3175 *** (0.0785)
Linguistic ties _(i,j,t)	2.2319 *** (0.4958)	1.1867 *** (0.2205)	2.4439 *** (0.5665)	1.2104 *** (0.2251)	2.2795 *** (0.4910)	1.2252 *** (0.2269)	2.3408 *** (0.5071)	1.1849 *** (0.2307)
Capital ratio _(i,t)	0.1747 ** (0.0742)	-0.1581 *** (0.0235)						
Asset quality _(i,t-1)			-0.1320 (0.1293)	0.0697 *** (0.0238)				
Profitability _(i,t)					0.4181 * (0.0859)	-0.4053 *** (0.1286)		
Cost efficiency _(i,t-1)							-0.0107 (0.0133)	0.0144 *** (0.0033)
Time dummies	yes							
Cluster country-pair	no							
Country-pair random effects	yes							
No. of obs.	571	8,377	533	7,699	571	8,377	537	7,867
No. of groups	39	616	39	615	39	616	39	615
Adj. R ²	0.58	0.50	0.59	0.47	0.60	0.48	0.59	0.49

Notes: The regression model and statistical parameters are described in Table 4. Abbreviations: CL: “Common lender relationship”; NCL: No “common lender relationship”.

Table 7
Correlation matrix

	GDP _(i,t-1)	GDP _(j,t-1)	Distance _(i,j)	Linguistic ties _(i,j)	Concentration _(i,t)	Disintermediation _(i,t)	Regulatory arbitrage (de jure) _(i,j,t)	Regulatory arbitrage (de facto) _(i,j,t)	Moral hazard index _(i,t)	Capital ratio _(i,t)	Asset quality _(i,t-1)	Profitability _(i,t)	Cost efficiency _(i,t-1)
GDP _(i,t)	1.00												
GDP _(j,t)	0.01	1.00											
Distance _(i,j)	0.24***	0.20***	1.00										
Linguistic ties _(i,j)	0.17***	-0.08***	0.10***	1.00									
Concentration _(i,t)	-0.39***	0.01	0.03***	-0.09***	1.00								
Disintermediation _(i,t)	-0.01	0.03***	0.05***	0.13***	0.09***	1.00							
Regulatory arbitrage (de jure) _(i,j,t)	-0.09***	0.08***	-0.03***	-0.05***	0.01	0.04***	1.00						
Regulatory arbitrage (de facto) _(i,j,t)	-0.26***	-0.14***	-0.11***	-0.03***	0.21***	0.09***	0.03***	1.00					
Moral hazard index _(i,t)	0.01	0.01	-0.10***	-0.09***	-0.19***	-0.52***	0.08***	0.09***	1.00				
Capital ratio _(i,t)	0.25***	0.02	0.10***	0.14***	-0.33***	0.09***	0.05***	-0.18***	-0.44***	1.00			
Asset quality _(i,t-1)	0.38***	0.01	0.03***	-0.05***	-0.01	-0.27***	0.01	-0.11***	0.08***	-0.33***	1.00		
Profitability _(i,t)	-0.01	0.03***	0.03**	0.17***	-0.03***	0.38***	0.05***	-0.05***	-0.45***	0.61***	-0.55***	1.00	
Cost efficiency _(i,t-1)	-0.18***	-0.03**	-0.14***	-0.11***	-0.14***	-0.16***	0.03***	0.21***	0.43***	-0.44***	0.16***	-0.43***	1.00