Bank Lending to Emerging Markets: Empirical Evidence on Country-level and Bank-specific Determinants

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Abstract: Using data on 13 OECD and 51 emerging markets between 1993 and 2007, this study investigates country-level and bank-specific determinants of foreign bank lending. We provide empirical evidence that both the macroeconomic and institutional environment are strong determinants of foreign bank lending to emerging markets. Among lending banks characteristics, bank size positively affects the volume of foreign claims whereas bank capitalization, profitability and efficiency have a negative impact. Controlling for structural breaks in our time series, we further provide empirical evidence that the impact of macroeconomic and bank-specific determinants significantly changes with regard to different time periods.

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1. Introduction

The incentive for OECD country banks to increasingly engage in cross-border lending activities primarily results from challenges in domestic credit markets being provoked by the ongoing process of globalization since the late 1980s which has induced fiercer competition in local banking markets and hence, has led to decreasing profit margins. However, as emerging markets have begun to eliminate trade barriers as well as capital controls and have started liberalizing financial markets at the same time, banks from industrialized countries have taken advantage of new investment opportunities to evade the challenges in own local markets. As a consequence, international bank lending to emerging markets by OECD country banks has sharply increased since the beginning of the 1990s. While foreign claims on emerging markets added up to 464 bn USD in 1993, their amount grew roughly seven-fold to 3,073 bn USD in 2007 (BIS, 2008a). However, foreign claims are not evenly distributed among emerging markets. International lending is most pronounced in Asia, followed by Middle and Eastern Europe as well as Latin America. In contrast, Africa amongst countries in the Middle East does not attract international capital flows from foreign banks in the first place (Jeanneau and Micu, 2002).

From a theoretical perspective, an increase in bank lending from mature to emerging markets is suggested by the neoclassical *Heckscher-Ohlin model* predicting that capital may flow from rich to poor countries due to local differentials in the marginal product of capital. While industrialized countries are capital-abundant in comparison to poor countries, the returns to capital are higher in developing countries due to greater unexploited investment opportunities. Assuming this coherency to be true, arbitrage in terms of capital flows from rich countries will benefit poor countries since the access to financial resources will provide an opportunity to develop local physical capital and hence increase income. Assumptions of the neoclassical growth model, however, are strong since this model disregards transaction costs and the institutional framework. Thus, motivated by the "Lucas Paradox" (Lucas, 1990),

a growing strand of empirical research has focused on the role of country-level characteristics (the macroeconomic endowment, the legal and institutional framework) and has elaborated several important determinants which help better explain uneven flows of international bank lending between rich and poor countries (e.g. Papaioannou, 2009; Alfaro et al., 2008; Lane and Milesi-Ferretti, 2008). In contrast, to the best of our knowledge, there is no empirical study that has investigated the impact of the lending banks' specific characteristics on international lending yet. However, controlling for bank-specific characteristics is likewise important since the neoclassical growth model not only disregards transaction costs and institutions but also assumes the bank to act as a "black box of production functions" and hence fails to explain different business and investment strategies.

Against this background, our analysis extends previous studies since we provide empirical evidence for an impact of different lending bank-specific characteristics on international bank flows to emerging markets. Moreover, controlling for structural breaks in our time series we find that the role of the macroeconomic endowment and different bank-specific characteristics on foreign bank lending changes with regard to different periods in time.

The remainder of this paper is organized as follows. Section 2 presents related literature on country-level determinants of international bank lending. Section 3 initially describes our dataset and introduces our empirical model and strategy. Empirical results are presented and discussed in Section 4. Finally, Section 5 concludes.

2. Related literature

Our paper is related to previous empirical research on the determinants of international bank lending. Although some kind of analogy to research on foreign direct investment (FDI) does exist, the number of studies explicitly dealing with financial claims is still small.

To begin with, using data on 40 lending and 140 recipient countries for the period from 1984 to 2002 Papaioannou (2009) provides empirical evidence that underperforming institutions, i.e. weak property rights, legal inefficiency 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) provide empirical evidence 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 impact on the share of the 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.

3. Empirical analysis

3.1. Data

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.

We retrieved our measure of *foreign bank claims* from the "Consolidated Banking Statistics" provided by the Bank for International Settlements (BIS). Introduced in the late 1970s and published quarterly since March 2000, 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 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 serving as an accurate measure of the risk exposure of the lender's national banking system. The BIS distinguishes between international and foreign claims, comprising different on-balance sheet exposures. While international claims comprise 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 immediate borrower basis.[1]

Due to the hub-like pattern of international bank lending, we include 13 lending countries which provide continuous information on their banking systems' financial claims on other countries for our period of interest from 1993 to 2007.[2] In contrast to related empirical

[1] 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 an empirical study employing panel analysis.

[2] Our analysis focuses on the period from 1993 to 2007 since BankScope data is just available from 1993 onwards.

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 in conformance with MSCI Barra as of April 2009. A list of countries included in our empirical study as well as information on the percentage coverage of foreign claims in the lending country's banking system is provided in Table 1.

When examining the determinants of bank lending to emerging markets, it is imperative to initially control for the basic (bilateral) macroeconomic environment that is likely to affect international financial flows. Hence, we employ a *gravity model* which consists of the gravity force element derived from Newton's gravitational force concept as well as further basic macroeconomic variables to explain differences in the volume of financial claims between source and recipient countries. This model originates from trade theory in which it is commonly used to analyze international trade flows (Deardorff, 1998; Bergstrand, 1985; Anderson, 1979; Tinbergen, 1962). In recent years, however, the gravity approach has become more and more popular in international finance (Papaioannou, 2009; Rose and Spiegel, 2004; Jeanneau and Micu, 2002).

We define the *gravity force element* as

$$\text{Gravity}_{i,j} = \frac{\text{GDP}_i \text{ x } \text{GDP}_j}{\text{D}_{i,j}} \ , \tag{1}$$

where i denotes the source country and j the recipient country. GDP_i and GDP_j are the source and the recipient country's log of real GDP and D_{ij} is the distance between the national capitals of two countries. From a mathematical viewpoint, the gravitational force between two countries is directly proportional to the product of their national incomes and indirectly proportional to the distance between them. From an economic point of view, international bank lending should be positively related to the source and recipient countries' income,

whereas increasing distance (which proxies for transaction costs and information asymmetries, Ahearne et al., 2004) should be negatively related to financial linkages.

We complete the *gravity model* by employing further basic macroeconomic variables that are likely to determine international financial flows to emerging markets. Hence, we use the World Development Indicators (WDI) database, provided by the World Bank, to obtain the source and the recipient country's level of *income* per capita (log of GDP per capita) as well as the countries' *business cycle* (GDP growth) to capture macroeconomic trends.

Turning to *country-level determinants* of international financial flows we include four country-specific variables to control for the institutional environment in emerging markets. *First*, we employ the IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions to construct a dummy variable (*exchange rate agreement*) which takes on the value of one if the recipient country operates either a crawling band around or a peg to the currency of the lending country. *Second*, we calculate the difference between short-term real interest rates of the source and the recipient country to control for *interest rate arbitrage*. *Third*, we utilize the OECD Country Risk Classification to control for the likelihood that the borrowing country will service its external debt (*country risk*). The index assesses both the country's economic and financial risk as well as its political stability and classifies countries into eight country risk categories with zero being the lowest and seven the highest risk classification. *Finally*, *financial reforms* is employed to assess the degree of financial liberalization. The index is obtained from the Financial Reform Dataset provided by the International Monetary Fund (IMF) and measures the degree of financial liberalization in recipient countries. The index is subdivided into seven dimensions addressing different aspects of financial sector policy, e.g. state ownership in the banking sector, prudential regulations and supervision of the banking sector or securities market policy.

Next to these most common country-level determinants, we employ *lending bank-specific determinants*, since we expect different characteristics of lending banks to be further

major determinants of international financial flows. We control for the source countries' banking system *size* and additionally include the *capital ratio*, *asset quality*, *efficiency*, *earnings* and *liquidity* according to the CAMEL rating methodology.[3] We retrieve bank-specific variables from aggregating consolidated balance sheet data from BankScope database[4] per country and year. We initially adjust the 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.

3.2. Empirical model

To study the impact of different country-level and lending bank-specific determinants on financial flows to emerging markets we estimate the following model on panel data:

$$y_{ijt} = a_{ij} + \sum \beta_k g_{ijt,k} + \beta_2 x_{ijt} + \mu_t + \varepsilon_{ijt}. \qquad (2)$$

Y_{ijt} represents the log of total foreign claims by banks from source country *i* to all sectors of recipient country *j* in year *t*. The vector $g_{ijt,k}$ describes the gravity model which includes the gravity force element as well as GDP per capita and real GDP growth of the source and recipient country respectively. X_{ijt} describes either country-level determinants or bank-specific determinants of foreign claims that are employed in separate regressions. The model includes time fixed effects μ_t to control for unobserved time-variant measures like

[3] The CAMEL rating was introduced in 1987 by the National Credit Union Administration to evaluate the health of US credit unions. Since then, it has become a widely used approach to cover financial and operative factors in empirical banking research.

[4] BankScope database is provided by Bureau van Dijk and provides a comprehensive database containing information on 29,000 private and public banks around the world.

expectations, trust and social attributes, which are assumed to influence financial linkages between source and recipient countries over time. Furthermore, the model includes country-pair fixed effects a_{ij} accounting for unobserved time-invariant measures like common language or common borders between source and recipient countries that may affect international financial flows. In addition, to control for heterogeneity in bank lending due to "common lender" relationships (Arvai et al., 2009) between single source and recipient countries, the model includes cluster-robust standard errors on the country-level. We use the generalized Lagrange multiplier test based on White (1980) to determine whether controlling for country-level heterogeneity improves the fit of our model. The null hypothesis of homoscedasticity is rejected at $\rho<0.000$, suggesting that the use of robust standard errors is appropriate.

Estimating the model with fixed effects is a consequent strategy for two reasons. First of all, we discriminate between random and fixed effects by defining the target of inference (Wooldridge, 2002). A random effects model is more appropriate if the interest of inference relates to a population mean, i.e. units are viewed as sampled from an overall population. In contrast, fixed effects are more suitable if the data at hand is not sampled but almost covers the full population as it is the case for our comprehensive sample of source OECD countries and recipient more-developed emerging and frontier markets as classified by MSCI Barra. 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 on the country-level and the Hausman test (1978) is inappropriate under heteroscedasticity, we employ a generalization of the Hausman approach 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 is rejected at $\rho<0.000$, suggesting that applying the fixed effects model is appropriate.

4. Empirical results

We present major results of our baseline regression in Table 4. While regression specification (1) refers to the entire sample, regressions (2) and (3) are robustness checks with regard to subsamples built from foreign claims on more-developed emerging markets and frontier markets respectively. Regressions including country-level determinants are reported in Table 5. Regressions employing bank-specific determinants while controlling for structural breaks in time series are reported in Tables 6-11.

4.1. Main findings

As Table 4 reports, *gravity* enters regression specification (1) significantly positive at the one percent level, suggesting that international financial flows are driven by the gravitational force between the source and recipient country. Hence, with regard to the construction of the gravity force element we suggest that increasing national incomes favor international bank lending, while an increase in the economic or geographical distance between countries inhibit them. This is in line with empirical evidence provided by Degryse and Ongena (2005) suggesting that the importance of distance might result from rising transaction costs and information asymmetries since geographical distance increases the difficulty to monitor distant markets. Additionally, Buch (2005) suggests that the negative effect of distance on international bank lending activities might be due to a possible home bias of lending banks.

Introducing the source and recipient country's *per capita income*, we provide empirical evidence for the "Lucas Paradox". As the source country's income enters our regression significantly negative at the ten percent level whereas the recipient country's

income enters this regression significantly positive, we find that banks' capital may flow from rich to poor countries. This result is in line with previous empirical studies by Papaioannou (2009), Alfaro et al. (2008) and Tornell and Velasco (1992).

Business cycle of both source and recipient countries enters the regression significantly positive at the five percent level. While the procyclical relationship between economic growth in recipient countries and bank capital inflows was expected and corresponds to the significant positive impact of the recipient country's per capita income, the likewise procyclical effect of business cycles in the source country is somewhat surprising. Our result does not confirm theoretical assumptions that strong economic growth in lending countries may reduce foreign lending to emerging markets due to increasing local investment opportunities. In contrast, theories of imperfect capital markets suggest that asymmetric information and hence transaction costs are lower during economic booms which in turn may favor lending cross-border (Kiyotaki and Moore, 1997; Bernanke and Gertler, 1989).

By means of regressions (2) and (3) we investigate the robustness of our results when splitting the entire sample into two subgroups to distinguish between foreign claims on more-developed emerging markets and frontier markets respectively. While more-developed emerging markets experience rapid economic growth and are becoming industrialized, frontier markets represent a subgroup of emerging markets which is investable but exhibits distinctive risk-return patterns. As shown, the coefficient of the *gravity* measure exhibits higher values in regression specification (2) indicating that gravity is a stronger determinant of bank lending to more-developed emerging markets than frontier markets. Furthermore, we find that the *source country's per capita income* and *business cycle* are statistically significant determinants of bank lending to more-developed emerging markets, whereas the flow of bank capital to frontier markets strongly depends on the macroeconomic environment of the recipient country itself. Since financial flows are (forcefully) pushed to more-developed emerging markets while frontier markets attract capital inflows, we suggest that investors

prefer markets either already liberalized or where economic activity is gaining strength. Moreover, we propose that the macroeconomic endowment of frontier markets serves as an indispensible calculus for the lending banks' investment decisions due to higher information asymmetries and hence higher transaction costs when lending to these recipient markets (Ahearne et al., 2004).

4.2. Country-level determinants

By means of regressions (1)-(4), Table 5, we investigate the impact of country-level determinants on foreign bank lending. We lag our measures of interest rate arbitrage and financial reforms to address likely reverse causality which may arise if international bank lending has a positive impact on these variables. Furthermore, to avoid simultaneity, we include them in turn in separate regressions.

With regard to the gravity model, results from our baseline regression are basically reconfirmed when controlling for further country-level determinants. The gravity force element enters all regressions significantly positive at the one percent level still indicating the importance of both the economic as well as the geographical distance between source and recipient countries with regard to international bank lending. Furthermore, the recipient country's per capita income and business cycles remain major determinants for attracting financial inflows.

Among our institutional country-level determinants, *exchange rate agreement* enters regression specification (1) significantly positive at the five percent level revealing that international bank lending to emerging markets is encouraged by low exchange rate volatility and hence, exchange rate risk. This result is consistent with previous empirical findings by Jeanneou and Micu (2004) suggesting that fixed and tightly managed exchange rate agreements are statistically significant explanatory factors for investment decisions by financial institutions in lending countries. *Interest rate arbitrage* between source and recipient

countries enters regression specification (2) significantly positive at the five percent level, indicating that emerging markets exhibiting higher real interest rates vis-à-vis domestic rates are more prone to receive foreign bank lending. Our result is in line with empirical findings by Buch et al. (2010) suggesting that lending banks intensively arbitrage on interest rate differentials and hence, may benefit from a world financial system being far from perfectly integrated (Miller and Puthenpurackal, 2002). Introducing *country risk*, this variable enters regression specification (3) significantly negative at the one percent level indicating that higher economic and financial risk as well as lower political stability in emerging markets has a negative impact on attracting foreign bank lending. Moreover, results reveal that source country banks behave risk-aversely with regard to their investment decisions. This is in line with empirical findings by Hale (2007) suggesting that borrowers in countries with high debt services have limited access to international bank loans and thus are much more likely to issue bonds on (local) capital markets. Finally, *financial reforms* enters regression specification (4) significantly positive at the one percent level, demonstrating a positive relationship between implementing financial reforms and attracting foreign bank lending by recipient countries.

4.3. Structural breaks in time series

Estimation results may be biased by structural breaks in our time series of foreign lending. As Figure 1 illustrates, the volume of banks' foreign claims initially increases during the onset stage until 1998 as a result of ongoing globalization and financial liberalization processes in recipient markets that have begun in the early 1990s. After 1998 the volume of foreign claims slows down and remains virtually constant between 1998 and 2002 which might be traced back to an accumulation of severe (global) financial crises within this time

period.[5] After this point in time the volume of banks' foreign claims rapidly increases until 2007 and is assumed to significantly decline as a response to the ongoing subprime crisis.

Against this background, we split the entire sample into three samples with subsample (1) covering the period from 1993 to 1998 (the onset stage), subsample (2) lasting from 1999 to 2003 (the crises stage) and subsample (3) covering the period from 2004 to 2007 (the recovery and boom stage). Since the break dates are known a priori we control for the assumption of structural breaks in our time series by employing the classical Chow test (1960). As shown in Tables 6-11 the calculated F-values exceed the critical levels for each subsample. Hence, the null hypothesis of structural stability (parameter constancy) is rejected in each case, suggesting that our time series is determined by structural breaks and building subsamples for these three different time periods is appropriate.

4.4. Bank-specific determinants

Regression results for different bank-specific determinants for the full time period and the three subsamples are reported in Tables 6-11.[6] We lag our measures of bank asset quality and liquidity to address likely reverse causality which may arise if lending to emerging markets has an impact on these variables. Furthermore, due to high correlations between most of these bank-specific measures (Table 14) we include them in turn in separate regressions. While we describe the empirical effects of our bank-specific measures of interest table by table, we discuss further control variables across all regressions shown in Tables 6-11.

To be upfront with it, empirical results from subsample regressions in large parts significantly differ from those results being obtained for the full time period regressions as

[5] The Asian financial crisis (1997-1998), the Argentine debt crisis (1998-2002), the Russian financial crisis (1998) and the Dotcom-crisis (2000-2002) are identified as four major crises during this time period.

[6] Unfortunately, we are not able to perform similar regressions with regard to our country-level determinants. This is due to the fact that these measures, in contrast to bank-specific variables, hardly vary over time and are omitted for most of the subsamples as a result of reduced time periods.

reported by Tables 6-11. Hence, our empirical analysis reveals further important insight into the relationship between macroeconomic as well as bank-specific characteristics and international financial flows that have not been detected by relevant empirical studies disregarding structural breaks in time series of foreign bank claims. With regard to the gravity model, the gravity force element enters the full time period regressions (1) as well as the subsample regressions (2) and (4) significantly positive, suggesting that the gravity between source and recipient countries may still be a strong positive determinant even when controlling for different time periods of cross-border lending. As an important exception however, the gravity measure enters regression specifications (3) significantly negative indicating that foreign claims are more prone to be withdrawn during periods of major financial crises if the lending relationship between source and recipient country exhibits a higher gravitational force. Since the gravity force element increases with a decreasing distance and an increasing product of GDP values respectively we suggest that lower transaction costs and lower levels of information asymmetries as well as more-developed recipient economies support the withdrawal of foreign claims during crisis periods. Introducing the measures of source and recipient country per capita income we still provide overall empirical evidence for the "Lucas Paradox" which is in line with our findings from baseline regressions and regressions on different country-level determinants. However, since source country income enters regression specification (2) significantly positive at the one percent level we do not provide any empirical evidence for the paradox during the onset stage of cross-border lending. Our result might be due to the fact that in particular during the onset stage source country banks have tried to counter decreasing margins in home markets by transferring parts of their credit business into emerging countries which had started financial liberalization concurrently to globalization processes. Regarding the source country business cycle measure, this variable enters the subsample regressions (2) and (4) significantly negative. Since profitability coincides with business boom phases (Albertazzi and

Gambacorta, 2009; Goddard et al., 2004) we suggest that the lending banks' risk-taking behavior may be more distinct during economic booms.

Turning from gravity model measures to *bank-specific determinants* of international bank lending, *bank size* enters the full time period regression (1), Table 6 significantly positive at the five percent level indicating that larger banks may provide a greater volume of foreign claims on emerging markets. In addition, a significantly positive sign of the size measure at the one percent level in subsample regression (3) reveals that larger banks may not have withdrawn foreign claims during periods of financial crises which might be due to the fact that larger banks may diversify loan portfolio risks more efficiently as a result of higher economies of scale and scope (Boyd and Prescott, 1986; Ramakrishnan and Thakor, 1984). Apart from these functional diversification effects, it is also suggested that larger banks engaging in cross-border activities may additionally obtain economies of scale and scope by geographical risk diversification (Méon and Weill, 2005). With regard to regression specification (4) the size measure changes its sign and enters the regression significantly negative at the one percent level indicating that even smaller banks may have engaged in cross-border lending during the boom phase.

Introducing *capital ratio*, this variable enters the full time period regression (1) as well as subsample regressions (2) and (3), Table 7, significantly negative at the one percent level suggesting that better capitalized banks provide smaller amounts of foreign claims towards emerging countries. Our finding is in line with previous empirical studies providing evidence that better capitalized banks may be less prone to risk taking. As higher 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; Keeley, 1990).

As Table 8 shows, *asset quality* enters regressions (1) and (4) significantly negative at the ten and one percent level respectively indicating that banks exhibiting higher loan

portfolio risks engage less in cross-border lending. At first sight this result was expected since foreign claims towards more-developed emerging and frontier markets may typically be described as risky investments themselves and hence, may not be suitable to diversify risky loan portfolios. However, one may argue that in particular financially weak banks may engage in cross-border lending to emerging markets if investments of higher risk involve likewise higher returns. Hence, we control for "gambling to resurrection" strategies (Calomiris and Kahn, 1991) of lending banks by including measures of bank *efficiency* and *profitability*. As Tables 9 and 10 report, both cost efficiency and earnings enter regression specifications (3) significantly negative at the ten and five percent level respectively. Thus, we do not provide any empirical evidence for a "gambling for resurrection" strategy even when controlling for the onset stage of international financial flows or later financial crisis periods.

Finally, *liquidity* enters the onset stage subsample regression (2), Table 11, significantly positive at the five percent level and remains insignificant in all other regressions. We suggest that OECD source country banks being exposed to stronger competition in home markets due to the ongoing process of globalization since the late 1980s have transferred liquidity into financially liberalized emerging markets in order to evade decreasing local profit margins.

5. Conclusion

While related empirical work on the determinants of international bank lending focuses on macroeconomic conditions and the institutional framework, the contribution at hand is, to the best of our knowledge, the first study that empirically investigates the impact of both country-level and bank-specific characteristics on bank lending to emerging markets while controlling for structural breaks in time series on foreign bank lending.

Using a dataset on bank claims from 13 OECD countries vis-à-vis 51 more-developed emerging markets and frontier markets between 1993 and 2007, we provide empirical

evidence that the *macroeconomic environment* in both the source and the recipient country may be a strong determinant of foreign bank lending to emerging markets. In particular, empirical results confirm the "Lucas Paradox" suggesting that financial allocation may favor more-developed countries. Moreover, splitting the sample we find that more-developed emerging markets may benefit from economic boom phases in the source country, whereas frontier markets may attract bank loans primarily as a result of the level of local macroeconomic and institutional development. Introducing *country-level determinants*, our analysis reveals that exchange rate agreements and interest rate differentials between source and recipient country may foster foreign bank lending. In contrast, increasing credit risk in emerging markets as well as the inability to implement financial reforms may inhibit international lending by banks located in OECD countries. As regards *lending bank-specific characteristics*, we provide empirical evidence that bank size may positively affect the volume of foreign claims on emerging markets. Moreover, banks either being better capitalized or exhibiting greater loan portfolio risks may conclude fewer loan agreements with borrowers located in these markets. With regard to the latter, we additionally find that "gambling for resurrection" may not be a determinant of (excessive) foreign bank lending. Finally, splitting our sample into three subsamples addressing different stages of international bank lending, we provide empirical evidence that the impact of macroeconomic and bank-specific determinants changes with regard to different time periods. Hence, while we do not provide any empirical evidence for the "Lucas Paradox" during the onset stage of cross-border lending, foreign claims are more prone to be withdrawn during periods of major financial crises if the lending relationship between source and recipient country exhibits a higher gravitational force. Moreover, even smaller banks may engage in international bank lending during boom phases whereas well-capitalized banks may be less prone to risk taking in the onset and crises stage. Finally, we do not provide any empirical evidence for a

"gambling for resurrection" strategy of financially weak lending banks even when controlling for the onset stage of international financial flows or later financial crisis periods.

Against the background of our empirical results, we deduce the following policy implications. First, emerging markets do have the possibility to attract foreign claims by an institutional environment fostering economic activity. Hence, the development of a high-quality institutional framework is especially important for frontier markets since the inflow of foreign claims by this group of countries highly depends on local macroeconomic and institutional determinants. Moreover, the implementation of financial reforms seems to be of utmost importance.

Second, banking regulation is particularly interested in preventing banks from "gambling for resurrection". Since we provide empirical evidence that neither low capitalization nor low profitability or efficiency of OECD banks are determinants of (excessive) bank lending to emerging markets, we suggest a careful reassessment of the adequacy of the regulatory framework on bank capital flows to emerging markets. However, in particular experience of the Asian crisis shows that massive withdrawals of bank lending may encourage serious disruptions in developing markets. Since our analysis only accounts indirectly for the possible impact of economic disruptions in emerging markets on the OECD banks' soundness, the necessity to investigate this relationship in more detail will be the object of future research.

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

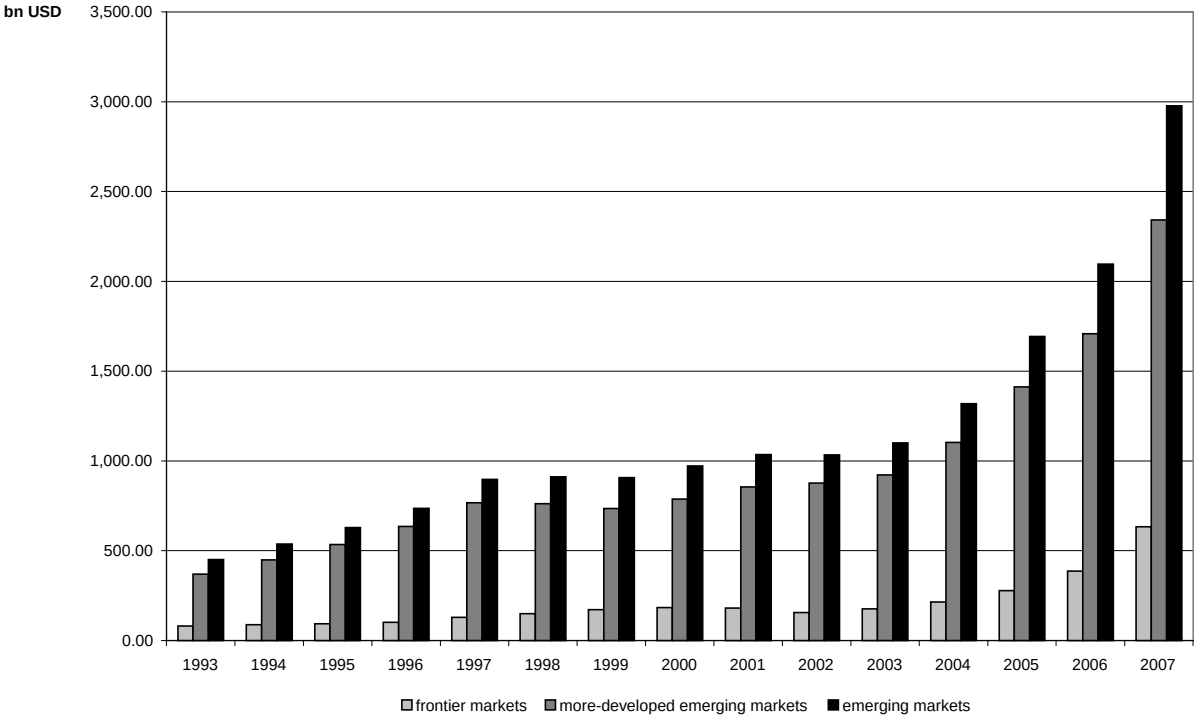

Table 1
Included source and recipient countries

Source country			Recipient country (emerging market)			
Name	*Percentage coverage of foreign claims*[a]	*Number of reporting banks at end-2007*[1]	*More-developed emerging markets*[b]		*Frontier markets*[2]	
Austria	nearly 100 %	57	Brazil	Poland	Argentina	Nigeria
Belgium	100 %	102	Chile	Russia	Bahrain	Oman
Finland	nearly 100 %	6	China	South Africa	Botswana	Pakistan
France	nearly 100 %	347	Colombia	South Korea	Bulgaria	Qatar
Germany	nearly 100 %	2,000	Czech Republic	Taiwan	Croatia	Romania
Italy	100 %	806	Egypt	Thailand	Estonia	Trinidad and Tobago
Japan	nearly 100 %	158	Hungary	Turkey	Ghana	Saudi Arabia
Netherlands	100 %	101	India		Jamaica	Serbia
Spain	nearly 100 %	177	Indonesia		Jordan	Slovenia
Sweden	nearly 100 %	11	Israel		Kazakhstan	Sri Lanka
Switzerland	approx. 95 %	60	Malaysia		Kenya	Tunisia
United Kingdom	98 %	190	Mexico		Kuwait	Ukraine
United States	nearly 100 %	150	Morocco		Lebanon	United Arab Emirates
			Peru		Lithuania	Vietnam
			Philippines		Mauritius	

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 source country banking system's cross-border claims on the recipient country in all currencies as well as local claims of their foreign affiliates in foreign and local currency.	Consolidated Banking Statistics (Bank for International Settlements)
Gravity $_{(i, j, t-1)}$	Lag (1) of the product of the log of the source and recipient country's real GDP (2000 USD) relative to the log of the distance (km) between both countries.	World Development Indicators (World Bank), own calc.
Income $_{(i, t-1)}$	Lag (1) of the ratio of the source country's GDP to population.	World Development Indicators (World Bank)
Income $_{(j, t-1)}$	Lag (1) of the ratio of the recipient country's GDP to population.	World Development Indicators (World Bank)
Business cycle $_{(i, t-1)}$	Lag (2) of the source country's rate of real GDP growth at constant 2000 prices (annual percentage change).	World Development Indicators (World Bank)
Business cycle $_{(j, t-1)}$	Lag (2) of the recipient country's rate of real GDP growth at constant 2000 prices (annual percentage change).	World Development Indicators (World Bank)
MDEM	Dummy variable that takes on the value of one if the recipient country is classified as a more-developed emerging market; 0 otherwise.	MSCI Barra
FRM	Dummy variable that takes on the value of one if the recipient country is classified as a frontier market; 0 otherwise.	MSCI Barra
Exchange rate agreement $_{(i, j, t)}$	Lag (1) of a dummy variable that takes on the value of one if the recipient country operates a crawling band around or a peg to the currency of the source country.	Annual Report on Exchange Rate Arrangements and Exchange Restrictions (International Monetary Fund)
Interest rate arbitrage $_{(i, j, t-1)}$	Difference between the real interest rate (%) of the source country and the real interest rate (%) of the recipient country.	World Development Indicators (World Bank)
Country risk $_{(j, t)}$	Indicator that measures the recipient country credit risk, i.e. the likelihood that a country will service its external debt.	Country Risk Classification (OECD)
Financial reforms $_{(j, t-1)}$	Lag (1) of an index that measures the degree of financial liberalization in the recipient country.	Financial Reform Dataset (International Monetary Fund)

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

Variable	Definition	Source
Size $_{(i, t)}$	Log of the source country banking system's total assets.	BankScope (Bureau van Dijk)
Capital ratio $_{(i, t)}$	Ratio of the source country banking system's equity capital to total assets.	BankScope (Bureau van Dijk)
Asset quality $_{(i, t-1)}$	Lag (1) of the source country banking system's non-performing loans to total assets.	BankScope (Bureau van Dijk)
Efficiency $_{(i, t)}$	Cost to income ratio (source country banking system).	BankScope (Bureau van Dijk)
Earnings $_{(i, t)}$	Return on average assets before taxes (ROAA) of the source country's banking system.	BankScope (Bureau van Dijk)
Liquidity $_{(i, t-1)}$	Lag (1) of the source country banking system's liquidity ratio, calculated as one minus its net loans to total assets.	BankScope (Bureau van Dijk), own calc.

Table 3
Descriptive statistics

Variable	N	Mean	SD	Min	Max
Log of foreign claims $_{(i, j, t)}$	9173	5.3105	2.4379	-1.3863	11.8293
Gravity $_{(i, j, t-1)}$	9152	17.2751	2.9374	10.04	29.40
Log of income $_{(i, t-1)}$	9282	10.0803	0.2637	9.35	10.59
Log of income $_{(j, t-1)}$	9126	7.9647	1.1226	5.40	10.43
Business cycle $_{(i, t-2)}$	8619	2.2170	1.5083	-2.05	6.09
Business cycle $_{(j, t-2)}$	8528	4.2302	4.4779	-22.93	33.99
MDEM	9945	0.4314	0.4953	0	1
FRM	9945	0.5686	0.4953	0	1
Exchange rate agreement $_{(i, j, t)}$	9945	0.0972	0.2963	0	1
Interest rate arbitrage $_{(i, j, t-1)}$	6163	3.2234	15.1386	-102.03	84.05
Country risk $_{(j, t)}$	9945	3.9686	1.7872	0	7
Financial reforms $_{(j, t-1)}$	6916	0.6702	0.1816	0.08	1.13
Log of size $_{(i, t)}$	9894	13.9785	1.3469	9.36	16.36
Capital ratio $_{(i, t)}$	9894	4.5789	1.5027	2.51	9.75
Asset quality $_{(i, t-1)}$	8160	1.1177	1.0733	0	6.61
Efficiency $_{(i, t)}$	9894	63.7884	8.4105	43.83	95.43
Earnings $_{(i, t)}$	9894	1.7206	0.6829	0.50	3.80
Liquidity $_{(i, t-1)}$	9231	0.4875	0.1060	0.30	0.79

Table 4
Baseline regressions

	(1)	(2)	(3)
Gravity $_{(i, j, t-1)}$	0.7587	1.2302	0.7912
	(0.1200)***	(0.4616)***	(0.1526)***
Income $_{(i, t-1)}$	–1.1748	–2.9224	–0.3265
	(0.6358)*	(1.3363)**	(0.8758)
Income $_{(j, t-1)}$	1.4766	0.3408	1.4784
	(0.1518)***	(0.8488)	(0.1759)***
Business cycle $_{(i, t-2)}$	0.0208	0.0429	0.0058
	(0.0103)**	(0.0130)***	(0.0157)
Business cycle $_{(j, t-2)}$	0.0102	0.0005	0.0125
	(0.0041)**	(0.0045)	(0.0059)**
Country-pair fixed effects	yes	yes	yes
Time fixed effects	yes	yes	yes
Cluster country-pair	yes	yes	yes
No. of obs.	7908	3650	4258
Wald χ^2	78.76***	31.19***	57.62***
Adj. R^2	0.27	0.24	0.20

Notes: The panel model estimated is Foreign claims $_{(i=\text{source country, } j=\text{recipient country, } t=\text{time})} = \alpha + \beta_1$ Gravity$_{i,j,t-1}$ $+ \beta_2$ Income$_{i,t-1} + \beta_3$ Income$_{j,t-1} + \beta_4$ Business cycle$_{i,t-2} + \beta_5$ Business cycle$_{j,t-2} + \varepsilon_{i,j,t}$. Regression (1) refers to the entire sample whereas regressions (2) and (3) refer to subsamples built from foreign claims on more-developed emerging markets (MDEM) and frontier markets (FRM) respectively. Constant term included but not reported. Heteroscedasticity consistent standard errors are in parenthesis. ***, **, *: statistically significant at the 1, 5 and 10% level.

Table 5
Country-level determinants

	(1)	(2)	(3)	(4)
Gravity $_{(i, j, t-1)}$	0.7550	0.7827	0.6845	0.5482
	(0.1193) ***	(0.1526) ***	(0.1241) ***	(0.1359) ***
Income $_{(i, t-1)}$	–1.1941	–0.4120	–0.9196	–1.9381
	(0.6356) *	(0.7354)	(0.6504)	(0.7056)
Income $_{(j, t-1)}$	1.4577	1.1250	1.3896	1.3144
	(0.1500) ***	(0.1879) ***	(0.1517) ***	(0.1658) ***
Business cycle $_{(i, t-2)}$	0.0194	0.0166	0.0234	0.0220
	(0.0103) *	(0.0114)	(0.0102)	(0.0116)
Business cycle $_{(j, t-2)}$	0.0096	0.0086	0.0081	0.0102
	(0.0041) **	(0.0048) *	(0.0040) **	(0.0048) ***
Exchange rate agreement $_{(i, j, t)}$	0.2227			
	(0.1046) **			
Interest rate arbitrage $_{(i, j, t-1)}$		0.0036		
		(0.0015) **		
Country risk $_{(j, t)}$			–0.1038	
			(0.0361) ***	
Financial reforms $_{(j, t-1)}$				1.8217
				(0.3687) ***
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes
Cluster country-pair	yes	yes	yes	yes
No. of obs.	7908	5329	7908	6121
Wald χ^2	66.63 ***	39.51 ***	66.99 ***	51.02 ***
Adj. R^2	0.27	0.28	0.26	0.26

Notes: The panel model estimated is Foreign claims $_{(i=\text{source country, } j=\text{recipient country, } t=\text{time})} = \alpha + \beta_1$ Gravity$_{i,j,t-1} + \beta_2$ Income$_{i,t-1} + \beta_3$ Income$_{j,t-1} + \beta_4$ Business cycle$_{i,t-2} + \beta_5$ Business cycle$_{j,t-2} + \varepsilon_{i,j,t}$. Country-level determinants of bank foreign claims are included in regressions (1)-(4). Constant term included but not reported. Heteroscedasticity consistent standard errors are in parenthesis. ***, **, *: statistically significant at the 1, 5 and 10% level.

Table 6
Bank-specific determinants I (Bank size)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.6428	0.5801	–1.3622	3.0738
	(0.1241) ***	(0.1849) ***	(0.5593) **	(1.3549) **
Income $_{(i, t-1)}$	–1.7832	5.3508	–3.2280	–9.0691
	(0.6363) ***	(1.2241) ***	(2.3547)	(3.3849) **
Income $_{(j, t-1)}$	1.4335	0.8620	3.8693	2.1362
	(0.1535) ***	(0.1536) ***	(0.9168) ***	(2.8251)
Business cycle $_{(i, t-2)}$	0.0358	–0.0214	–0.0079	–0.1377
	(0.0105) ***	(0.0095) ***	(0.0122)	(0.0445) ***
Business cycle $_{(j, t-2)}$	0.0097	0.0199	–0.0131	0.0017
	(0.0040) ***	(0.0051) **	(0.0050) **	(0.0159)
Size $_{(i, t)}$	0.2309	0.0478	0.3509	–0.7493
	(0.0608) **	(0.0655)	(0.0954) ***	(0.2318) ***
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	yes	yes
No. of obs.	7908	2348	1864	1200
Wald χ^2	81.71 ***	52.81 ***	17.26 ***	36.66 ***
Adj. R^2	0.25	0.30	0.13	0.34
F-test		8.81 ***	5.31 **	28.51 ***

Notes: The panel model estimated is Foreign claims $_{(i=\text{source country, } j=\text{recipient country, } t=\text{time})} = \alpha + \beta_1$ Gravity$_{i,j,t-1} + \beta_2$ Income$_{i,t-1} + \beta_3$ Income$_{j,t-1} + \beta_4$ Business cycle$_{i,t-2} + \beta_5$ Business cycle$_{j,t-2} + \varepsilon_{i,j,t}$. Regression (1) refers to the full time period whereas regressions (2)-(4) refer to subsamples built for the periods identified by the Chow test. Constant term included but not reported. Heteroscedasticity consistent standard errors are in parenthesis. $^{***, **, *}$: statistically significant at the 1, 5 and 10% level.

Table 7
Bank-specific determinants II (Capital ratio)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.7142	0.4860	–0.7548	4.3775
	(0.1177) ***	(0.1892) **	(0.4981) *	(1.2771) ***
Income $_{(i, t-1)}$	–0.5083	6.2103	–0.3349	–14.6250
	(0.6271)	(1.1538) ***	(2.0499)	(3.3336) ***
Income $_{(j, t-1)}$	1.4469	0.8016	3.2352	–0.2338
	(0.1521) ***	(0.1525) ***	(0.8777) ***	(2.6529)
Business cycle $_{(i, t-2)}$	0.0125	–0.0269	–0.0346	–0.1572
	(0.0099)	(0.0096) ***	(0.0123) ***	(0.0490) ***
Business cycle $_{(j, t-2)}$	0.0105	0.0197	–0.0139	0.0060
	(0.0040) ***	(0.0051) ***	(0.0050) ***	(0.0161)
Capital ratio $_{(i, t)}$	–0.1175	–0.1099	–0.1145	–0.1454
	(0.0268) ***	(0.0384) ***	(0.0381) ***	(0.0354)
Country-pair fixed effects	yes	Yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	yes	yes
No. of obs.	7908	2348	1864	1200
Wald χ^2	80.03 ***	57.66 ***	15.85 ***	35.37 ***
Adj. R^2	0.28	0.25	0.06	0.35
F-test		12.96 ***	5.62 **	26.08 ***

Note: The empirical model and estimation parameters are defined in Table 6.

Table 8
Bank-specific determinants III (Asset quality)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.8978	0.5100	–0.1978	2.3805
	(0.1258) ***	(0.2273) **	(0.5629) *	(1.2469) *
Income $_{(i, t-1)}$	–1.9911	5.9027	–4.0983	–9.8136
	(0.6945) ***	(1.5014) ***	(2.5195)	(3.1532) ***
Income $_{(j, t-1)}$	1.5034	0.8784	2.4939	1.9740
	(0.1544) ***	(0.1617) ***	(0.9894) **	(2.5674)
Business cycle $_{(i, t-2)}$	0.0145	–0.0367	–0.0155	–0.0803
	(0.0106)	(0.0117) ***	(0.0134)	(0.0455) *
Business cycle $_{(j, t-2)}$	0.0045	0.0173	–0.0138	0.0040
	(0.0043)	(0.0056) ***	(0.0051) ***	(0.0161)
Asset quality $_{(i, t-1)}$	–0.0549	–0.0481	–0.0196	–0.7838
	(0.0309) *	(0.0463)	(0.0249)	(0.1585) ***
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	yes	yes
No. of Obs.	7159	1696	1864	1200
Wald χ^2	60.06 ***	46.02 ***	12.81 ***	39.90 ***
Adj. R^2	0.27	0.25	0.05	0.33
F-test		11.80 ***	4.04 **	26.27 ***

Note: The empirical model and estimation parameters are defined in Table 6.

Table 9
Bank-specific determinants IV (Efficiency)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.7597	0.5571	–0.5069	4.0085
	(0.1202) ***	(0.1855) ***	(0.5402) *	(1.3291) ***
Income $_{(i, t-1)}$	–1.0769	6.2340	–2.5659	–16.4154
	(0.6306) *	(1.1680) ***	(2.2796)	(3.4379) ***
Income $_{(j, t-1)}$	1.4721	0.8485	2.8835	0.5467
	(0.1517) ***	(0.1543) ***	(0.9483) ***	(2.7287)
Business cycle $_{(i, t-2)}$	0.0194	–0.0212	–0.0062	–0.1772
	(0.0103) ***	(0.0093) **	(0.0128)	(0.0547) ***
Business cycle $_{(j, t-2)}$	0.0104	0.0199	–0.0135	0.0040
	(0.0041) *	(0.0050) ***	(0.0050) ***	(0.0162)
Efficiency $_{(i, t)}$	0.0037	0.0134	–0.0114	0.0058
	(0.0027)	(0.0058)	(0.0059) *	(0.0043)
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	yes	yes
No. of obs.	7908	2348	1864	1200
Wald χ^2	65.87 ***	53.99 ***	12.98 ***	40.22 ***
Adj. R^2	0.27	0.28	0.04	0.34
F-test		11.71 ***	8.83 ***	32.64 ***

Note: The empirical model and estimation parameters are defined in Table 6.

Table 10
Bank-specific determinants V (Earnings)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.7205	0.5551	–0.5389	4.0612
	(0.1207) ***	(0.1848) ***	(0.5004) *	(1.3256) ***
Income $_{(i, t-1)}$	–1.6265	5.5609	–1.9369	–17.2131
	(0.6295) **	(1.1593) ***	(2.0566)	(3.4365) ***
Income $_{(j, t-1)}$	1.4556	0.8430	2.9794	0.7247
	(0.1537) ***	(0.1546) ***	(0.8909) ***	(2.7347)
Business cycle $_{(i, t-2)}$	0.0302	–0.0211	–0.0168	–0.2263
	(0.0098) ***	(0.0094) **	(0.0120)	(0.0531) ***
Business cycle $_{(j, t-2)}$	0.0095	0.0199	–0.0124	0.0034
	(0.0040) **	(0.0051) ***	(0.0050) **	(0.0161)
Earnings $_{(i, t)}$	–0.2013	–0.0851	–0.3979	0.7300
	(0.0652) ***	(0.0860)	(0.1550) **	(0.3497)
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	yes	yes
No. of obs.	7908	2348	1864	1200
Wald χ^2	72.41 ***	53.80 ***	15.03 ***	39.31 ***
Adj. R^2	0.26	0.28	0.03	0.33
F-test		9.96 ***	6.03 **	27.48 ***

Note: The empirical model and estimation parameters are defined in Table 6.

Table 11
Bank-specific determinants VI (Liquidity)

	(1) Full period	(2) 1993-1998	(3) 1999-2003	(4) 2004-2007
Gravity $_{(i, j, t-1)}$	0.7702	0.5085	–0.1720	3.9782
	(0.1302) ***	(0.1947) **	(0.5962) *	(1.3199) ***
Income $_{(i, t-1)}$	–1.2316	6.3594	–4.3268	–16.1853
	(0.6768) *	(1.2103) ***	(2.7484)	(3.4375) ***
Income $_{(j, t-1)}$	1.4838	0.8190	2.4574	0.6303
	(0.1539) ***	(0.1537) ***	(1.0229) **	(2.7232)
Business cycle $_{(i, t-2)}$	0.0206	–0.0281	–0.0174	–0.1977
	(0.0101) **	(0.0099) ***	(0.0120)	(0.0491) ***
Business cycle $_{(j, t-2)}$	0.0102	0.0199	–0.0135	0.0039
	(0.0041) **	(0.0051) ***	(0.0050) ***	(0.0161)
Liquidity $_{(i, t-1)}$	–0.1305	1.1555	–0.2428	–1.4420
	(0.3713)	(0.5463) **	(0.5496)	(0.9982)
Country-pair fixed effects	yes	yes	yes	yes
Time fixed effects	yes	no	no	no
Cluster country-pair	yes	yes	Yes	yes
No. of obs.	7908	2348	1864	1200
Wald χ^2	67.01 ***	55.55 ***	12.51 ***	34.04 ***
Adj. R^2	0.27	0.26	0.04	0.34
F-test		4.90 **	6.93 ***	20.33 ***

Note: The empirical model and estimation parameters are defined in Table 6.

Table 12
Correlation matrix (Gravity model)

	Foreign claims $_{(i, j, t)}$	Gravity $_{(i, j, t-1)}$	Income $_{(i, t-1)}$	Income $_{(j, t-1)}$	Business cycle $_{(i, t-2)}$	Business cycle $_{(j, t-2)}$
Foreign claims $_{(i, j, t)}$	1.00					
Gravity $_{(i, j, t-1)}$	0.13***	1.00				
Income $_{(i, t-1)}$	0.19***	0.11***	1.00			
Income $_{(j, t-1)}$	0.12***	0.13***	0.03**	1.00		
Business cycle $_{(i, t-2)}$	–0.10***	–0.06***	–0.09***	0.01	1.00	
Business cycle $_{(j, t-2)}$	0.07***	–0.02**	0.04***	0.06***	0.02**	1.00

Table 13
Correlation matrix (Country-level)

	Foreign claims (i, j, t)	Gravity (i, j, t-1)	Income (i, t-1)	Income (j, t-1)	Business cycle (i, t-2)	Business cycle (j, t-2)	Exchange rate agreement (i, j, t)	Interest rate arbitrage (i, j, t-1)	Country risk (j, t)	Financial reforms (j, t-1)
Foreign claims (i, j, t)	1.00									
Gravity (i, j, t-1)	0.13***	1.00								
Income (i, t-1)	0.19***	0.11***	1.00							
Income (j, t-1)	0.12***	0.13***	0.03***	1.00						
Business cycle (i, t-2)	–0.10***	–0.06**	–0.09***	0.01	1.00					
Business cycle (j, t-2)	0.07***	–0.02	0.04***	0.06***	0.02**	1.00				
Exchange rate agreement (i, j, t)	0.08***	0.18***	0.06***	0.05***	0.10***	0.04***	1.00			
Interest rate arbitrage (i, j, t-1)	0.10***	–0.02	0.04***	0.09***	0.11***	0.01	0.01	1.00		
Country risk (j, t)	–0.20***	–0.16***	–0.03**	–0.57***	0.02*	–0.26***	–0.08***	0.11***	1.00	
Financial reforms (j, t-1)	0.11***	0.12***	0.15***	0.52***	0.05***	0.03**	0.14***	0.06***	–0.28***	1.00

Table 14
Correlation matrix (Bank-level)

	Foreign claims $_{(i, j, t)}$	Gravity $_{(i, j, t-1)}$	Income $_{(i, t-1)}$	Income $_{(j, t-1)}$	Business cycle $_{(i, t-2)}$	Business cycle $_{(j, t-2)}$	Size $_{(i, t)}$	Capital ratio $_{(i, t)}$	Asset quality $_{(i, t-1)}$	Efficiency $_{(i, t)}$	Earnings $_{(i, t)}$	Liquidity $_{(i, t-1)}$
Foreign claims $_{(i, j, t)}$	1.00											
Gravity $_{(i, j, t-1)}$	0.13***	1.00										
Income $_{(i, t-1)}$	0.19***	0.11***	1.00									
Income $_{(j, t-1)}$	0.12***	0.13***	0.03***	1.00								
Business cycle $_{(i, t-2)}$	–0.10***	–0.06**	–0.09***	0.01	1.00							
Business cycle $_{(j, t-2)}$	0.07***	–0.02	0.04***	0.06***	0.02**	1.00						
Size $_{(i, t)}$	0.28***	0.21**	0.06***	0.04***	–0.32***	0.06***	1.00					
Capital ratio $_{(i, t)}$	–0.07***	0.08***	–0.03***	0.01	0.24***	0.02*	–0.41***	1.00				
Asset quality $_{(i, t-1)}$	–0.10***	0.00***	–0.10***	–0.04***	–0.34***	–0.05***	0.08***	–0.14***	1.00			
Efficiency $_{(i, t)}$	0.15***	–0.03***	–0.19***	–0.03***	–0.24***	–0.05***	0.19***	–0.45***	–0.06***	1.00		
Earnings $_{(i, t)}$	–0.14***	0.00***	–0.40***	–0.04***	0.31***	–0.08***	–0.54***	0.58***	0.20***	–0.24***	1.00	
Liquidity $_{(i, t-1)}$	0.13***	–0.04***	–0.09***	0.01	–0.25***	0.04***	0.25***	–0.40***	–0.16***	0.54***	–0.46***	1.00