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German bank lending to industrial and non-industrial countries: driven by fundamentals or different treatment?

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Abstract

This paper shows that the substantial disparity in German bank lending towards industrial (IC) and non-industrial (Non-IC) countries is largely explained by differences in countries' endowments and only to a minor extent by German banks' different treatment of these country groups. This is demonstrated by applying a decomposition technique to an augmented gravity model that is estimated for German foreign lending using a new micro panel data-set on individual claims from the Deutsche Bundesbank covering the period from 1996 to 2002.

Keywords: German bank lending, gravity models, Oaxaca decomposition analysis

JEL classification: F30; F34;G21

Non technical summary

In theory, capital flows provide risk sharing opportunities for both debtors and creditors and can enhance economic efficiency. In practice, however, capital inflows can rapidly turn into capital outflows thereby creating economic instability or even financial crises, especially in developing countries.

Broadly speaking, capital flows can be divided into foreign direct investment, portfolio investment, and bank lending. While bank lending has lost in importance as a source of finance in the 1990s as compared to the 1970s or 1980s, it still amounts to about 20 percent of capital inflows. As German banks are among the major creditors to industrial as well as developing countries, their lending behaviour is of particular interest.

This paper analyses German banks' lending behaviour towards industrial and non-industrial countries. In particular, the discrepancy in bank lending to these two country groups is explained as about 85 percent is directed to industrial and only about 15 percent to non-industrial countries.

The analysis is conduced in two steps. First, the determinants of German bank lending are estimated using a gravity model positing that claims depend positively on recipient countries' economic size and negatively on the distance to Germany as well as other factors. Second, the lending gap between IC and Non-IC countries is decomposed into one part stemming from differences in countries' endowments and one part that results from German banks' different treatment of these country groups with respect to their fundamentals.

The findings are that market size proxies, distance from Germany, foreign direct investment and country risk explain most of the variation in German foreign claims. With respect to the lending gap between IC and Non-IC countries, it turns out that differences in countries' factor endowments explain more than two thirds of this gap, while less than one third is unexplained and hence due to different treatment of countries' fundamentals and a residual of unobserved factors.

Nichttechnische Zusammenfassung

Aus theoretischer Sicht bieten internationale Kapitalflüsse sowohl für Kreditnehmer als auch Kreditgeber die Möglichkeit, Risiken besser zu streuen und die ökonomische Effizienz zu steigern. In der Realität können Kapitalzuflüsse sich jedoch schnell in Kapitalabflüsse verwandeln und somit zu Instabilität oder sogar Finanzkrisen beitragen.

Im Allgemeinen kann man Kapitalflüsse in Direktinvestitionen, Portfolioinvestitionen und Bankkredite unterteilen. Wenngleich Bankkredite in den 90er Jahren im Vergleich zu den 70er und 80er Jahren an Bedeutung verloren haben, machen sie immer noch etwa 20 Prozent aller Kapitalzuflüsse aus. Da die deutschen Banken zu den größten Kreditgebern weltweit gehören, ist ihr Kreditvergabeverhalten von besonderem Interesse.

In diesem Papier wird die Kreditvergabe deutscher Banken an Industrie- und Nicht-Industrieländer analysiert. Insbesondere wird das Ziel verfolgt, die Diskrepanz in der Kreditvergabe an diese beiden Ländergruppen, 85 Prozent aller Kredite gehen an Industrieländer und lediglich 15 Prozent an Nicht-Industrieländer, zu erklären.

Das Vorgehen unterteilt sich in zwei Schritte. Zunächst werden die Determinanten der deutschen Kreditvergabe unter Verwendung eines Gravitätsmodells geschätzt. Aus dem Modell lässt sich ableiten, dass die Kreditvergabe unter anderem positiv von der wirtschaftlichen Größe eines Nehmerlandes und negativ von der Distanz zu Deutschland abhängt. Anschließend wird der Unterschied in der Kreditvergabe zwischen Industrie- und Nicht-Industrieländern in zwei Komponenten zerlegt, nämlich in einen ersten Teil, der sich durch unterschiedliche Fundamentalfaktoren in den Ländergruppen erklären lässt, und einen zweiten, der sich auf unterschiedliche Behandlung dieser Fundamentalfaktoren zurückführen lässt.

Es zeigt sich, dass Marktgröße, Distanz zu Deutschland, Direktinvestitionen deutscher Firmen sowie das Länderrisiko der Nehmerländer die Variation in der deutschen Kreditvergabe fast komplett erklären. Die Diskrepanz in der Kreditvergabe an Industrie- und Nicht-Industrieländer lässt sich zu mehr als zwei Dritteln auf Unterschiede in den eben genannten Fundamentalfaktoren zurückführen, während ein Drittel unerklärt bleibt und somit von unterschiedlicher Behandlung der Fundamentalfaktoren sowie einem Residuum an unbeobachteten Faktoren stammt.

Contents

German bank lending to industrial and non-industrial countries: Driven by fundamentals or different treatment?[#*]

1 Motivation

Capital mobility can help investors diversify portfolio risk and can enable borrowers to stimulate economic growth and smooth their consumption paths.[1] While it is commonly believed that freely moving capital among industrial countries enhances economic efficiency and thus increases total welfare, the positive impact of increased capital mobility for developing countries is still a subject of debate in the literature.[2] Proponents maintain that relaxing constraints on capital flows leads to a more efficient allocation of resources in developing countries, stimulating economic growth and enhancing economic well-being. Opponents emphasise that capital flows may result in higher economic instability and vulnerability to crises.[3] To understand the determinants of capital flows and their volatility has thus been an aim of empirical studies.[4]

The focus in this paper is on the determinants of one specific form of capital, namely German bank lending, and on one aspect of instability that arises from banks treating countries as a group rather than as individual countries. In theory, claims to different country groups such as industrial (IC) and non-industrial countries (Non-IC) may either deviate because countries in these groups differ with respect to their characteristics (e.g. market size) or because characteristics are treated differently, i.e. market size is valued differently depending on whether a country belongs to the IC or Non-IC country group. As is well known, banks have regional limits for their exposures in

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[1] See Calvo et al. (1996).

[2] Prasad et al. (2003, p.9) for instance find that consumption volatility declined with financial integration in industrial countries but not yet in developing countries.

[3] See Kaminsky (2004) and Obstfeld (1998) for a general discussion of the merits and drawbacks of capital flows.

[4] See Alfaro et al. (2005) for a recent study of the determinants of capital flows.

place and it is thus of interest to know how different groups of countries are treated when banks invest internationally.[5]

In particular, I will analyse the reasons for the disparate lending behaviour of German banks towards IC and Non-IC countries from 1996 to 2002.[6] I proceed in two steps: First, the determinants of German bank lending are estimated using an augmented gravity model. Second, the estimated gravity model is used to decompose the lending gap between industrial and non-industrial countries in a "characteristics" and a "treatment" effect.

The paper thus contributes to the literature in two ways: Firstly, by estimating a gravity equation for German bank lending using a new micro panel data-set and secondly by applying the Oaxaca (1973) decomposition technique to the gravity model, which has not yet been done. With respect to the discrepancy in lending towards IC and Non-IC countries, this technique makes it possible to calculate the share of the lending difference due to countries' endowments and the share stemming from unequal treatment of IC and Non-IC countries, respectively.

The findings of the paper can be summarized as follows: The gravity model shows that market size proxies, distance from Germany, foreign direct investment and country risk account for 80 percent of the variation in German bank loans. With respect to the lending gap between IC and Non-IC countries, I find that differences in countries' factor endowments explain more than two thirds of this gap, while less than one third is unexplained and hence due to different treatment of countries' fundamentals and a residual of unobserved factors.

The paper is structured as follows. First, I review the literature relevant to the study in Section 2. Following this, the empirical methodology applied in the paper will be outlined in Section 3.

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[5] Calvo et al. (1996) posit for instance that "the Mexican crisis of late 1994 tended to make the attitude of investors toward emerging markets more discriminating". Note, however, that it is not the aim of this paper to stress the impact of outstanding events, but rather to study treatment of country groups in general.

[6] This question is also related to the Lucas Paradox, i.e. why capital does not flow from rich to poor countries. However, as I do not have data on net German bank lending (inflows minus outflows) but only on German foreign bank lending, my results do not provide an explanation of the Lucas Paradox in the strict sense as outlined in Lucas (1990).

Subsequently, I describe the data sources and some stylised facts about banks' foreign exposures in Sections 4, while results are presented in Section 5. Section 6 concludes.

2 Review of the literature

As German bank lending is the focus of this study, I will briefly put it into perspective. Broadly speaking, private capital flows can be divided into foreign direct investment, equity or bond flows and bank lending.[7] Albeit bank lending has decreased in importance as a source of capital inflows in the last decade as compared to the 1970s and 1980s, it still accounts for about 20-30 percent of capital inflows to emerging markets and its high volatility has been an issue of ongoing concern.[8] With regard to the importance of German bank lending in international bank lending, it should be noted that German banks have been among the largest creditors to emerging markets in the last decade and account, at par with the US, for about 15-20 percent of all international bank claims.[9]

Due to the impact of capital flows on countries' development and economic well being, numerous empirical studies have been conducted to understand foreign direct investment patterns, equity and bond flows as well as international banks' lending behaviour.

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[7] Each form has specific benefits and drawbacks. Prasad et al. (2003) show that FDI flows are for instance much less volatile than other capital flows. See also Reisen and Soto (2001) who analyse the relationship between different types of capital flows and economic growth.

[8] In the 1970s, capital flows mainly comprised bank lending. This was attributable to bank deposits stemming from OPEC countries' current account surpluses (see Chadha and Folkerts-Landau, 1999). In the 1980s, however, bank lending declined dramatically as world interest rates rose and a severe debt crisis affected many developing countries. In contrast, the early 1990s are characterised by a surge of private capital flows. The financial crises in Mexico (1994), Asia (1997) and Russia (1998) are mirrored by a high volatility in portfolio flows and bank lending, while FDI flows have steadily increased. See e.g. Alfaro et al. (2005) for a review of capital flows from 1970 and 2000.

[9] See Consolidated Banking Statistics, Bank for International Settlements.

An approach often used for analysing international capital movements is to estimate a gravity model.[10] The basic idea behind a gravity model is related to physics and the fact that "gravitational attraction between two bodies depends upon the mass of each body and the distance separating them".[11] As attrition in physics, certain frictions will, however, impede the exchange in goods or capital.[12] As a consequence, the gravity model has been augmented to control for different sources of frictions in international capital flows.[13]

The gravity model, albeit initially an empirical approach, has been deduced from a variety of economic theories on goods and asset trade, respectively. Concerning the volume of trade, for instance Helpman (1998, p. 24) derives an equation in which the volume of trade depends positively on the trading partners' GDP levels. Martin and Rey (2004) specify a theoretical model to analyse the determinants of asset flows from which the gravity equation emerges.[14] Buch (2000) outlines a portfolio model suggesting that excess returns, market size and risks determine foreign lending activities of commercial banks.

As this paper applies an augmented gravity model to analyse German bank lending, three recent papers using gravity models to explain bank lending are related to the present paper. First, Rose and Spiegel (2004) estimate a gravity model in the context of sovereign default using bank claims as dependent variable. Their analysis is based on the hypothesis that trade sanctions imply a severe penalty following a country's default. Hence, they expect creditors with larger bilateral trade flows to have a comparative advantage in bank lending as their power to penalize is ceteris paribus higher. Using the "Consolidated Banking Statistics" provided by the Bank for

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[10] This methodology dates back to Tinbergen (1962) and Pöyhönen (1963), who estimated a gravity model for trade flows.
[11] See Baldwin (1994, p. 119). In the context of this paper, the gravity equation postulates that bank lending between Germany and other countries depends on countries' economic size and information costs.
[12] On this issue, Tinbergen (1962, p. 265) writes: "Apart from purely economic variables it is likely that political or semi-political factors play a part in determining the volume of trade between countries".
[13] Rose (2000) for instance estimates a gravity model for bilateral trade controlling for currency unions, an issue also dating back to Tinbergen's (1962, p. 265) study, in which he controlled for "the existence of special trade agreements" by including a specific dummy variable to measure this effect.
[14] Strictly speaking, their equation depends on financial wealth, aggregate consumption, transaction costs as well as the expected return of assets (see Martin and Rey, 2004, p. 352). For assets such as equities, financial wealth is proxied in empirical applications by stock market capitalisation, see e.g. Portes and Rey (1999). For bank lending, the volume of GDP seems more appropriate (see Buch and Lipponer (2004) or Papaioannou (2005)).

International Settlements (BIS), they find a statistically and economically significant impact of trade flows on bank lending.[15]

Papaioannou (2005) estimates a gravity model using the "Locational Banking Statistics", a different data source from the BIS.[16] Instead of analysing stocks of claims as Rose and Spiegel (2004), this author looks at currency adjusted lending flows. This study, covering flows of BIS reporting countries and their respective debtors from 1984 to 2002, stresses the importance of institutional quality for bank lending.[17] The results point to a positive and significant as well as robust impact of institutional quality on the size of absolute bank flows.

Also related to the present study is a paper by Buch and Lipponer (2004) using a gravity model to analyse a) which German banks go abroad and b) whether banks enter new markets via subsidiaries (FDI) or via cross-border financial services.[18] They find that larger GDP and bilateral trade flows are positively linked to German banking activities abroad, while distance exerts a negative impact.[19]

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[15] A major problem of their paper is, however, whether the observed relationship is in fact due to comparative advantage in penalizing sovereign defaults. An impact of trade on lending may also occur for a variety of other reasons. Among a number of reasons put forward in a paper by Wright (2004), one obvious channel between trade flows and bank lending exists because banks offer trade credits and hence countries with high bilateral trading volumes also have larger bank claims on each other.

[16] Note that both data-sets (Consolidated Banking Statistics and Locational Banking Statistics) have advantages and disadvantages. While the Consolidated Banking Statistics data takes for instance lending between banks at home and their subsidiaries abroad into account, there is no adjustment for changes in stocks of claims due to currency changes. The Locational Banking Statistics, on the other hand, provides flow data adjusted for currency fluctuations but does not control for intra-bank lending. For more information on the different BIS data sources see Wooldridge (2002).

[17] For an analysis of the impact of institutional quality on stock returns in emerging markets see Bilson et al. (2002). Alfaro et al. (2003) emphasize the role of institutions when explaining the Lucas Paradox. See Political Risk Services Group (2003) for a description of the index.

[18] Cross-border financial services are defined as the sum of bank premiums and interest rate returns paid and received. FDI is defined as claim from a German bank to its foreign affiliate. Their analysis is based on data from the Deutsche Bundesbank and hence only one creditor country, Germany, and its activities abroad is subject of the analysis in their as well as in this paper.

[19] It should be noted that the data used in our paper, albeit also stemming from the Bundesbank, differs from Buch and Lipponer (2004) in two respects: Firstly, we use the stock of foreign claims, i.e. the volume of outstanding claims, rather than the volume of premiums and interest payments on these claims as dependent variable. Premiums and Interest rate payments are defined as the volume of claims multiplied with claim specific premiums and interest rates, respectively. Secondly, we concentrate on consolidated claims for the largest 15 banks instead of claims for all banks, as consolidated data is not available for all banks. These 15 banks account for 75 percent of all consolidated claims. Our data stem from the Department for Banking and Financial Supervision. As we consolidated the data ourselves, we limited the coverage of banks due to time constraints to the largest banks in German foreign lending.

3 Empirical methodology

The empirical part of the paper is divided into two sections. In the first section, an augmented gravity model along the lines of Buch and Lipponer (2004), Rose and Spiegel (2004) and Papaioannou (2005) is estimated. In the second part, the mean difference in claims towards industrial and non-industrial countries is decomposed into an "explained" and an "unexplained" part by applying a technique proposed in Oaxaca (1973) including an extension suggested in Yun (2003).

3.1 The augmented gravity model

The gravity model takes the following form:[20]

$$\text{Ln}(\text{claims}_{b,c,t}) = \text{c} + \alpha * \ln(\text{gdp}_{c,t}) + \beta * \ln(\text{dist}_c) + \gamma \ln(\text{fdi}_{c,t}) + \delta * \ln(\text{risk}_{c,t}) + \zeta * \text{mc}_{c,t} + \mu_b + \mu_c + \mu_t + \varepsilon_{b,c,t}$$

where subscript *b* stands for *creditor bank*, *c* for the *receiving country* and *t* for *time* (year).

The dependent variable is:

- $Ln\ (claims_{b,c,t})$: Log of real claims (stock) from bank b to country c in year t

The set of regressors[21] include:

- $Ln(gdp_{c,t})$: Log of real GDP of country c in year t
- $Ln(dist_c)$: Log of distance of country c from Germany
- $Ln(fdi_{c,t})$: Log of real FDI (stock) from Germany in country c in year t
- $Ln(risk_{c,t})$: Log of an index for country risk (combining political, economic as well as financial risk) of country c in year t
- $Mc_{c,t}$: Stock market capitalisation in % of GDP of country c in year t

[20] All variables are denominated in Euro or have been converted to Euro as described in Table 1 (Appendix).

Note that the data-set exhibits three dimensions and thus three unobserved effects may exist: Bank [μ_b], country [μ_c] and time [μ_t] specific effects. The error term $\varepsilon_{b,c,t}$ is assumed to have a mean of zero as well as a constant variance.

I estimate this model using cluster regression, i.e. a general version of the random effects model.[22] The baseline specification includes bank and time dummies to control for μ_b and μ_t.

Controlling for μ_c is, however, not fully possible as including country dummies takes away all explanatory power of the regressors.[23] This can be seen by looking at Table 3, which exhibits an analysis of variance of the variables across groups (defined as bank*country) and time (year). Note that the variance of the regressors (X_{it}) for the pooled data is by construction the sum of the between group variance and the within group variance. As can be seen, there is hardly any variation of the data across time. Instead, most of the variation in the data stems from variation across groups, i.e. bank country combinations, as shown by the similarity of between group variation and pooled variation. Estimating a fixed effects model therefore does a priori not make sense as the variation within groups is very small.

A standard random effects estimation is also not desirable due to the possible presence of heteroscedasticity which may stem from the fact that the regressors take on the same value for each bank. For example: GDP for Argentina in 1996 is the same for Deutsche Bank as well as Dresdner Bank and all other banks, so is the value for country risk, FDI and market capitalization.[24] In other words, the explanatory variables only vary across country and time, resulting in a violation of the assumption that errors are independently distributed. Instead, errors may systematically depend on specific groups, i.e. countries. This problem has been called the

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[21] See Table 1 for sources and exact definitions of variables.
[22] This is done using STATA 8. For details on cluster regression see e.g. Manual [U], pp. 270.
[23] This will be shown in a regression in Section 4.
[24] Note that distance only varies across country and not time.

"*Moulton Problem*" in the literature.[25] The problem is solved by estimating *cluster* regressions, where the country dimension is defined as cluster.[26]

A common concern in regression analysis is endogeneity of the regressors with respect to the dependent variable resulting in a correlation of the explanatory variable with the error term and thus inconsistent estimates of the ß coefficients. In the gravity model estimated, endogeneity is, however, not a major concern as we use individual bank data. It is unlikely that German bank lending significantly influences the right hand side variables such as GDP, FDI, country risk or market capitalization.

Choice of variables

The determinants of German foreign lending in this paper include the "usual" gravity factors such as GDP and distance as proxies for market size and information costs. As additional controls, the stock of FDI, an index covering political, economic and financial country risk in the borrower country as well as stock market capitalisation in percent of GDP in debtor countries are included in the baseline specification. The model is estimated for the full sample as well as separately for IC and non-IC countries. We expect the following effects of the explanatory variables:

GDP: GDP is commonly used in gravity models as a proxy for market size. As I only analyse bank lending from Germany to other countries, I only include the recipient country's GDP. On the one hand, larger claims are ceteris paribus demanded to finance expenditures and on the other hand, German banks face more opportunities to invest, which results in a larger supply of credit. Hence, I expect a positive coefficient on GDP.

Distance: A priori, the effect of distance is ambiguous. Albeit most empirical studies such Portes and Rey (1999), Rose and Spiegel (2004) or Papaioannou (2005) find a negative impact of distance on capital flows or asset holdings, a positive effect of distance can be rationalised from a

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[25] See Moulton (1986). Unadjusted standard errors may exhibit a large bias downwards implying the danger of spurious regression. The problem arises if errors are correlated within groups. In our case, a group is country.

[26] Note that standard errors estimated with a cluster regression are also "robust", i.e. cluster takes serial correlation as well as heteroscedasticity into account.

portfolio point of view. While the former effect is explained by rising information costs in countries situated further away, the latter effect can be rationalised by deceasing business cycle correlations in more distant countries and thus an opportunity to diversify a bank's portfolio (see Buch, 1999).[27]

FDI: In the baseline regression, I include the stock of German FDI instead of trade flows because it is a stock variable as the dependent variable. Intuitively, as banks finance part of companies' FDI, countries receiving ceteris paribus more FDI from German companies are expected to receive higher claims than others, i.e. German banks follow their customers abroad (see Buch, 2000). Furthermore, banks may follow FDI also due to better information about the country gained from financing FDI or even from the knowledge of German companies abroad.[28]

Country risk: Concerning the index for country risk, which includes for instance countries' government stability and democratic accountability as proxies for political risk, inflation and current account deficit as economic variables, or short term debt as financial risk, among others, we expect a positive coefficient: Countries with lower country risk (i.e. larger value of the variable) receive ceteris paribus more foreign claims. Several studies have recently explored the effect of country risk on capital flows.[29]

Market capitalisation: Finally, stock market capitalisation in percent of GDP is included to proxy for the size of countries' financial markets as in Buch and Lipponer (2004) and Portes and Rey (1999). It is, however, an empirical question whether market capitalisation exerts a positive or negative impact on German banks' foreign assets: A larger financial market implies more demand for loans as well as opportunities to invest and can thus be considered an additional proxy for market size. However, a high ratio of market capitalisation to GDP might also mirror a

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[27] Note that Tinbergen (1962, p. 263) pointed out that distance would not only proxy for transportation but also for information costs. Portes and Rey (1999) find that the coefficient of distance drops when including other measures of information asymmetries implying that distance indeed is a proxy for information costs. Note, however, that distance in this paper not only proxies information but to some extent for physical transport costs as long as banks are financing foreign trade (see Buch, 1999).

[28] Note that German FDI is positively and distance negatively correlated with Germany's bilateral trade flows and thus both variables capture trade financing activities of German banks to some extend.

[29] See e.g. Alfaro et al. (2005) and Papaioannou (2005).

market-based in contrast to a bank-based system and thus a ceteris paribus lower demand for foreign claims if these are considered as substitutes rather than complements.[30]

3.2 The decomposition analysis

With respect to the literature on decomposition analysis it should be noted that there is, according to my best knowledge, no study that has applied this technique in the context of either gravity models for trade flows or international bank lending. The technique, initially introduced by Oaxaca (1973), allows to decompose the mean difference of the dependent variable (the average difference in claims to IC and Non-IC countries) into a part stemming from different characteristics (such as market size, distance etc.), i.e. an "explained part" and an "unexplained part" stemming from different ß-coefficients obtained in separate regressions for IC and Non-IC countries.[31]

The technique, albeit initially used to decompose wage differentials between men and women or public and private sector employees, is not confined to this subject area but can be applied in other areas as well.[32] Examples include Ham, Svejnar and Terrell (1998) who study unemployment duration, Moore and Newman (1988) focusing on American post-war trade union membership or Heitmueller (2004) analysing job mobility between England and Scotland.

In the present paper, the mean difference in bank claims towards industrial and non-industrial countries can thus be decomposed into an explained as well as an unexplained part. I first estimate the augmented gravity model for the two respective groups, industrial and non-industrial countries.

$$Y_g = X_g \beta_g + \varepsilon_g \qquad (1)$$

[30] Traditionally, financial sectors are described either as market-based or bank based systems, respectively. See Levine (2002) for an economic assessment of the two types across countries. Note that this distinction is not only an issue for industrial countries but also for developing countries. Demirguc-Kunt and Maksimovic (1996) show for instance that bank and equity finance are rather complements than substitutes in developing countries.
[31] If omission of variables is not a concern, this part reflects unequal treatment of IC and Non-IC countries.
[32] See Yun (2003, p.1).

with Y, a vector (n x 1) of the dependent variable (ln_claims), X, a matrix (n x k) of regressors, ß, a vector (k x 1) of coefficients, and an error term, ε (n x 1). After estimating (1) for each group, the set of estimated ß-coefficients can be used to predict the average claim of each group *g:*[33]

$$\overline{Y}_{IC} = \overline{X}_{IC}\ \hat{\beta}_{IC} \qquad (2a)$$

$$\overline{Y}_{n\_IC} = \overline{X}_{n\_IC}\ \hat{\beta}_{n\_IC} \qquad (2b)$$

The difference in predicted average claims can be written as:

$$\overline{Y}_{IC} - \overline{Y}_{n\_IC} = \overline{X}_{IC}\ \hat{\beta}_{IC} - \overline{X}_{n\_IC}\ \hat{\beta}_{n\_IC} \qquad (3)$$

After simple algebraic manipulations[34], one obtains the following equation:

$$\overline{Y}_{IC} - \overline{Y}_{n\_IC} = \underbrace{(\overline{X}_{IC} - \overline{X}_{n\_IC})\ \hat{\beta}_{IC}}_{explained} + \underbrace{\overline{X}_{n\_IC}\ (\hat{\beta}_{IC} - \hat{\beta}_{n\_IC})}_{unexplained} \qquad (4)$$

Thus, holding everything else constant and taking the same ß-coefficients for both groups, differences in countries' endowments result in a difference in average (log) claims of magnitude "*explained"*. The second term named *unexplained* is the difference between the estimated slope coefficients (i.e., ßs) for IC and Non-IC countries weighted by the average level of characteristics of Non-IC countries.[35] Thus, ceteris paribus, the weighted difference in ß-coefficients results in a mean difference of the dependent variable of magnitude "*unexplained*".

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[33] $\overline{Y}$ (1 x 1) is the mean of the dependent variable, $\overline{X}$ is a row vector (1 x k) of means of the explanatory variables and ß a column vector (k x 1) of estimated coefficients from (1).

[34] Define: $\Delta\overline{X} = (\overline{X}_{IC} - \overline{X}_{n\_IC})$ and $\Delta\hat{\beta} = (\hat{\beta}_{n\_IC} - \hat{\beta}_{IC})$. Now replace $\hat{\beta}_{n\_IC}$

$\overline{Y}_{IC} - \overline{Y}_{n\_IC} = \overline{X}_{IC}\ \hat{\beta}_{IC} - \overline{X}_{n\_IC}\ (\hat{\beta}_{IC} + \Delta\hat{\beta})$

$\overline{Y}_{IC} - \overline{Y}_{n\_IC} = (\overline{X}_{IC} - \overline{X}_{n\_IC})\ \hat{\beta}_{IC} - \overline{X}_{n\_IC}\ (\Delta\hat{\beta})$

[35] Note that one can also change weights such that $\overline{Y}_{IC} - \overline{Y}_{n\_IC} = (\overline{X}_{IC} - \overline{X}_{n\_IC})\ \hat{\beta}_{n\_IC} + \overline{X}_{IC}\ (\hat{\beta}_{IC} - \hat{\beta}_{n\_IC})$ which will in most cases lead to different results due to different weights. Thus, the results of both weighting schemes will be presented.

Having decomposed the difference, we know how much is *explained* by disparities in countries' fundamentals and how much is *unexplained* and thus due to different behaviour (shown in different ß-coefficients) of German banks with respect to industrial and non-industrial countries, respectively.

Hence, the findings shed light on the question why bank lending from Germany to IC and Non-IC countries differs. However, these are aggregate figures and we do not know yet which of the regressors and coefficients, respectively, contributes how much to this difference.

Further insights can be obtained from a detailed decomposition of the difference in the means of the dependent variable. For each explanatory variable and for each ß-coefficient one can compute its share of the total *explained* and *unexplained* part, respectively.

$$\text{Explained}_j = (\overline{x}_{IC,j} - \overline{x}_{n\_IC,j})\,\hat{\beta}_{IC,j} \qquad (5)$$

$$\text{Unexplained}_j = \overline{x}_{n\_IC,j}(\hat{\beta}_{IC,j} - \hat{\beta}_{n\_IC,j}) \qquad (6)$$

Thus, Explained_j represents the fraction of the explained difference in (4) due to differences in the j^{th} mean characteristic. Take country risk as an example: Because IC and Non-IC countries have different average values of country risk, the difference in mean (log) outstanding claims is of magnitude Explained_j. Similarly, Unexplained_j is the part of the unexplained component in equation (4) that is due to differences in the j^{th} ß-coefficient, e.g. a different ß-coefficient of the variable country risk, weighted by the average country risk in Non-IC countries.[36]

[36] Note that an identification problem has to be taken into account with respect to the detailed decomposition of the coefficients effect for dummy variables. As a matter of fact, the detailed coefficients effect is sensitive to the left out reference group (see e.g. Oaxaca and Ransom 1999). Yun (2003) proposes a solution to the problem that was applied in the paper. As we apply decomposition to an OLS regression, the formulas can be directly applied as shown in Yun (2003, p. 8).

Note that by construction, the explained part in (4) is the sum of all individual explained parts in (5), i.e. $\sum_{1}^{k} \text{Explained}_j = \text{Explained}$. The same holds for the individual unexplained parts, i.e. $\sum_{1}^{k} \text{Unexplained}_j = \text{Unexplained}$.

Possible Caveats of decomposition analysis

Before turning to the data sources and results, I discuss some potential caveats when applying decomposition analysis. **First**, some coefficients might turn out significant for one group but not for the other, which is not taken into account by the analysis (see Moore and Newman, 1988). In our study, however, this will not pose a large problem as most coefficients are at least almost significant for both samples. **Second**, some variables a priori only matter for one group but not the other: A dummy variable for EU membership would take the value zero for all Non-IC countries prior to 2004 and hence cannot be estimated. In this paper, we encounter outliers that could be controlled for by dummy variables and an interaction term, however only for the Non-IC sample. The dummy as well as the interaction term cannot be estimated for the IC sample and therefore need to be excluded, which is dissatisfactory to some extent. **Third**, an identification problem exists with respect to dummy variables, i.e. the estimated detailed coefficients effect (equation 6) attributed to a dummy variable depends on the choice of the left-out reference group (see Oaxaca and Ransom, 1999). To take an example, the coefficient effect of a time dummy concerning two time periods, e.g. 1999 and 2000, depends on whether 1999 or 2000 is included in the regression. Despite the fact that we are not interested in a particular dummy variable in this study (we only include time and bank dummies), we take this problem into account by applying a correction suggested in Yun (2003). The correction approximates the "true" contribution of individual dummy variables to the difference in claims by averaging the estimates with various reference groups (in the example above, the "true" coefficient effect is the average of one regression with a dummy for 1999 and one with a dummy for 2000 included in the regression). **Fourth**, as we need to make predictions of the dependent variable in the decomposition analysis, a high R^2 is desirable (see Bender 2003). Thus, in the context of this paper, it is desirable to explain a large fraction of the variance in foreign bank claims. As gravity models generally explain a large fraction of the dependent variable, in our case around 80%, this is not a serious concern in the present study. **Fifth**, as out of sample predictions are needed to decompose the difference in average claims, we need to assume that the variables enter the model in the same functional form in IC as well as Non-IC country regressions. I use the standard functional form suggested in the literature on gravity models for capital flows and thus this issue raises no major concern in this study.[37] As none of the other caveats has raised serious concerns, decomposition analysis for the gravity model on bank claims can be performed.

4 Data sources

Dependent Variable: The data on foreign claims of German banks, which I use in this paper, are collected in the credit register of three million Deutsche Mark or more at the Deutsche Bundesbank. German credit institutions are required to report all claims which have exceeded the threshold of €1.5 million at the end of each quarter.[38] To obtain an adequate measure of banks' total credit exposure, the data has been adjusted in several ways.[39]

The sample includes 15 German banks and their foreign subsidiaries covering 75 percent of total unconsolidated exposure of German banks from 1996 to 2002.[40] Hence, the maximum sample size is 6195 observations, i.e. 15 banks' exposures to 59 countries from 1996 to 2002.[41]

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[37] If this were not the case, a pooling of the two country groups would not be possible at all, even if one would control for different intercepts and slope coefficients. While it makes sense that the impact of a variable varies with its level (e.g. decreasing importance of country size taken account of by including GDP in logarithmic form), there is no a priori reason why e.g. GDP should have a larger effect on Non-IC country lending provided other factors such country risk etc. are controlled for.

[38] Claims include on- and off-balance sheet activities. Off-balance-sheet items include derivatives (other than written option positions), guarantees assumed in respect of these, and other off-balance-sheet transactions (Deutsche Bundesbank, 1998). The following items are deemed not to be credit exposures: shares in other enterprises irrespective of how they are shown in the balance sheet and securities in the trading portfolio.

[39] First, we consolidated all foreign claims to exclude inter-office positions between a head institution and its foreign subsidiaries. Second, we subtracted publicly guaranteed claims from total claims to obtain a more accurate measure of banks' effective foreign exposure to credit risk. Hence, in comparison to other data sources the Bundesbank data allow a much better calculation of banks' credit exposures. However, there are also some important shortcomings. There are no data available on valuation changes (for example write-downs of non-performing loans, currency composition). Furthermore, we have no information on banks' indirect exposures via their lending to other commercial entities such as hedge funds. See Nestmann et al. (2004) for a detailed description and a descriptive analysis of the data-set.

[40] Banks included are listed in Appendix I. For a detailed overview of the German banking system see Brunner et al. (2004), Krahnen and Schmidt (2004), Koetter et. al. (2004) and Sachverständigenrat (2004).

[41] As not every bank has an exposure in all countries at all times, 5276 exposures show up in the data-set, with 3215 observations reported in Non-IC countries and 2061 in IC countries.

Explanatory variables: The explanatory variables included in the regression analysis mainly stem from the World Development Indicators of the World Bank. Other sources are the Direction of Trade Statistics from the International Monetary Fund as well as the International Capital Links Statistics of Deutsche Bundesbank.

Some stylised Facts

Some stylised facts on German bank lending will now be highlighted. Table 2a shows total claims by region for the period 1996 to 2002. Worth noting is the following: First, total claims to IC countries are about 8 times larger in 1996 and about 11 times larger in 2002 than claims to Non-IC countries, i.e. the gap between lending to IC and Non-IC countries has widened over time. Second, Asia, Western Hemisphere and Emerging Europe receive the largest shares of lending to Non-IC countries, while exposure to Middle East and Africa is comparatively low.[42] Third, while claims to Asia have remained more or less constant, claims to Emerging Europe, Western Hemisphere and Industrial countries have constantly been rising from year to year.[43] Table 2b exhibits the average annual exposure of large commercial as well as *Land* banks from 1996 to 2002. As can be seen, the United States and the United Kingdom receive by far the largest amount of German bank lending, followed by France and the Netherlands. Non-IC countries obtaining large amounts of German credit are Brazil, Poland, Korea and Russia. About twenty out of the 59 countries in our sample receive less than 1 Billion Euro per year with Bolivia, Paraguay and Namibia each obtaining less than 100 Million Euro. It should be noted that there is, however, a considerable variation of claims within IC and Non-IC countries, respectively.

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[42] Note that I use the regional classification of the IMF. Countries belong to Industrial countries, Asia, Africa, Middle East, Western Hemisphere or Emerging Europe.

[43] Note that claims to Asia rose before the Asian crisis in 1997 and fell back to its pre-crisis level afterwards. The Russian crisis cannot be seen in the data, possibly because I use yearly averages of stocks of claims. Western Hemisphere's exposure decreased after the crisis in Argentina in 2001.

5 Results

In this section, the gravity model is estimated and tested for sensitivity. Afterwards, the decomposition analysis will be carried out in Section 5.2 using the estimates of the baseline gravity equation obtained in Section 5.1.

5.1 Results from estimating the augmented gravity model

German bank lending can be analysed using a gravity model as described in Section 3.[44] It posits that bank lending depends positively on GDP, German companies' FDI, country risk as well as market capitalization in debtor countries and negatively on distance from Germany.[45] **Table 5a** shows the results from estimating the baseline specification.

Table 5a. Baseline specification

	(1)	(2)	(3)
	All countries, baseline	IC countries, baseline	Non-IC countries, baseline
ln_gdp	0.767***	0.658***	0.570***
	(8.24)	(5.52)	(3.38)
ln_dist	-0.363***	-0.353***	-0.152
	(6.34)	(4.35)	(1.42)
ln_fdi	0.074***	0.106**	0.093***
	(3.20)	(2.41)	(2.80)
ln_risk	4.104***	2.174	2.456**
	(4.82)	(1.27)	(2.21)
mc	0.004***	0.003**	0.003
	(3.22)	(2.22)	(1.65)
Observations	4428	2060	2368
R-squared	0.78	0.81	0.62

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses: For (1) – (3), country is set as cluster, as described in Section 6. For definition of variables see Table 1.

In regression (1), all variables have the expected sign and are significant at the one percent level. Due to the fact that the dependent as well as all explanatory variables (apart from market capitalization) are expressed in logarithms, we can interpret each ß-coefficient as elasticity. For

[44] With respect to the variables included in the baseline specification it should be noted that overlaps between IC and Non-IC countries exist for all variables.
[45] Note that country risk is scaled from 0 (very low risk) to 100 (very high risk) and thus larger values imply less risk.

instance, concerning the impact of market size on bank lending, we observe that a one percent higher GDP leads on average to 0.76 percent higher claims. Geographical distance has the expected negative sign implying that countries further away from Germany obtain ceteris paribus less bank lending. Note also that countries which host ceteris paribus more German FDI also obtain a larger amount of foreign claims and that a 1 percent lower country risk index induces a 4 percent larger amount of claims. Finally, if the average market capitalization to GDP ratio is one percent higher, bank lending rises by 0.2 percent.[46] As is common to gravity models, the variation of the dependent variable is well explained by the variation in the explanatory variables, as shown by the R^2 value of 78 percent.

Columns (2) and (3) from Table 5a show the baseline regression estimated separately for the two groups focused on in this paper. The results are qualitatively similar to (1), i.e. coefficients have the same sign. Concerning the magnitude, however, some differences stand out: Distance is not different from zero for non-industrial countries, while it is negative and significant for the IC sample. This should, however, not be interpreted as if information costs do not play a role in bank lending to Non-IC countries. As mentioned above, the benefits of diversification may cancel increased information costs out and therefore result in a neutral impact of distance on bank lending (see Buch, 1999). Concerning country risk, the coefficient for IC countries is not significant and slightly lower than for Non-IC countries. FDI and market capitalisation have almost the same coefficient in both samples.

I test the sensitivity of the baseline regression in several ways. First, I estimated the baseline using claims adjusted for currency fluctuations (Table 5b). Second, I estimate the gravity model allowing for other structures of the error term as well as with and without outliers, respectively (Table 5c). Third, I check the sensitivity with respect to different time periods as well as aggregated over all time periods (Table 5d). Fourth, I add banks' total assets as a bank specific variable to the baseline specification (Table 5e). Fifth, I apply a Tobit regression to the gravity

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[46] Note that in the Log-Lin specification, the elasticity of Y (Dependent variable) with respect to X (Regressor) depends on the value of X. Here we evaluate the elasticity of Y with respect to X at the mean of mc, i.e. we multiply the average value of mc with the ß-coefficient (52*0.004).

model (Table 6a). Finally, I include several control variables, thereby testing their impact on the dependent as well as interactions with regressors (Tables 6b and 6c).

Concerning all these additional regressions, I find that the coefficients of the baseline regression remain almost unchanged and that none of the added covariates appears to have a significant impact on German bank lending. To save space, regressions are only shown and described in Appendix IV.

5.2 Results from the decomposition analysis

To explore the issue of lending discrepancies between IC and non-IC countries, I apply the decomposition technique introduced by Oaxaca (1973). This will shed light on the question why Non–IC countries receive significantly less foreign bank lending than IC countries. As a matter of fact, the mean difference between IC and Non-IC countries can be decomposed into an explained part (due to differences in Xs) and an unexplained part (due to differences in ß-coefficients) as shown in Section 3. Now take a closer look at **Table 8** to obtain an idea of the magnitude of the explained and unexplained part, respectively.

Table 8. Decomposition of differences in mean predicted claims

Predicted log claims	$Mean_{IC}$ =13.64	$Mean_{NIC}$ = 10.85
ln_claims_{IC} - ln_claims_{NIC}	2.802* (100 %)	
Explained (weight $ß_{IC}$)	2.128* (76 %)	---
Explained (weight $ß_{NIC}$)	-----	1.771* (63%)
Unexplained (weight X_{NIC})	0.674* (24 %)	---
Unexplained (weight X_{IC})	----	1.030* (37%)

Notes: Bootstrapped standard errors. *Significant at the 1% level.

The overall difference in predicted average lending (in logs) between the two groups is about 2.8. Regardless of the weighting scheme ($ß=ß_{IC}$ or $ß=ß_{NIC}$), most of the differential in (log) mean loans is accounted for by differences in countries' characteristics. As can be seen, between 63 and 76 percent of this discrepancy are due to differing characteristics, i.e. means of the explanatory variables, while about 24 to 37 percent stem from differences in coefficient values which were estimated in separate regressions for IC and Non-IC countries. In other words, because the two groups have different average levels of GDP, distance to Germany, FDI from German companies, country risk and market capitalization as percentage of GDP, the average value of claims in non-IC countries is lower than in IC countries.[47] It is worth noting that all figures have to be interpreted ceteris paribus, i.e. everything else constant, the difference in (log) lending due to the characteristics effect would be between 1.8 to 2.1, while the coefficient effect ceteris paribus induces a mean difference in (log) lending between 0.7 and 1.0.[48]

Since we are particularly interested in the composition of the explained and unexplained part, we also perform a detailed decomposition of the average difference in bank loans.

Table 9. Detailed decomposition of differences in mean predicted claims

	Expl. (weight $ß_{IC}$)	**Unexpl.** (weight X_{NIC})	**Expl.** (weight $ß_{NIC}$)	**Unexpl.** (weight X_{IC})
ln_gdp	0.989*	-1.203	0.856*	-1.250
ln_dist	0.321*	2.232	0.138*	2.365
ln_fdi	0.488*	0.041	0.432*	0.097
ln_risk	0.358*	-1.568*	0.405*	-1.385*
mc	0.139*	-0.010	0.151*	-0.022
Time dummies	0.0085#	0.5392#	0.0052#	0.5359#
Bank dummies	0.158#	7.206#	0.205#	7.252#
Constant	---	-6.564	---	-6.564

Notes: Bootstrapped standard errors. *Significant at the 1% level.# This figure is the sum of the individual time and bank effects, respectively. Only some time and dummy variables are significant.

47 Note that time as well as bank dummies are included but not shown. They contribute to the explained and unexplained part, as will be seen in the detailed decomposition further below.

48 Since the explained and the unexplained parts are positive, their adding up increases the average difference. However, this needs not to be the case. If, on the contrary, the unexplained part would e.g. be negative, explained and unexplained part would balance each other out, i.e. a difference in characteristics would be compensated by a difference in coefficients. See e.g. Moore and Newman (1988).

Table 9 shows the results. Clearly, differences in GDP account for the largest fraction of the explained part: The differences in GDP would, ceteris paribus, increase the gap of (log) claims between 0.85 and 0.99. With respect to another proxy for market size, mc, we only observe a low predicted (log) difference in claims between IC and non-IC countries of about 0.14. Additionally, the fact that Non-IC countries are further away from Germany, receive less FDI and have on average a lower country risk index, would ceteris paribus lead to a (log) discrepancy in bank lending of 0.1 to 0.3, 0.43 to 0.48 and 0.35 to 0.40, respectively, depending on the weighting scheme. Note that all estimates have been tested for their significance using bootstrap confidence intervals.[49] For the explained part, all gaps are significant at the 1% level. To summarise: Per capita GDP, FDI and country risk account for most of the observed differences in bank lending.

Besides the explained part, the overall difference in claims is due to different ß-coefficients in the regressions for IC and Non-IC countries as well as the constant term. The second and forth column of **Table 9** show for both weighting schemes the implied gaps in average loans that would, ceteris paribus, exist. Note that the constant term reflects characteristics that have not been captured by the regressors included in the model. Albeit the constant term is rather large in absolute size, it is not statistically significantly different from zero. The only significant difference in ß-coefficients concerns the country risk variable. In other words, it appears that banks treat country risk in both groups not in the same way. Some caution with this interpretation should be noted as country risk was not significant in the regression for IC countries and we omitted three countries from the Non-IC sample.[50] All other coefficient effects are not statistically different from zero. Thus, treatment between the two groups does not seem to be the driving force for the differences in German bank lending to IC and Non-IC countries.

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[49] See Efron and Tibshirani (1993) for details. The procedure can be illustrated as follows: 1000 samples of size N are drawn from the original data-set with replacement. For each sample, all statistics are re-estimated to derive standard errors and confidence intervals. Note that three different types of confidence intervals have been computed: The normal (N), the percentile (P) and the bias corrected (BC) which are similar if the bootstrap statistic is approximately normal. This is the case for all variables shown in Table 9. For further details see Stata7 Manual [A-G, p. 168].

[50] The countries are Indonesia, Russia and Turkey. Hence, this is only a conclusion that can be drawn for the countries in the sample.

6 Summary and conclusion

This paper explores the differences in average German bank lending to industrialised and non-industrial countries. This is done in two steps: First, I estimate an augmented gravity model for German bank lending including "gravity" factors such as GDP and distance. The augmenting factors are FDI of German companies, country risk and market capitalization in percent of GDP. The gravity model explains a large part of variation in German bank lending. It also provides the basis for the decomposition analysis which sheds light on the lending gap between lending to IC and Non-IC countries. The gap is decomposed into an explained part due to countries' endowments and an unexplained part due to different treatment of IC and Non-IC countries by German banks.

The results suggest that German bank lending is to a large extent allocated according to countries' fundamentals and different treatment of IC and Non-IC countries as groups appears comparatively small.

I thus conclude that IC and Non-IC countries are treated to a large extent in the same way and that being allocated to one group or the other should only be a minor concern. More importantly, improving country fundamentals, e.g. attracting more FDI, will lead to an increase in bank claims, no matter what group a country "belongs" to.

In future research it would be interesting to test whether this result also holds for other definitions of country groups (e.g. sub-groups of developing countries such as Western Hemisphere, Emerging Europe etc.) and whether it can be sustained for a larger group of lenders, e.g. by using data from the Bank for International Settlements.[51]

[51] Note that BIS data is aggregated on the country level. Thus while the behaviour of more countries can be analysed, this comes at the cost that no information on individual banks is available.

7 References

Alfaro, L., S. Kalemli-Ozcan and V. Volosovych (2003): “Why doesn’t capital flow from rich to poor countries? An empirical investigation”, mimeo.

Alfaro, L., S. Kalemli-Ozcan and V. Volosovych (2005): “Capital flows in a globalized world: The role of policies and institutions”, *Paper prepared for the NBER conference on international capital flows*, December 17-18, 2004.

Baldwin, R. (1994): *Towards an Integrated Europe*. Centre for Economic Policy Research (CEPR), London.

Barro, R. J. and J.-W. Lee (2000): “International Data on Educational Attainment: Updates and Implications”, *CID Working Paper,* No. 42, Harvard University.

Barth, J. R., G. Caprio, Jr and R. Levine (2001): “The regulation and supervision of banks around the world. A new database”.

Bender, K. A. (2003): “Examining equality between public and private sector wage distributions”, *Economic Inquiry,* 41, 1: 62-70.

BIS (2004): “Consolidated Banking Statistics”, Bank for International Settlements.

Bilson, C. M., T. J. Brailsford and V. C. Hooper (2002): “The explanatory power of political risk in emerging markets”. *International Review of Financial Analysis,* 11: 1-27.

Brunner, A., J. Decressin, D. Hardy and B. Kudela (2004): “Germany’s three-pillar banking system: Cross country perspectives in Europe”, *IMF Occasional Paper,* No 233, International Monetary Fund.

Buch, C. and A. Lipponer (2004): "FDI versus cross-border financial services: The globalisation of German banks". *Discussion Paper Series 1: Studies of the Economic Research Centre*, No. 05, Deutsche Bundesbank.

Buch, C. (2000): “Why do banks go abroad? Evidence from German data”. *Fiancial Markets, Institutions&Instruments,* 9(1): 33-67.

Buch, C. (1999): “Distance and international banking”. *Kiel Working Paper*, No. 1043. Kiel Institute for World Economics. Forthcoming in *Review of International Economics*.

Calvo, G., L. Leidermann and C. Reinhard (1996): “Inflows of capital to developing countries in the 1990s”, *Journal of Economic Perspectives*, 10 (2):123-139.

Chadha, B. and D. Folkerts-Landau (2001): "The evolving role of banks in international capital flows" in *International capital flows* edited by M. Feldstein, The University of Chicago Press, Chicago and London.

Mc Donald, J. F. and R. A. Moffitt (1980): "The uses of Tobit analysis", *The Review of Economics and Statistics*: 318-321.

Demirgüc-Kunt, A. and V. Maksimovic (1998): "Law, finance and firm growth", *Journal of Fiannce*, 53 (6): 2107-2137.

Deutsche Bundesbank (1998): *Monthly Report*, August 1998.

Efron, B. and R. Tibshirani (1993): *An introduction to the bootstrap.* Chapman and Hall, New York.

Heitmueller, A. (2004): "Job mobility in Britain: Are the Scots different? Evidence from the BHPS". *Scottish Journal of Political Economy,* 51 (3): 329-357.

Helpman, E. (1998): "The structure of foreign trade", *NBER Working Paper,* No. 6752, National Bureau for Economic Research.

Jeanneau, S. and M. Micu (2002): "Determinants of international bank lending to emerging market countries". *BIS Working Papers*, No. 112.

Kaminsky, G. L. (2004): "International capital flows: A blessing or a curse?", mimeo. George Washington University.

Krahnen, J. P. and H.R. Schmidt (2004): *The German financial system*. Oxford, Oxford University Press.

Koetter, M., T. Nestmann, S. Stolz and M. Wedow (2004): "Structures and Trends in German Banking", *Kiel Working Papers*, No 1225, Kiel Institute for World Economics.

Levine, R. (2002): "Bank-based or market-based financial systems: Which is better?", *Journal of Financial Intermediation*, 11 (4): 398-428.

Levy-Yeyati, E. and F. Sturzenegger (2003): "A de facto classification of exchange rate regimes: A Methodological Note". Available at http://www.aeaweb.org/aer/contents/.

Lucas, R. E., Jr (1990): "Why doesn't capital flow from rich to poor countries?", *Amercian Economic Review,* 80 (2): 92-96.

Martin, P. and H. Rey (2004): "Financial super-markets: size matters for asset trade". *Journal of International Economics,* 64: 335-361.

Moore, W. J. and R. J. Newman (1998): “A cross-section analysis of the postwar decline in American trade union membership”. *Journal of Labor Research*, IX (2): 11-125.

Moulton, B. R. (1986). “Random group effects and the precision of regression estimates”, *Journal of Econometrics,* 32: 385-397.

Nestmann, T., N. v. Westernhagen and M. Wedow (2004): “A Micro Data-set on foreign claims of German banks“, unpublished.

Oaxaca, R. (1973): “Male-female wage differentials in urban labor markets”, *International Economic Review*, 14 (3): 693-709.

Oaxaca, R. and M. R. Ransom (1999): “Identification in detailed wage decompositions”. *The Review of Economics and Statistics,* 81(1):154-157.

Obstfeld, M. (1998): “The global capital market: Benefactor or menace?”, Journal of Economic Perspectives, Vol. 12 (4): 9-30.

Papaioammou, E. (2005):”What drives international bank flows? Politics, institutions and other determinants”, *ECB Working Paper*, No. 437. European Central Bank.

Portes, R. and Helene Rey (1999): “The determinants of cross-border equity flows: the geography of information”, *NBER Working Pape*r, No. 7336. National Bureau of Economic Research.

Portes, R., H. Rey and Y. Oh (2001): “Information and capital flows; The determinants of transactions in financial markets”, *European Economic Review*, 45: 783-96.

Pöyhönen, P. (1963): “A tentative model for the volume of trade between countries”, *Weltwirtschaftliches Archiv* 90 (1): 93-99.

Prasad, E., K. Rogoff, S-J. Wei and M. A. Kose (2003): “Effects of financial globalization on developing countries: Some empirical evidence”, *IMF Occasional Paper*, No. 220. International Monetary Fund.

Reinhart, C. and Rogoff, K. (2004): “A modern interpretation of exchange rate regimes”. *Quarterly Journal of Economics,* 119(1): 1-48.

Reisen, H. and M. Soto (2001): “Which types of capital inflows foster developing country growth?”, *International Finance,* 4 (1): 1-14.

Rose, A. K. and M. M. Spiegel (2004): “A gravity model of sovereign lending: Trade, Default and credit”. *IMF Staff Papers*, 51, Special Issue. International Monetary Fund.

Rose, A. K. (2000): “One money, one market: Estimating the effect of common currencies on trade”. *Economic Policy*, 15 (30): 9-45.

Sachverständigenrat (2004): Erfolge im Ausland, Herausforderungen im Inland- Jahresgutachten 2004/05, Sachverständigenrat zur Begutachtung der Gesamtwirtschaftlichen Entwicklung, Statistisches Bundesamt, Wiesbaden.

Sinn, H. W. (1999): The German State Banks. Edward Elgar, Cheltenham, UK.

Tinbergen, J. (1963): Shaping the world economy, The Twentieth Century Fund, New York.

Wooldridge, P. (2002): "Uses of the BIS statistics: An introduction", *BIS Quarterly Revie*w, March: 75–92.

Wright, M. L. J. (2004): "New empirical results on default: A discussion of "A gravity model of sovereign lending: Trade, default and credit", *IMF Staff Papers*, 51, Special Issue.

Yun, M. S. (2003): "A simple solution to the identification problem in detailed wage decompositions". *IZA Discussion Paper,* No. 836. Institute for the Study of Labor.

8 Appendix

I Banks and countries in the sample

Large commercial banks (4)

Bayerische Hypo- und Vereinsbank München AG Konzern

Commerzbank AG Frankfurt Konzern

Deutsche Bank AG Frankfurt Konzern

Dresdner Bank AG Frankfurt Konzern

Land banks (11)

Bankgesellschaft Berlin AG Konzern

Bayern LB Holding AG München Gruppe

Hamburgische Landesbank Girozentrale Hamburg Gruppe

Landesbank Baden Württemberg Stuttgart Gruppe

Landesbank Nordrhein Westfahlen AG Düsseldorf Gruppe

Landesbank Rheinland Pfalz Girozentrale Mainz Gruppe

Landesbank Sachsen Girozentrale Leipzig Gruppe

Landesbank Schleswig Holstein Kiel Gruppe

Norddeutsche Landesbank GZ Hannover Gruppe

Sparkassen und Giroverband Hessen Thüringen Frankfurt Gruppe

Sparkassen und Giroverband Saarbrücken Saar Gruppe

Countries (59)

Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Costa Rica, Croatia, Czech Republic, Denmark, Ecuador, Egypt, Estonia, Finland, France, Ghana, Greece, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Latvia, Lithuania, Malaysia, Mexico, Morocco, Namibia, Netherlands, New Zealand, Norway, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela.

II Description of variables and Sources

Table 1

Baseline Specification

Variable	Description	Source
ln_claims	Logarithm of real consolidated claims (stock) of bank b to country c in year t (in €). As deflator, the CPI (base year 1995) for Germany from the *World Development Indicators* is used.	Credit register for loans of three million Deutsche Mark or more, Deutsche Bundesbank Nestmann et al. (2004)
ln_gdp	Logarithm of annual GDP of country c in year t (in constant 1995 US $). The figures are converted to Euro at the current average annual exchange rate, taken from the *International Financial Statistics*.	World Development Indicators, World Bank
ln_dist	Logarithm of greater circle distance between Germany and country c.	Rose (2004)
ln_fdi	Logarithm of real foreign direct investment (stock) of German enterprises in country c at time t (in €). As deflator, the CPI (base year 1995) for Germany from the *World Development Indicators* is used.	International Capital Links, Deutsche Bundesbank
ln_risk	Logarithm of country risk index capturing political, economic and financial risk in country c in year t. The index runs from 0 (very high risk) to 100 (very low risk).	World Development Indicators, International country risk group (ICRG)
mc	Stock market capitalisation in % of GDP.	World Development Indicators, World Bank

Additional controls

Variable	Description	Source
ln_size	Logarithm of total bank assets (in €). As deflator, the CPI (base year 1995) for Germany from the *World Development Indicators* is used.	Deutsche Bundesbank
ln_trade	Logarithm of exports from Germany to country c (in $). The figures are converted to Euro at the current average annual exchange rate, taken from the *International Financial Statistics*.	Direction of Trade Statistics, IMF
inf	Annual consumer prise inflation in country c at time t (in %).	World Development Indicators, World Bank
lr	Lending interest rate in country c at time t (in %).	World Development Indicators, World Bank
bb_gdp	Annual budget deficit (Surplus) in percent of GDP in country c at time t.	World Development Indicators, World Bank
ca_gdp	Current account balance in percent of GDP in country c at time t.	World Development Indicators, World Bank
schooling	Average years of schooling of total population above 25 years. Data available for 1995 and 1999. Data for other years were added by linear interpolation.	Barro and Lee (2000)
supervision	Index of toughness of banking supervisors. The index runs from 0 to 6, and a high index indicates greater supervisory power.	Barth et al. (2001) and Buch and Lipponer (2004)
transparency	Index of disclosure requirements in the banking industry. The index runs from 0 to 4 and a higher index indicates greater transparency.	Barth et al. (2001) and Buch and Lipponer (2004)
Ex_regime_1	Classification of exchange rate regimes ranges from 1 (fixed) to 15 (freely floating).	Reinhart and Rogoff (2004)
Ex_regime_2	Classification ranges from 2 (float) to 5 (fixed). Note that 1 is allocated to inconclusive cases.	Levy-Yeyati and Sturzenegger (2003)

III Summary Statistics and Correlation matrices

Table 2a: Total claims by region and time (€ Billion)

	1996	1997	1998	1999	2000	2001	2002
Industrial Countries	473.4	683.7	859.1	933.2	1112.4	1328.1	1379.4
Asia	24.3	33.5	26.0	25.4	25.7	26.4	23.7
Africa	3.0	4.4	5.6	6.0	5.8	6.2	6.2
Middle_East	0.9	1.6	2.2	2.5	2.5	2.8	2.6
Western_Hemisphere	16.5	19.8	25.7	26.1	28.1	30.4	26.2
Emerging_Europe	12.7	18.6	26.9	31.8	40.4	52.0	62.8
All Non-Industrial Countries	57.4	77.8	86.4	91.8	102.4	117.9	121.6

Notes: Claims refer to consolidated nominal claims by large commercial as well as Land Banks as shown in Table I. Further details on the consolidation methodology can be found in Nestmann et al. (2004).
Source: Deutsche Bundesbank, author's calculation.

Table 2b: Average annual outstanding claims by country from 1996-2002 (€ Billion)

Country	Average claim	Country	Average claim	Country	Average claim
United States	295.18	**Russia**	6.81	**Egypt**	0.77
United Kingdom	169.81	**Finland**	6.63	**Slovenia**	0.77
France	90.40	**Argentina**	6.25	**Slovak Republic**	0.75
Netherlands	64.84	**Greece**	5.92	**Peru**	0.52
Japan	55.20	**Hungary**	5.66	**Morocco**	0.39
Italy	52.57	**Czech Republic**	5.65	**Uruguay**	0.31
Switzerland	41.66	**Mexico**	5.31	**Romania**	0.28
Austria	33.04	**Turkey**	5.31	**Estonia**	0.28
Spain	26.71	**South Africa**	4.58	**Tunisia**	0.22
Belgium	23.28	**China**	4.38	**Ecuador**	0.19
Ireland	21.41	**Indonesia**	4.21	**Lithuania**	0.18
Canada	19.56	**Thailand**	3.61	**Costa Rica**	0.18
Sweden	15.52	**Malaysia**	3.35	**Latvia**	0.15
Australia	15.51	**Chile**	2.70	**Bulgaria**	0.12
Denmark	10.45	**India**	2.26	**Ghana**	0.11
Portugal	8.91	**New Zealand**	1.98	**Jordan**	0.11
Norway	8.47	**Croatia**	1.44	**Bolivia**	0.09
Brazil	7.95	**Philippines**	1.40	**Paraguay**	0.04
Poland	7.63	**Israel**	1.29	**Namibia**	0.03
Korea	7.20	**Venezuela**	1.13		

Notes: Claims refer to consolidated nominal claims by large commercial as well as Land Banks as shown in Table I. Further details on the consolidation methodology can be found in Nestmann et al. (2004).
Source: Deutsche Bundesbank, authors calculation.

Table 2c: All countries

	Mean	Std	Min	Max	Obs
Real claims (in million €)	1324.2	5485.9	0.0	147701.0	5276
Real GDP (in million €)	466418.2	1288298.0	2804.9	10200000.0	6195
Distance (in km)	3184.7	2841.2	173.1	11427.1	6195
Real FDI (in million €)	6496.7	17709.2	0.0	185816.2	5745
Country risk (0-100)	74.5	9.2	41.0	92.5	6045
Market cap. (% of GDP)	51.5	53.6	0.0	330.0	6030
Ln_claims	11.8	2.5	-1.4	18.8	5241
Ln_gdp	25.4	1.8	21.8	30.0	6195
Ln_dist	7.5	1.2	5.2	9.3	6195
Ln_fdi	4.7	5.0	-3.0	12.1	5370
Ln_risk	4.3	0.1	3.7	4.5	6045
Exports (In million $)	8466.8	13694.8	0.0	64713.1	6165
Inflation	11.8	54.2	-1.4	1058.4	6195
Lending rate	16.5	17.3	1.9	146.8	5580
BB_GDP (%)	-1.9	2.9	-19.6	5.1	4035
CA_GDP (%)	-0.8	5.2	-14.1	18.0	6150
Schooling (av. Years)	7.9	2.3	3.7	12.3	4935
Supervision	3.7	1.7	0.0	6.0	5565
Transparency	1.8	0.9	0.0	4.0	5565
Banks' assets (million €)	216560.1	184061.7	8880.2	818409.9	6136
Ex_regime_1	7.7	4.2	1	15	5220
Ex_regime_2	3.5	1.4	1	5	4185

Notes: For definition and source of variables see Table 1.

Table 2d: Industrial countries

	Mean	Std	Min	Max	Obs
Real claims (in million €)	3089.7	8466.4	0.0	147701.0	2061
Real GDP (in million €)	1099342.0	2048857.0	48844.1	10200000.0	2100
Distance (in km)	2207.2	3101.9	173.1	11427.1	2100
Real FDI (in million €)	15739.7	26771.9	0.1	185816.2	2100
Country risk (0-100)	83.7	4.1	73.3	92.5	2100
Market cap. (% of GDP)	88.3	58.8	12.9	330.0	2100
Ln_claims	13.6	1.8	4.5	18.8	2060
Ln_gdp	26.7	1.3	24.6	30.0	2100
Ln_dist	6.9	1.2	5.2	9.3	2100
Ln_fdi	7.9	3.3	-1.9	12.1	2100
Ln_risk	4.4	0.0	4.3	4.5	2100
Exports (In million $)	19895.8	18441.0	0.0	64713.1	2070
Inflation	2.1	1.3	-0.9	8.2	2100
Lending rate	6.9	3.0	1.9	21.0	1950
BB_GDP (%)	-0.9	2.5	-8.5	5.1	1035
CA_GDP (%)	0.8	4.9	-10.4	15.6	2085
Schooling (av. Years)	9.5	1.8	4.6	12.3	2100
Supervision	3.3	1.6	0.0	6.0	1995
Transparency	2.1	0.8	1.0	3.0	1995
Banks' assets (million €)	216560.1	184090.9	8880.2	818409.9	2080
Ex_regime_1	6.7	4.7	1	13	1800
Ex_regime_2	3.7	1.5	1	5	1500

Notes: For definition and source of variables see Table 1.

Table 2e: Non-industrial countries

	Mean	Std	Min	Max	Obs
Real claims (in million €)	192.3	412.3	0.0	8082.0	3215
Real GDP (in million €)	141841.9	219018.7	2804.9	1270416.0	4095
Distance (in km)	3686.0	2557.1	298.6	7389.5	4095
Real FDI (in million €)	1171.6	1974.6	0.0	8120.9	3645
Country risk (0-100)	69.6	7.2	41.0	85.0	3945
Market cap. (% of GDP)	31.8	38.0	0.0	304.4	3930
Ln_claims	10.6	2.1	-1.4	15.9	3181
Ln_gdp	24.6	1.5	21.8	27.9	4095
Ln_dist	7.8	1.0	5.7	8.9	4095
Ln_fdi	2.7	4.7	-3.0	9.0	3270
Ln_risk	4.2	0.1	3.7	4.4	3945
Exports (In million $)	2689.6	3329.4	25.3	15014.3	4095
Inflation	16.8	66.2	-1.4	1058.4	4095
Lending rate	21.7	19.5	5.3	146.8	3630
BB_GDP (%)	-2.2	3.0	-19.6	3.9	3000
CA_GDP (%)	-1.7	5.2	-14.1	18.0	4065
Schooling (av. years)	6.7	1.8	3.7	10.7	2835
Supervision	3.9	1.6	0.0	6.0	3570
Transparency	1.7	0.9	0.0	4.0	3570
Banks' assets (million €)	216560.1	184069.3	8880.2	818409.9	4056
Ex_regime_1	8.2	3.9	1	15	3420
Ex_regime_2	3.4	1.3	1	5	2685

Notes: For definition and source of variables see Table 1.

Table 3: Analysis of variation (all countries)

	ln_claims	ln_gdp	ldist	ln_fdi	ln_risk	mc
Mean *mean(Xit)*	12.085	25.973	7.415	5.440	4.318	59.706
Pooled *var(Xit)*	5.318	1.973	1.466	21.772	0.018	3140.981
Fixed Effects *var(Xit-mean(Xit))*	0.372	0.031	0.000	1.046	0.003	554.003
Between Effects *var(mean(Xit))*	4.946	1.943	1.466	20.725	0.015	2586.978

Notes: This table shows the variation of individual variables across groups and time. Group is defined as bank/country pair, time in years. Note that the variance of the groups in the pooled regression consists of the sum of variance of the "between" and "fixed effects" variation. For construction of variables see Table 1.

Table 4a: Correlation Matrix (all countries)

obs: 4428	ln_claims	ln_gdp	ln_dist	ln_fdi	ln_risk	mc
ln_claims	1.00					
ln_gdp	0.63	1.00				
ln_dist	-0.26	0.10	1.00			
ln_fdi	0.60	0.69	-0.31	1.00		
ln_risk	0.50	0.36	-0.43	0.47	1.00	
mc	0.41	0.40	-0.06	0.33	0.41	1.00

Notes: For definition and source of variables see Table 1.

Table 4b: Correlation Matrix (industrial countries)

obs: 2060	ln_claims	ln_gdp	ln_dist	ln_fdi	ln_risk	mc
ln_claims	1.00					
ln_gdp	0.55	1.00				
ln_dist	-0.22	0.22	1.00			
ln_fdi	0.54	0.55	-0.35	1.00		
ln_risk	0.05	-0.13	-0.27	-0.02	1.00	
mc	0.27	0.22	-0.11	0.12	0.18	1.00

Notes: For definition and source of variables see Table 1.

Table 4c: Correlation Matrix (non-industrial countries)

obs: 2368	ln_claims	ln_gdp	ln_dist	ln_fdi	ln_risk	mc
ln_claims	1.00					
ln_gdp	0.39	1.00				
ln_dist	0.09	0.52	1.00			
ln_fdi	0.40	0.63	-0.04	1.00		
ln_risk	0.13	-0.03	-0.26	0.24	1.00	
mc	0.14	0.24	0.41	0.18	0.12	1.00

Notes: For definition and source of variables see Table 1.

IV Additional Regression results

Table 5b. Baseline specification: Adjustment for currency fluctuation

Table 5b reports the results for currency adjusted foreign claims. Note that the stock of claims from one year to another may rise or fall either due to an actual rise or fall in claims or due to a valuation effect induced by a change in the exchange rate, as part of claims are denominated in Dollar and other currencies but have to be reported in Euro to the Bundesbank. Unfortunately, I do not know the currency composition of each claim but only of the aggregate of German banks. Thus, the adjustment is only an approximation for the true change in claims due to changes in exchange rates (For further details on the adjustment of claims see Nestmann et al. , 2004). Note that the results hardly change. The sample is slightly smaller as data on the currency composition is not available for Estonia, Lithuania, Latvia, Costa Rica and Uruguay.

	(1)	(2)	(3)
	All countries, baseline, adjusted for currency fluctuation	IC countries, baseline, adjusted for currency fluctuation	Non-IC countries, baseline, adjusted for currency fluctuation
ln_gdp	0.784***	0.659***	0.620***
	(7.97)	(5.52)	(3.14)
ln_dist	-0.364***	-0.356***	-0.180
	(6.32)	(4.34)	(1.39)
ln_fdi	0.087***	0.107**	0.104***
	(3.48)	(2.36)	(2.89)
ln_risk	4.202***	2.182	2.343*
	(4.77)	(1.28)	(2.00)
mc	0.004***	0.003**	0.004*
	(3.28)	(2.24)	(1.78)
Observations	4364	2060	2304
R-squared	0.78	0.81	0.61

Notes: Dependent variable: Logarithm of currency adjusted bank claims of bank b on county c at time t. The adjustment aims to correct stocks of claims for changes that are solely due to a change in the currency in which the loan is denominated. The currency adjustment of claims is described in Nestmann et al. (2004). *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses: For (1) – (3), country is set as cluster, as described in Section 3. For definition of variables see Table 1.

Table 5c: Baseline Specification: Outliers

In **Table 5c** the gravity model is estimated allowing for different structures of the error term: In regression (1) an interaction between country and time is set as cluster, i.e. the variance covariance matrix allows for an arbitrary heteroscedasticity structure across this dimension. Note that t-values have increased significantly pointing to the Moulton problem. In column (2) we include country dummies next to time and bank dummies. Note that none of our variables is significant any more. This is not surprising as variables do mainly vary across countries (see Table 3). Hence, including a dummy variable for each country leaves no more explanatory power for the regressors. The following two regressions show that country risk is valued differently for three outliers, Indonesia, Russia, and Turkey. In Regression (4) we observe an insignificant effect of country risk on bank lending. This surprising result is due to the impact of these outliers. Therefore we created a dummy variable for these three outliers ("geo") as well as an interaction term between "geo" and country risk in regression (5). It turns out that country risk indeed has a positive and significant impact on lending to non-industrial countries in general. For the three countries of geopolitical importance, however, it appears that a decrease of 1 percent of country risk even leads to a slight increase of 0.6 percent (2.5-3.1) in loans. This may be rationalised by the geopolitical importance of these countries overcompensating a low score of country risk. It should be noted that albeit the three countries obtain a significant share of all claims to non-industrial countries, our analysis remains valid for most of German bank lending.

	(1)	(2)	(3)	(4)
	All countries, Cluster Country*time	All Countries, Cluster Country with Country Dummies	Non-IC Countries, including outliers	Non-IC Countries, including outliers with interaction term
ln_gdp	0.767***	1.905	0.683***	0.579***
	(17.91)	(1.57)	(4.20)	(3.50)
ln_dist	-0.363***	-1.651	-0.253**	-0.144
	(12.35)	(1.18)	(2.44)	(1.40)
ln_fdi	0.074***	-0.030	0.083**	0.089***
	(6.30)	(0.78)	(2.51)	(2.92)
ln_risk	4.104***	-1.092	-0.071	2.560**
	(8.48)	(1.48)	(0.07)	(2.38)
mc	0.004***	0.001	0.004*	0.003
	(6.06)	(0.99)	(1.87)	(1.67)
geo_ln_risk				-3.170***
				(3.18)
geo				14.080***
				(3.33)
Observations	4428	4428	2668	2668
R-squared	0.78	0.84	0.62	0.64

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses: For (1) country*time is set as cluster, for (2)-(4) country as described in Section 6. For construction of variables see Table 1.

Table 5d: Baseline Specification: Different time periods

In **Table 5d** I estimate the baseline specification for different time periods as well as aggregated over all time periods. Regression (1) is performed for the period including the Asian and Russian financial crises, while regressions (2) and (3) present the estimates for the post crises period. Coefficients hardly change at all which again mirrors the low variability of the data across time and the large variation across countries, respectively. This is further supported by regression (4) in which variables have been averaged over time but coefficients remain rather stable. Obviously, the number of observations drops sharply as the sample now consists at most of 15 banks and 59 countries, i.e. 885 observations instead of 6195. I nevertheless keep the time dimension for the sensitivity checks as some covariates might vary more over time than variables in the baseline specification.

	(1)	(2)	(3)	(4)
	All countries, baseline for 1996-1998	All countries, baseline for 1999-2002	All countries, baseline for 2000-2002	All countries, aggregated over time
ln_gdp	0.803***	0.740***	0.755***	0.691***
	(10.16)	(6.22)	(5.82)	(7.18)
ln_dist	-0.333***	-0.383***	-0.392***	-0.277***
	(6.31)	(5.08)	(4.78)	(4.34)
ln_fdi	0.061**	0.087***	0.087**	0.096***
	(2.58)	(2.99)	(2.64)	(3.93)
ln_risk	3.916***	4.287***	4.138***	5.517***
	(4.73)	(4.14)	(3.76)	(5.95)
mc	0.004***	0.004**	0.005**	0.004**
	(3.31)	(2.65)	(2.44)	(2.52)
Observations	1896	2532	1880	694
R-squared	0.81	0.77	0.76	0.84

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses: For (1)-(4) country is set as cluster as described in Section 3. For construction of variables see Table 1.

Table 5e. Baseline including bank size

In **Table 5e** I control for bank size next to bank dummy variables in the regression The data set consists of individual bank data and banks' size might be correlated with lending behaviour. Larger banks might for instance have a different portfolio structures than smaller banks. Columns (1) to (3) include the logarithm of banks' total assets (ln_size). It should be noted that the sample only consists of 15 banks and thus variation is not as large as for a full sample of all German banks including savings and cooperative banks. As neither savings nor cooperative banks are engaged to a large extend in foreign lending, they are excluded. However, neither the coefficients and their significance levels nor the overall explanatory power of the regression change in comparison to Table 5a. As variation of banks' assets is low over time, all that changes is the constant and the dummy variables for banks. As bank size does not represent a country specific endowment, I do not include it in the decomposition analysis of the next section. Note that the results of the decomposition analysis including bank size can be obtained from the author upon request. As in the regression, only the constant as well as bank dummy variables change in the decomposition analysis.

	(1)	(2)	(3)
	All countries, with bank size	IC countries, with bank size	Non-IC countries, with bank size
ln_gdp	0.767***	0.658***	0.569***
	(8.23)	(5.52)	(3.38)
ln_dist	-0.362***	-0.353***	-0.150
	(6.32)	(4.35)	(1.41)
ln_fdi	0.074***	0.106**	0.094***
	(3.20)	(2.41)	(2.81)
ln_risk	4.119***	2.169	2.471**
	(4.83)	(1.26)	(2.22)
mc	0.004***	0.003**	0.003
	(3.21)	(2.22)	(1.64)
ln_size	0.767***	1.093***	0.539**
	(5.35)	(7.60)	(2.34)
Observations	4428	2060	2368
R-squared	0.78	0.82	0.62

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. In contrast to 5a, Regressions (1) to (3) include the logarithm of banks' total assets. T- values -based on robust standard errors- in parentheses: For (1) – (3) country is set as cluster, as described in Section 3. For construction of variables see Table 1.

Table 6 a. Tobit Regression

The following regressions in **Table 6a** are concerned with the estimation technique applied. One problem that needs to be taken into account is that banks only report claims above 1.5 million Euro. Thus, a bank that does not report an exposure in fact has outstanding claims between zero and 1.5 Million Euro. This information is, however, not included in the original reports to the Bundesbank leading a priori to an unbalanced data-set. I therefore augment the data-set and fill in 1€ where no claim is reported. In the augmented dataset, we have data on claims of 15 banks on 59 countries from 1996 to 2002, i.e. 15*59*7=6195 observations. Missing values of other variables limit the sample size to 4935. Note that the amount of missing values is comparatively low as we only analyse the largest German banks and most of them have had exposures in almost all markets at all times considered. For IC countries, 40 exposures are missing, for non-IC countries, 467 observations are needed to balance the data-set. In Tobit regression, a Maximum Likelihood estimation combining linear regression and a Probit analysis, I define values equal and below zero as censored. Table 6a shows the results of estimating regressions (1)-(3) of table 5a using Tobit regressions. All variables keep the expected sign and remain significant in all three regressions. Note that the magnitude of coefficients cannot be directly compared to the Cluster regressions in Table 5. The coefficients of Tobit regressions can be interpreted in the following way: The effect of a change in the i^{th} explanatory variable on the dependent variable (ln_claims) can be divided into a) the change of those claims above the limit (€1.5 mn) weighted by the probability of being above the limit (€1.5 mn); and b) the change in the probability of being above the limit (€1.5 mn), weighted by the expected value of claims above the limit (€1.5 mn) [See Mc Donald and Moffitt (1980, p.318)].

	(1)	(2)	(3)
	Tobit, All countries	Tobit, IC countries	Tobit, Non-IC countries
ln_gdp	0.959***	0.688***	1.541***
	(6.39)	(5.07)	(4.54)
ln_dist	-0.471***	-0.429***	-0.980***
	(3.78)	(3.43)	(-3.70)
ln_fdi	0.198***	0.162**	0.124*
	(3.86)	(1.98)	(1.87)
ln_risk	6.234***	3.412**	4.975*
	(3.57)	(2.10)	(1.79)
mc	0.005**	0.003*	0.013**
	(2.27)	(1.87)	(2.51)
Observations	4935	2100	2835
Censored	507	40	467

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T-values based on robust standard errors in parentheses. For construction of variables see Table 1. In regression (1)-(3): All censored observations are left-censored at zero.

Table 6b. Additional covariates (1)

In **Table 6b** I first run regressions (1)-(3) including macroeconomic variables such as inflation, budget balance and current account (both in percent of GDP). Note that the coefficients of the other variables hardly change and the interpretation is the same as in Table 5a. In the following two regressions I include the prevailing exchange rate regime of country i at time t to the list of regressors. This can be rationalised by a preference for low exchange rate volatility outweighing the increased risk of sharp devaluations (Papaioannou (2005, p. 30). While column (4) includes the exchange rate classification of Reinhart and Rogoff (2004), (5) contains the classification of Levy-Yeati and Sturzenegger (2003). In Reinhart and Rogoff (2004), a large number is associated with more flexible exchange rate regimes, while it is the other way round in the classification by Levy-Yeati and Sturzenegger (2003). Note that both papers provide a fine and coarse classification: For Reinhard and Rogoff (2004) the fine classification contains 15 categories and the coarse classification 5 categories, while Levy-Yeati and Sturzenegger (2003) provide a five and a three way classification. Both classifications are downloadable from the Internet. Regressions (4) and (5) use the fine classification, respectively. Results for the coarse classifications are similar but not shown. For definition of the classification system see Table 1 in the Appendix. The variables for exchange rate regimes are neither in (4) nor in (5) significantly different from zero. Thus, either the exchange rate regime is not a determinant for German bank lending or positive and negative effects of regimes cancel each other out.

	(1)	(2)	(3)	(4)	(5)
	With Inflation	With BBoGDP	With CAoGDP	With Ex. Regime 1	With Ex. Regime 2
ln_gdp	0.770***	0.854***	0.756***	0.751***	0.808***
	(8.39)	(10.80)	(8.94)	(8.78)	(9.42)
ln_dist	-0.347***	-0.311***	-0.368***	-0.333***	-0.328***
	(5.90)	(6.37)	(6.57)	(5.55)	(6.40)
ln_fdi	0.077***	0.050**	0.077***	0.074***	0.064***
	(3.34)	(2.27)	(3.46)	(3.49)	(2.88)
ln_risk	4.648***	4.881***	4.149***	4.550***	4.029***
	(4.83)	(6.82)	(4.72)	(5.88)	(4.93)
mc	0.004***	0.004***	0.004***	0.004***	0.003***
	(3.20)	(2.98)	(3.27)	(3.35)	(3.55)
inf	0.009				
	(0.92)				
bb_gdp		-0.001			
		(0.04)			
ca_GDP			-0.010		
			(0.78)		
Ex_regime_1				-0.007	
				(0.42)	
Ex_regime_2					0.026
					(0.54)
Observations	4383	2700	4386	3828	2793
R-squared	0.78	0.78	0.78	0.79	0.80

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses. Country is set as cluster as described in section 3. For definitions of variables see Table 1. In (1) and (2) outliers (inflation > 60% and BBoGDP>10%) are excluded.

Table 6c. Additional covariates (2)

In **Table 6c** I include the logarithm of bilateral exports instead of FDI. Exports and FDI are highly correlated (correlation coefficient of 0.78) and can therefore not be included simultaneously. We note that exports are, however, not significant. Note that Buch and Lipponer (2004) find a positive and significant impact of trade in their study. The result in the present study appears to stem from the negative correlation with distance (-0.56) as leaving distance out of the regression turns exports significant. As exports are flows and not stocks such as FDI in this paper, I opt for FDI in all further specifications. The lending rate included in column (2) is not significant. This may be due to the fact that stocks of claims are analysed which depend less on interest rate differentials than flows of claims (I thank Claudia Buch for this comment). Including average years of schooling, the rate of inflation as well as an indicator for the disclosure requirements and another one for the toughness of banking supervisors abroad does not change the picture (I thank Alexander Lipponer for providing the data on the indices for transparency and banking supervision).

	(1)	(2)	(3)	(4)	(5)
	All countries, with Exports	With Lending rate	With years of schooling	With Transparency index	With Bank Supervision index
ln_gdp	0.816***	0.790***	0.704***	0.758***	0.759***
	(5.16)	(8.48)	(7.56)	(8.11)	(8.04)
ln_dist	-0.336**	-0.387***	-0.435***	-0.368***	-0.366***
	(2.24)	(6.43)	(5.91)	(6.62)	(6.33)
ln_trade	0.161				
	(0.83)				
ln_risk	4.325***	4.288***	2.988**	4.214***	4.299***
	(4.32)	(4.04)	(2.62)	(4.74)	(4.47)
mc	0.004***	0.004***	0.003**	0.004***	0.004***
	(2.97)	(3.48)	(2.62)	(2.79)	(2.91)
ln_fdi		0.060**	0.073***	0.077***	0.074***
		(2.56)	(2.89)	(3.22)	(3.26)
lr		0.007			
		(1.34)			
Schooling			0.074		
			(1.33)		
Transparency				0.055	
				(0.74)	
Supervison					-0.001
					(0.02)
Observations	4383	4098	3867	4155	4155
R-squared	0.77	0.78	0.79	0.78	0.78

Notes: Dependent variable: Logarithm of claims of bank b on county c at time t. *; **; *** refer to 10%, 5% and 1% level of significance. Constant not reported. Time dummies as well as bank dummies included in all regressions, but not reported. T- values -based on robust standard errors- in parentheses. Country is set as cluster as described in section 3. For definitions of variables see Table 1. In (1) note that ln_fdi and ln_trade are highly correlated (0.81) and thus are not jointly included in the regression.

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