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Preface

Globalisation is arguably among the most significant developments in the economic history of the world of the past half-century. In addition to a remarkable rise in the exchange of goods and services across borders, this period witnessed the collapse of the Bretton Woods system of fixed exchange rates in 1973 and the concomitant abolition of capital controls by the major economies, which ushered in a new wave of financial globalisation (Mundell, 2000). The ensuing decades saw a large number of developed and emerging market economies follow suit in lifting capital account and other restrictions to investing overseas, thus contributing to an enormous increase in the level of foreign assets and liabilities (Lane and Milesi-Ferretti, 2003, 2007). Today, international financial integration stands at a level unprecedented in recent history.

At the same time, financial globalisation has stirred much and often fierce debate among economists, and eminent people in the profession have had long-standing disagreements over its costs and benefits (see Kose, Prasad, Rogoff, and Wei, 2007). Indeed, there was no shortage of events to rekindle the argument between the advocates and those more sceptical of financial globalisation. The 1990s, for instance, had their Mexican crisis of 1994, the 1997/98 Asian crisis and the 1998 Russian financial crisis that in its wake brought down the LTCM hedge fund — which was then bailed out by the United States to prevent ripple effects from spreading across the entire financial system. This accumulation of crises led perhaps the most vocal

critic, Nobel laureate Joseph Stiglitz, to conclude that "when there is a single accident on a highway, one suspects that the driver's attention may have lapsed. But when there are dozens of accidents at the same bend in the same highway, one needs to re-examine the design of the road" (Stiglitz, 2000).

Yet despite these events, policy for a long time seemed to tilt more towards the view expressed by Stanley Fischer, then First Deputy Managing Director of the International Monetary Fund (IMF), that the benefits of financial liberalisation outweigh the potential costs (Fischer, 1998). In contrast to those earlier crises, however, the global repercussions of the recent US subprime and eurozone debt crises have generally soured the mood on financial globalisation. How significant the change in attitude has been is probably best exemplified by the fact that, as recently as November 2012, the IMF issued a new institutional view on capital flows (IMF, 2012). Therein, in what many commentators have interpreted as a major ideological shift and a sharp reversal of its position during the 1990s, the Fund accepts the management of volatile cross-border capital flows through direct controls as long as those are "transparent, targeted, [and] temporary".

It is therefore difficult to overstate not only the major importance of international financial integration, but also its topicality on the global economic policy agenda. What may at times go unnoticed in the debate, though, is that financial globalisation has been, and continues to be, a highly heterogeneous process in which some markets have integrated considerably more rapidly than others, and that the associated risks and benefits can also differ substantially.

This dissertation attempts to provide new insights into the integration of global financial markets and to further our understanding of the consequences. To this end, it analyses three major topics, each of which is treated in its own, self-contained chapter. A good compass to this dissertation and as to where each of the three

chapters fits in is provided by considering the spectrum of financial contracts available to households, corporations, and governments.

On one end of the spectrum, there is financial intermediation through banks that grant classic loans, an activity which regularly involves a close relationship between banks and borrowers (Boot, 2000). It is perhaps therefore that banking markets tend to be less internationally integrated than the markets for other financial instruments (see, eg, Adam, Jappelli, Menichini, Padula, and Pagano, 2002; Baele, Ferrando, Hördahl, Krylova, and Monnet, 2004) and that international bank lending is among the least volatile of financial cross-border flows (Gabriele, Baratav, and Parikh, 2000).

On the other end of the spectrum are instruments of portfolio investment such as stocks and bonds. These can be traded with relative ease by banks and other financial institutions on a transaction-by-transaction basis, involving virtually no relationship between the parties concerned. While these markets exhibit a higher level of international integration, portfolio flows have also been found to be the most unstable (eg, Sarno and Taylor, 1999; Calvo and Mendoza, 2000). Exposure to portfolio flows has consequently been identified as a major risk in terms of the vulnerability of, in particular, emerging and developing countries to so-called "sudden stops", which can have a highly disruptive impact on the real economy (Reinhart and Calvo, 2000).

Starting out at the banking end of the spectrum, the first chapter of this dissertation examines the frictions that shape international loan portfolios and the integration of global banking markets. The second chapter turns to the sovereign bond market at the opposite end and looks at whether changes in one country's credit rating spill over across borders to the refinancing costs of other sovereigns. In the third chapter, I investigate the behaviour of foreign banks in the market for syndicated loans, which

constitute a hybrid of traditional bank credit and portfolio investment and which are a vital source of financing for borrowers in emerging and developing economies.

In the following, I sketch in more detail the central questions analysed in each of the three chapters and highlight their key results and contributions. The first chapter is motivated by two seemingly contradictory observations on the international credit portfolios held by large German banks.[1] On the one hand, despite a massive increase in their foreign exposure over the past two decades more generally, these banks' portfolios continue to be relatively concentrated in that only a small number of countries account for the lion's share of foreign lending. On the other hand, the existence of notable business cycle asynchronicity between countries suggests that banks could achieve major diversification gains by holding more diversified portfolios.

We conjecture that this discrepancy is due to country-specific frictions that drive a wedge between the potential and the effective risk and return in international lending. To investigate this, we first define an explicit, frictionless benchmark scenario by computing mean-variance optimised portfolios that we could expect to observe in the absence of country-specific frictions. Based on a bank-country panel for the period between 2003 and 2007 for large, internationally oriented German banks and a representative set of 35 countries, we find that German banks' international credit portfolios deviate substantially from this benchmark. As this indicates that frictions do indeed play a role, we then examine more closely which geographical, institutional, and regulatory variables explain those deviations.

Our results point to the institutional environment and banking regulations as constituting important frictions in international lending. In particular, countries with more developed institutions, stricter capital regulations, transparency in the banking sector, and stronger supervision tend to be overweighted by German banks.

[1] This chapter is based on the article "Diversification and Determinants of International Credit Portfolios: Evidence from German Banks", which is joint work with Matthias Köhler from the Deutsche Bundesbank (see Böninghausen and Köhler, 2012).

Better institutions, for example, such as higher bureaucratic and legal efficiency, may lower agency costs and thereby improve a country's *de facto* risk-return profile relative to other countries, causing it to be overweighted. Destinations that are more integrated with Germany in the real sector are overweighted as well, while eurozone membership also introduces some positive bias towards member countries. However, more distant countries are not systematically underweighted, suggesting that informational frictions in international banking do not increase monotonically with distance.

Overall, the evidence suggests that German banks' international credit portfolios are not carved in stone. Rather than being shaped by factors that cannot change over time, deviations from our benchmark are largely due to factors within the hands of policy makers. Hence, improvements and convergence of institutional and regulatory frameworks around the world could reduce the overweighting and underweighting of countries in the portfolios of German banks. This also has more general implications. Even though institutional and regulatory changes would certainly take time to accomplish, there is reason to believe that they could contribute to banking markets becoming more internationally integrated in the future.

The second chapter takes up a highly topical debate, which has resurfaced in the wake of sovereign stress in the eurozone, on whether the announcements of sovereign rating changes by major credit rating agencies impact on the refinancing costs of other governments.[2] Moreover, transcending the level of mere debate, worries over so-called negative spillover effects on other countries' sovereign bond yields are understood to have been at least partly responsible for recent, actual changes in European Union legislation on rating agencies. While spillovers are thus highly relevant from a policy perspective, their presumed existence is not straightforward to

[2]This chapter is based on the article "Credit Ratings and Cross-Border Bond Market Spillovers", which is joint work with Michael Zabel from the University of Munich (see Böninghausen and Zabel, 2013).

identify in financial markets, where confounding events are ubiquitous and hamper the establishment of clear counterfactuals.

We therefore make a methodological contribution to the literature in proposing a novel empirical strategy to cleanly identify the existence of cross-border spillover effects of sovereign rating announcements. This is made possible by collecting an extensive dataset of the complete history of rating actions by the "Big Three" (Standard & Poor's, Moody's, and Fitch) and daily sovereign bond market movements for up to 73 countries between 1994 and 2011. Exploiting substantial variation across crisis and non-crisis periods as well as developed and emerging economies, we perform an explicit counterfactual analysis. This pits bond market reactions to small revisions in an agency's assessment of a country's creditworthiness against reactions to all other, more major changes. Importantly, we demonstrate how it helps avoid the problems associated with a classic event-study approach in a spillover context, and how it relieves us of having to make additional assumptions as in a number of other papers.

We find that there is a major asymmetry in the sovereign debt market's treatment of ratings. Whereas there is robust evidence in favour of significant spillovers following sovereign rating downgrades — the main concern of policy makers —, other countries' bond market reactions to upgrades appear to be much more muted at best. Investigating the potential channels of spillovers across countries, we find that spillovers from downgrades are more pronounced for countries within the same region. Strikingly, however, we find that bilateral trade linkages, financial integration, or fundamental similarities between countries cannot explain why belonging to a common region amplifies negative spillover effects.

This is particularly interesting in view of the notion inherent in many policy discussions and proposals that spillovers are in some sense unwarranted, so as to merit an intervention by the state to constrain the agencies' scope of action. While the

amount of measurable fundamentals is naturally limited, our findings do not suggest that concerns over countries being found "guilty by association" in financial markets can be easily dismissed.

The third chapter is also motivated by an issue that looms large on the agenda of policy makers. It focuses explicitly on emerging and developing countries which are heavily reliant on external sources of financing, and which have a history of being subject to sudden stops of the inflows of foreign capital that were accompanied by significant declines in real activity. Because a substantial portion of these flows is accounted for by international syndicated loans — where two or more banks jointly agree to lend to a borrower —, the chapter takes a closer look at the behaviour of foreign banks in this market. Specifically, it asks whether there is a group of foreign banks that participate more reliably in the provision of such loans than others, in particular when economic conditions in the emerging market deteriorate.

My analysis indeed provides evidence for important differences in foreign bank behaviour. I begin by drawing a dividing line between those foreign banks that participated in the first ever syndicated loan deals in a given country ("early participants") and those that did not ("late participants"). The reason is that, in those early deals, the heterogeneity in banks' assessments of individual country risk was likely extraordinarily high, as were information asymmetries vis-à-vis borrowers in countries that had just opened up to foreign capital. I then go on to document for the extremely adverse scenario of sudden stops that the composition of loan syndicates changes over the course of such episodes. Whereas early participants start to represent an increasing fraction of syndicate members on deals signed whilst the sudden stop is still ongoing and thereafter, the pattern for late participants is quite the opposite.

Regression analysis shows that these specific patterns of differences in behaviour between the two groups of foreign banks are more general, and that they extend to

their responsiveness to more regular changes in economic conditions as well. In more detail, I estimate a linear probability model of individual foreign banks' decisions to join a given deal in a country or not, conditional on whether they belong to the group of early or late participants. Based on a total of 5,593 loan deals in 68 countries, I find that early participants are 0.9 percentage points more likely to sign up for further syndicated loan deals in a given country than other foreign banks. With an average participation probability in the sample of about 3.2 per cent, this points to early participation introducing major path dependence into syndicated lending to emerging markets. Moreover, as economic conditions deteriorate, the gap in participation probabilities between early and late participants tends to widen. This effect is particularly pronounced when considering non-Japanese parent banks, for which a one sample standard deviation drop in real GDP growth is linked to a widening of the wedge between early and late participants' probabilities of close to 0.4 percentage points. Hence, there are differences in responsiveness to economic conditions between the two groups in addition to level differences in participation.

The chapter contributes to a large literature on foreign bank activity in emerging markets. In spite of syndicated loans being an important element in the external financing mix of these countries, however, research has largely focused on traditional bank loans extended through the local affiliates of foreign banks and generally benchmarked foreign against domestic banks. To the best of my knowledge, my analysis offers the first investigation into differential foreign bank behaviour in emerging syndicated loan markets. It paints a richer picture, which can be relevant for policy makers who may want to monitor the composition of loan syndicates between early and late participants. Furthermore, the results highlight the risks that may come with broadening the creditor base at the expense of early participants who appear to provide more reliable funding.

Painting a richer picture is also the main contribution of this dissertation. The three chapters in conjunction emphasise the complexity of assessing the level of international financial integration of different markets and the risks and benefits that come with it. Ranging from international banking — where integration has been slower than in other areas but might be enhanced through changes to institutional and regulatory frameworks — to sovereign bond markets — where mere announcements on one country's perceived creditworthiness have immediate and not entirely understood repercussions on the refinancing costs of other governments —, policy makers are faced with a wide array of problems that require specifically targeted responses. Difficult though it may be to find and implement those, this dissertation goes some way towards a better understanding of a few relevant issues to begin with. At the same time, there is ample room for further research to pick up on the themes investigated herein and to shed more light on other aspects of financial globalisation.

Chapter 1

Diversification and Determinants of International Credit Portfolios: Evidence from German Banks*

1.1 Introduction

The global financial crisis and the ongoing debt crisis have brought to centre stage the activities of large, globally oriented banks and their importance in studying international financial integration. In fact, when the first signs of financial turmoil began to show in 2007, the foreign claims of banks reporting to the Bank for International Settlements stood at $34 trn at the end of the year as compared to only $11 trn in 2000, and just $1 trn in 1990. Banks from Germany, which hold a substantial portion of these claims, have likewise increased their international exposure through both cross-border lending and the establishment of branches and

*This chapter is based on joint work with Matthias Köhler from the Deutsche Bundesbank. It represents the authors' personal opinions and does not necessarily reflect the views of the Deutsche Bundesbank or its staff.

subsidiaries abroad. At the end of 2007, foreign activities already accounted for between 50 and 70 per cent of the total assets of major German banks.

In particular, the expansion into foreign markets creates the potential for banks to diversify across countries by exploiting the less-than-perfect co-movement of business cycles around the world. For instance, Kose, Otrok, and Prasad (2008) point out that notable business cycle asynchronicity exists between industrial countries on the one hand, and emerging market economies and developing countries on the other. This suggests that, potentially, major diversification gains can be realised by lending to the latter. However, international capital flows continue to be primarily concentrated on developed markets (Milesi-Ferretti and Tille, 2011). Large, globally oriented German banks also focus strongly on developed countries and concentrate about 90 per cent of their foreign private-sector lending on a set of 10 countries.

In this chapter, we examine the seeming inconsistency of these observations. We hypothesise that German banks may choose not to diversify because of the existence of country-specific frictions such as institutions, regulations, and other factors. These frictions might drive a wedge between the potential and the effective risk and return in foreign lending, thus shaping the bank portfolios that we observe.

To explore our hypothesis, we proceed in steps. In the first step, we ask whether banks' international credit portfolios are consistent with an explicit, frictionless benchmark scenario. To this end, we compare their actual portfolios to mean-variance portfolios that we could expect to observe in the absence of country-specific frictions. We find that German banks' international credit portfolios deviate substantially from our benchmark portfolios, indicating that the concentration is indeed due to frictions.

In the second step, we investigate which country-specific frictions cause German banks not to diversify and to overweight some countries whilst underweighting others. We do so by regressing the differences between banks' actual credit portfolios and our

benchmark portfolios on a broad set of geographical, institutional, and regulatory variables.

In short, our results show that the institutional environment and banking regulations are important determinants of the international credit portfolios of German banks. In particular, countries with more developed institutions, stricter capital regulations, transparency in the banking sector, and stronger supervision tend to be overweighted by German banks. The same applies to countries with larger and more developed banking markets. Moreover, destinations that exhibit a higher level of economic integration with Germany in the real sector are overweighted as well. Eurozone membership also appears to introduce some bias towards those countries that have introduced the common currency. In contrast, there is no strong evidence that informational frictions increase monotonically with distance since more distant countries are not systematically underweighted.

Our analysis is based on the Deutsche Bundesbank's *External Position Reports of German Banks*. This dataset contains detailed information on the foreign exposure of all German banks, including their foreign branches and subsidiaries. From this dataset, we construct a bank-country panel for the period between 2003 and 2007 for large, internationally oriented German banks and a representative set of 35 countries from all regions of the world that comprehensively reflects the investment opportunity set of German banks.

For this set of countries, we compute mean-variance portfolios à la Markowitz (1952, 1959) that we could expect to observe in the absence of country-specific frictions. These portfolios serve as the benchmark throughout our analysis. They are calibrated on the basis of *representative assets* that capture the potential, as opposed to the effective, risk and return of lending to a given country. Crucially, those not only indicate the risk and return of a country in isolation but also account for diversification gains that can be achieved by balancing relatively low loan repayments in one country

with relatively high loan repayments in another. Hence, the benchmark portfolios should well reflect the potential diversification gains that German banks could achieve by exploiting the asynchroniticy of business cycles around the world.

Our approach is most closely related to the work by Buch, Driscoll, and Ostergaard (2010). They use aggregate, locational data on the cross-border assets of banks from France, Germany, Italy, the United Kingdom and the United States in 23 countries between 1995 and 2003 to identify barriers to international financial integration. The authors find that the probability of a country's being overweighted against a Markowitz-type benchmark decreases with the severity of capital controls, and increases with a survey measure of trust among residents in the destination country.[1]

In contrast to Buch et al. (2010), we consider a much larger set of 35 countries that more comprehensively reflects the investment opportunity set of banks. This is relevant as the gains from portfolio diversification tend to increase in the asynchronicity of business cycles across countries. In order to adequately reflect these gains and to properly identify the relevant frictions in international banking, it is important to consider a wide range of potential lending destinations that are sufficiently heterogeneous in terms of both geography and economic development.

The dataset used in this chapter also allows us to improve on Buch et al. (2010) and to contribute to the literature on the determinants of international bank lending and portfolio allocation in two other important aspects. First, whereas Buch et al. (2010) concentrate on cross-border exposure only, we examine the consolidated foreign credit exposure of banks. This comprises both cross-border and affiliate claims. The latter have become particularly important over the past two decades, to the point that the average bank in our sample relies on branches and subsidiaries for about 40 to 50 per

[1]The chapter is also conceptually related to García-Herrero and Vázquez (2007) in that the authors also calibrate explicit mean-variance portfolios. They use those as a benchmark to evaluate how large banks from eight major industrial countries allocate assets to their foreign subsidiaries. Banks are found to leave opportunities for international diversification largely unexploited.

cent of its foreign credit exposure. Moreover, solely focusing on cross-border lending might give a distorted view of the relevance of frictions due to potential substitution effects between cross-border and affiliate lending (García-Herrero and Martínez Pería, 2007; García-Herrero and Vázquez, 2007). For instance, informational frictions when lending across borders might be overcome or alleviated by a local presence in the form of a branch or subsidiary.

Second, the micro nature of our data makes it possible to focus only on those large, globally oriented banks that can be assumed to incorporate diversification considerations into their lending decisions. Therefore, deviations from the benchmark can be interpreted as stemming from country-specific frictions that drive a wedge between the potential and the effective risk and return in foreign lending rather than non-diversifying behaviour on the part of banks. Furthermore, given that the over- or underweighting of countries in German banks' credit portfolios may also partly reflect that some banks single out strategically important countries, we are also able to control for this heterogeneity in banks' international portfolio strategies.

Thereby, this chapter contributes to the literature on the determinants of international asset portfolios in general, and international bank lending in particular. A significant number of empirical papers investigate cross-border flows and holdings of bonds and equities (eg, Portes, Rey, and Oh, 2001; Gelos and Wei, 2005; Lane and Milesi-Ferretti, 2005; Portes and Rey, 2005; Lane, 2006), some of them also in a mean-variance setting (De Santis and Gérard, 2006; Baele, Pungulescu, and Ter Horst, 2007). Similar research into international bank lending has been conducted more recently (eg, Aviat and Coeurdacier, 2007; Alfaro, Kalemli-Ozcan, and Volosovych, 2008; Heuchemer, Kleimeier, and Sander, 2009; Papaioannou, 2009).

In more detail, our results suggest that a country's institutional environment constitutes a major friction in international banking. In line with papers that stress the importance of institutional quality (eg, Alfaro et al., 2008; Papaioannou, 2009), we

find that countries with more developed institutions are overweighted by German banks relative to the benchmark portfolios. In countries where factors as, say, the protection of property rights, absence of corruption, or bureaucratic and legal efficiency are not as highly developed, agency costs tend to be higher. This worsens the risk-return profile of lending to those markets and drives a wedge between potential and actual risk and return.

Banking regulations are also important determinants of international credit portfolios. Moreover, the evidence indicates that these regulations matter in their own right. That is, they are more than merely a reflection of the institutional environment since they impact on a country's overweighting even after controlling for general institutional quality. In particular, German banks tend to overweight those countries that have strong regulations in the key areas identified by the Basel accords — regulatory capital, supervisory review, and market disclosure. This adds to evidence that restrictions are not necessarily a deterrent to foreign bank lending (see Committee on the Global Financial System [CGFS], 2010).

Countries that are more economically integrated with Germany are also found to be overweighted. Markets that account for a larger share of German real-sector foreign direct investment tend to exhibit lower frictions vis-à-vis Germany, which should favour bank lending to these destinations, too. In addition, this chapter looks at eurozone membership as another aspect of integration with Germany. Sharing a common currency can improve a country's actual risk-return profile from the perspective of a German bank relative to what it would be if the bank had to either bear exchange rate risk or hedge itself against it, which is costly. Indeed there is evidence, albeit slightly less compelling, that eurozone countries are overweighted against the benchmark.

However, more distant countries are not systematically underweighted. One would expect that to be the case if informational frictions between German banks and

foreign borrowers increased monotonically with distance to the destination country. Hence, information asymmetries in international banking appear to follow more complex patterns. This supports the evidence presented by Buch et al. (2010). Also benchmarking actual bank portfolios against mean-variance optimised ones, they do not find an effect of distance on the probability of a country's being overweighted either.

Overall, the evidence suggests that German banks' international credit portfolios are not carved in stone. Instead of being shaped by factors that cannot change over time, deviations from our benchmark are largely determined by factors within the hands of policy makers. Accordingly, improvements and convergence of institutional and regulatory frameworks around the world might reduce the overweighting or underweighting of countries in the portfolios of German banks. Hence, even though such changes would certainly take time, there is reason to believe that they could contribute to banking markets in general becoming more internationally integrated in the future.

The chapter is structured as follows. Section 1.2 describes the dataset and characterises the actual international credit portfolios of German banks. The methodology and properties of the benchmark portfolios are outlined in Section 1.3, while the frictions of interest and the empirical strategy to identify them are discussed in Section 1.4. The estimation results are presented in Section 1.5. Section 1.6 concludes.

1.2 International credit portfolios of German banks

1.2.1 Dataset

Data on international credit portfolios are from the Deutsche Bundesbank's *External Position Reports of German Banks*. This dataset contains monthly micro-level data

on the external assets and liabilities of German banks, including their branches and subsidiaries abroad. Moreover, foreign assets and liabilities are broken down along a number of dimensions such as destination country, asset class, counterparty sector, currency denomination, and maturity.[2] The richness of the dataset makes it highly suitable for investigating the international diversification of bank credit portfolios. Three advantages stand out in particular.

First, data are available at the bank level. While we are interested in the country-specific frictions due to which banks' actual portfolios deviate from benchmark portfolios, individual banks might differ in their country exposures for reasons other than the factors we are able to observe. For instance, banks may have a lot of experience and expertise in a certain market or other competitive advantages. There may also be banks which single out certain strategically important countries in their international portfolio strategy. The bank-country dimension of our dataset allows us to control for such unobserved heterogeneity in our econometric analysis (see 1.4.1).

Second, reporting is not confined to the external positions of bank headquarters but includes those of foreign affiliates as well. This is important since banks have not only increased their cross-border exposures over the past two decades but also their lending via branches and subsidiaries (Clarke, Cull, Martínez Pería, and Sánchez, 2003).[3] A glance at the data reveals the importance of foreign affiliates for internationally oriented banks. The average bank in our sample relies on branches and subsidiaries for about 40 to 50 per cent of its foreign exposure, with percentages even ranging into the 90s as banks become larger and more internationally active. Moreover, there is reason to suspect substitution effects in international lending between bank

[2]For a more detailed documentation, see Fiorentino, Koch, and Rudek (2010).

[3]Cross-border lending refers to lending conducted directly by the parent bank, ie from a banking group's headquarters, rather than by its foreign affiliates. We will therefore use these terms interchangeably. Likewise, we will also occasionally refer to lending via foreign affiliates as local lending.

headquarters and their foreign affiliates. Some loans which used to be extended by the parent bank may be granted locally once a foreign affiliate has been set up.[4] Hence, focusing only on either cross-border or affiliate lending might give a biased picture of banks' international diversification and its determinants. In contrast to García-Herrero and Vázquez (2007) and Buch et al. (2010), our dataset allows us to analyse a bank's *consolidated* foreign exposure.[5]

Finally, foreign exposures are reported for the actual country of destination. This matters because international banks use some foreign countries, most importantly financial centres, as "hubs" from which to lend to clients in yet other foreign destinations. Therefore, our data can be seen as providing a further refinement in that regard as well.

1.2.2 Sample selection

We use the detailed information on foreign claims to focus our analysis along a number of dimensions and to construct a dataset best suited to addressing our research question.

First, we focus on a specific set of banks. The key question of this chapter is whether and, if so, which frictions make banks overweight some countries whilst underweighting others. We investigate this by benchmarking actual portfolios against mean-variance optimised ones. In order for deviations from the benchmark to be interpretable as stemming from country-specific frictions rather than non-diversifying behaviour on the part of banks, we therefore require that the banks in our sample be sufficiently large and internationally oriented. These banks can be expected to incorporate diversification considerations into their international lending decisions.

[4] Also see García-Herrero and Martínez Pería (2007) who investigate the mix of international banks' foreign claims between cross-border and local affiliate lending.

[5] Whereas García-Herrero and Vázquez (2007) rely entirely on foreign subsidiaries data from Bankscope, the data used in Buch et al. (2010) do not allow the authors to distinguish between the claims of domestic headquarters and those of foreign subsidiaries in a given country.

For Germany, we identify those banks as the major commercial banks and the head institutions of the savings and co-operative banks. We exclude individual savings and co-operative banks as well as small or mid-sized banks due to their focus on domestic activities. Specialised lenders are not included either since they pursue distinct business models (eg, mortgage lending, business development loans, car financing).

Our final bank sample consists of 18 institutions. Compared to all other German banks, the banks in our sample have a considerably larger exposure to foreign countries. For example, while the banks in our sample have significant credit exposure to roughly 50 countries, all other German banks have, on average, substantial exposure to less than one country. The banks in our sample also maintain significantly more foreign affiliates than the other banks. Whereas the former have branches and/or subsidiaries in an average of 10 countries, the latter only have a local presence in approximately three foreign countries. Overall, the banks in our sample are sufficiently large and internationally oriented to pursue an international diversification strategy.

Second, we constrain our investigation to the period from 2003 to 2007. We exclude the global financial and debt crisis years because our research question appears most reasonable in "normal" times, ie relative tranquillity in financial markets. In times of financial distress, however, we would expect short-term motives (eg, loss reduction) to take precedence over strategic considerations like the international diversification of credit portfolios.

Third, we focus on loans to the non-bank private sector.[6] Table 1.1 shows that this lending aggregate is the most important component of German banks' total foreign claims over the entire sample period (42 per cent in 2007). Holdings of foreign bond and commercial paper (33 per cent) and credit to foreign banks (18 per cent) are less important. We do not include bonds and commercial paper since we cannot be

[6]Using the same database, Düwel, Frey, and Lipponer (2011) make similar choices.

Table 1.1: **Foreign claims of German banks, by asset class**

	2003	2004	2005	2006	2007
Total foreign claims	2,043	2,352	2,370	2,690	2,977
Credit to foreign non-bank private sector	818 *(40%)*	882 *(37%)*	900 *(38%)*	1,018 *(38%)*	1,236 *(42%)*
Credit to foreign banks	522 *(26%)*	653 *(28%)*	578 *(24%)*	589 *(22%)*	548 *(18%)*
Foreign bonds and commercial paper (any sector)	582 *(28%)*	671 *(29%)*	734 *(31%)*	897 *(33%)*	992 *(33%)*
Foreign shares (any sector)	50 *(2%)*	77 *(3%)*	97 *(4%)*	123 *(5%)*	136 *(5%)*

Notes — This table shows the foreign claims of all German banks broken down by asset class. Data are from the Deutsche Bundesbank's *External Position Reports of German Banks*. All exposures are in € bn.

sure that this asset category does not also capture securitised assets. This might be problematic due to the fact that securitisation was particularly prevalent during our sample period in the run-up to the global financial crisis and driven by different motives. Likewise, we exclude credit to foreign banks which is predominantly short-term in nature and not driven by long-term portfolio considerations. Foreign equity (five per cent) is negligible with regard to the international exposure of German banks.

Finally, despite constraints arising from the calculation of benchmark portfolios (see 1.3.1), we are able to construct a representative sample of 35 countries covering all major regions of the world (see Table A.1 in the Appendix). This set of countries covers about 85 per cent of the total foreign non-bank credit by the banks in our sample. By capturing a substantial amount of cross-country heterogeneity and potential diversification opportunities, we can expect to gain insights into the country-specific determinants of German banks' international credit portfolios.

We consolidate the loans to the non-bank private sector for all 18 banking groups over the sample period by aggregating the exposures of the parent bank and all

of its foreign affiliates. That is, we assume that German parent banks incorporate both their foreign branches and their subsidiaries in their international strategy. This seems reasonable due to the special importance of internal capital markets for German banks. McCauley, McGuire, and von Peter (2010), for example, show that the foreign affiliates of German banks rely more heavily on intra-group funds than other international banking groups. This suggests that the affiliates of German banks are particularly integrated with their parent. We therefore include both branches and subsidiaries in the analysis.

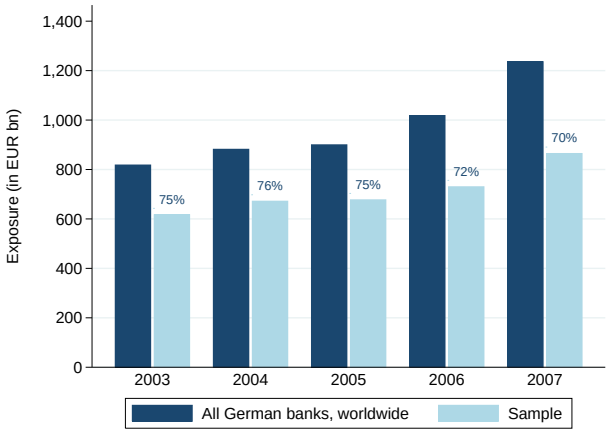
1.2.3 Stylised facts

Figure 1.1 shows the development of credit to the foreign non-bank private sector between 2003 and 2007 for both the total foreign exposure of all German banks (circa 2,000) and that of the 18 sample banks to the representative set of 35 countries. In each case, there is a marked upward trend, with the former increasing from €818 bn to €1.2 trn, and the latter from €617 bn to €865 bn. Both aggregates also move remarkably in tandem, indicating that our sample is highly comprehensive and representative along both the bank and country dimensions. Overall, our sample consistently accounts for 70 per cent or more of all foreign credit by the entire German banking system. It is to this sample that we will refer in the following.

The top 10 lending destinations of German banks at year-end 2007 are presented in Table 1.2 from both an aggregate and a micro-level perspective. The aggregate figures in the left-hand panel show the relative country weights in banks' international credit portfolios after aggregating the different country exposures over all banks in our sample. In the right-hand panel, we provide summary statistics on the basis of individual credit portfolios.

The United States and United Kingdom are by far the most important lending destinations for the banks in our sample. On aggregate, the US account for almost

Figure 1.1: **Credit to foreign non-bank private sector**



Notes — This figure shows overall exposures to the non-bank private sector for both all German banks with respect to any foreign country and the 18 internationally oriented banks in the sample towards the representative set of 35 countries over the 2003–2007 period. Percentages represent the portion of the entire German banking system's worldwide non-bank private sector credit accounted for by the sample banks and countries. Data are from the Deutsche Bundesbank's *External Position Reports of German Banks*.

40 per cent and the UK for roughly a third of total lending to foreign non-banks. Six of the remaining top lending destinations are located in Western Europe (about 17 per cent), the other two being Japan (three per cent) and Poland (1.5 per cent). Together, the 10 countries account for more than 90 per cent of total lending to non-banks. The disaggregated perspective is mostly in line with the observations at the aggregate level. The US and UK continue to be the two primary target countries for non-bank credit. Western European countries remain important as well, even though the rank ordering changes. Interestingly, Japan is no longer among the top lending destinations. In contrast, while Russia was not among the top 10 countries based on the aggregated data, it ranks in ninth place on the basis of the disaggregated data.

A closer look at the micro-level data provides further interesting insights into bank heterogeneity in portfolio holdings. For example, the standard deviations are large and frequently a multiple of the respective medians for all countries except the US

Table 1.2: **Main lending destinations of German banks (year-end 2007)**

Aggregated		Disaggregated		
			Median	Std dev
United States	38.7%	United States	29.0%	12.5%
United Kingdom	33.6%	United Kingdom	13.6%	14.8%
Ireland	3.8%	Netherlands	4.7%	11.0%
Italy	3.2%	France	4.0%	12.1%
France	3.1%	Switzerland	2.9%	4.1%
Japan	3.0%	Spain	2.8%	3.7%
Spain	2.8%	Ireland	1.8%	13.5%
Netherlands	2.6%	Italy	1.1%	3.6%
Switzerland	1.6%	Russia	1.0%	1.7%
Poland	1.5%	Poland	1.0%	5.1%

Notes — This table shows the top 10 lending destinations in terms of foreign non-bank private sector credit for the 18 internationally oriented German banks in the sample and the representative set of 35 countries. The left-hand panel shows country shares calculated after aggregating exposures over all sample banks. The figures in the right-hand panel are summary statistics over individual banks' relative exposures to a given country. Data are from the Deutsche Bundesbank's *External Position Reports of German Banks*.

and UK. This indicates that German banks take quite different views on lending to specific countries. In addition, this heterogeneous behaviour is not confined to emerging economies like Russia or Poland, but is observable with regard to highly developed nations like France or the Netherlands as well. Overall, the descriptive analysis of the main lending destinations points to the importance of allowing for bank heterogeneity in the empirical investigation of country-level frictions.

1.3 Benchmark portfolios

1.3.1 Methodology

The goal of this chapter is to examine which country-specific frictions drive a wedge between banks' actual portfolios and *benchmark portfolios*, ie portfolios we could expect to observe as the outcome of optimal international portfolio diversification in the absence of those frictions.

In a fashion similar to Buch et al. (2010) and García-Herrero and Vázquez (2007), we compute these benchmark portfolios by applying the Markowitz (1952, 1959) mean-variance framework on the basis of *representative assets*. We make some amendments to those portfolios to make them more suitable for our analysis. Most importantly, we account for the fact that portfolio weights obtained from mean-variance optimisation are invariant to the size of the respective economies and their capacity to absorb credit. We therefore introduce more realism by correcting for credit demand.

Representative assets We interpret a bank's benchmark international credit portfolio as arising from an optimal choice from a universe of representative assets, each of which represents one country in our sample. The decision to lend to a particular country or, more precisely, its non-bank private sector is regarded as granting a loan to a "typical", representative company in that country.[7] It is this company's economic and financial situation that the representative asset is intended to proxy.

The mean-variance framework then captures the risk-return trade-off faced by banks: all other things equal, they will prefer countries in which loan repayments are expected to be higher or less volatile. Crucially, in a portfolio context, banks may even consider lending to a country for which repayments are expected to be relatively low, or volatile, or both. The rationale is that banks can exploit the less-than-perfect correlation between one country's loan repayments and those in the rest of the portfolio to improve the risk-return profile of the portfolio as a whole (eg, Berger, 2000). Hence, the benefits of international diversification are greater the less aligned a country's economy with the business cycles of other countries.

To measure banks' expected risk and return in international lending, we would ideally like to use corporate bond indices. However, we found data availability to be

[7] Here and in the following, whenever we refer to a *country*, we mean that country's non-bank private sector (see 1.2.2 for our choice of lending aggregate).

too limited for non-Western countries. Since the benefits of portfolio diversification stem in large part from considering countries with relatively asynchronous business cycles, a sample dominated by developed countries with strong business cycle co-movements would underestimate the potential for international diversification. Hence, we choose national stock market indices as the representative assets. By mapping the international credit allocation problem into one among national equity indices, we are able to construct a dataset with a representative sample of 35 countries from all regions of the world which comprehensively reflects the investment opportunity set of German banks.[8]

The firm-value model by Merton (1974) provides a compelling rationale for the idea that the stock market contains valuable information about creditworthiness.[9] In a nutshell, the payoff to holders of a company's risky debt is interpreted as consisting of two components. The first component is independent of the firm's asset value and equal to the face value — ie, the repayment that would be received in the case of riskless debt. In the presence of credit risk, however, this payoff is reduced if the company cannot fully honour its commitments. As this happens whenever and the more the firm's asset value falls short of face value, the company's debt value and default probability depend on the development of its assets. While a higher expected return on the asset value raises the value of risky debt and reduces the probability of default, an increase in the volatility of the asset value has the opposite effect. Since the value of a firm's assets is not observable, industry models descending from Merton-type firm-value models infer the asset value and its development over time from that of a company's stock.[10]

[8]The broader country coverage also implies an increased cross-country heterogeneity in the frictions examined in this chapter. This should allow us to better identify the relevant effects.

[9]See Appendix A.1.1 for a more in-depth discussion of how we map the international credit allocation problem into a mean-variance choice among national equity indices.

[10]This is the case in Moody's KMV, for instance. For details on this and other credit risk models, see Crouhy, Galai, and Mark (2000), Crosbie and Bohn (2003), and Kealhofer (2003).

We take that as the starting point for our optimisation and proxy a country's representative firm by the return moments of its MSCI Barra national stock market index. Each equity index in isolation is characterised by expected return μ and standard deviation σ. It follows from above that banks will, ceteris paribus, prefer companies from countries with higher μ's and lower σ's. In addition, pairwise correlations ρ of national indices proxy for the degree to which equity markets — and business cycles — move together in the respective countries. At lower values of ρ, banks are more likely to engage in diversification between countries.

Table 1.3 reports regional return characteristics estimated at the end of 2007 for the sample of 35 countries. Interestingly, monthly mean returns are highest in South America and South and Southeast Asia (1.9 per cent each), and lowest in Western and Eastern Europe (0.7 per cent each). In general, mean returns in regions consisting primarily of developing and emerging economies tend to exceed those in developed regions (also see Table A.2 in the Appendix). At the same time, the more developed regions of Western Europe and North America carry substantially lower individual risk. Their return standard deviations of 5.3 and 5.5 per cent, respectively, are lower than those of any other region in the world. This suggests that their lending environments are relatively more stable. In contrast, the regions with the highest mean returns, South America and South and Southeast Asia, are also those with the highest standard deviations (10.6 and 9.4 per cent, respectively), which points to a risk-return trade-off in international lending.

Moreover, the return correlations underline the potential diversification gains to be made. As expected, correlations are consistently higher within than between regions. The correlation between Western Europe and South and Southeast Asia (0.28), for instance, is less than half that of Western European countries amongst one another (0.65). Returns are also highly correlated between Western Europe and North America (0.59), while correlations are noticeably lower with all other

Table 1.3: **Return characteristics, by region (year-end 2007)**

	Monthly return		Correlations						
	Mean	Std dev	WE	EE	NA	SA	MEA	SSA	EAO
Western Europe (WE)	0.7%	5.3%	0.65	0.39	0.59	0.39	0.46	0.28	0.40
Eastern Europe (EE)	0.7%	8.8%		0.54	0.51	0.36	0.40	0.28	0.35
North America (NA)	1.4%	5.5%			0.73	0.57	0.57	0.41	0.57
South America (SA)	1.9%	10.6%				0.46	0.40	0.35	0.39
Middle East & Africa (MEA)	1.6%	7.6%					0.45	0.31	0.47
South & Southeast Asia (SSA)	1.9%	9.4%						0.53	0.41
East Asia & Oceania (EAO)	1.3%	7.3%							0.56

Notes — This table characterises the monthly return moments of the 35 representative assets in the sample by their individual means and standard deviations, and by correlations with the other assets. For individual return characteristics, the reported figures represent median values of the constituent assets' means and standard deviations of return in a given region (see Table A.1 in the Appendix). For correlations, the table reports the median of pairwise return correlations among constituent assets of the regions involved. All figures are based on nine years of monthly euro/deutschmark returns between January 1999 and December 2007. Section A.1 in the Appendix provides further details.

regions of the world, which predominantly host emerging and developing economies. Finally, emerging economies are also far from perfectly aligned with each other. This suggests that discriminating on a country-by-country basis may further increase the benefits from diversification.

Portfolio optimisation[11] Banks are assumed to behave according to the principles of mean-variance optimisation, as introduced by Markowitz (1952, 1959). At the portfolio level, they minimise the return volatility σ for any given level of expected return μ, or maximise μ for any given level of σ. They borrow at a risk-free rate r in the interbank market[12] and optimally invest the funds in the risky representative assets under short-selling constraints.[13] Optimality is achieved when the Sharpe ratio $\frac{\mu - r}{\sigma}$ of the portfolio is maximised, ie when the expected excess return over the risk-free rate per unit of risk is highest. While differences in risk aversion determine

[11] Appendix A.1.2 provides more information on the portfolio optimisation procedure.

[12] We focus on large international German banks (see 1.2.2) that rely heavily on short-term interbank loans to fund their operations rather than retail deposits.

[13] As our ultimate interest lies in international *bank loan* portfolios, we rule out the possibility of short selling because it lacks an intuitive economic interpretation in this context.

the amount that banks invest at the risk-free rate, the composition of the risky asset portfolio is identical for all banks. The optimal relative country shares from mean-variance optimisation therefore obtain as the representative asset weights in the risky portfolio.

As the inputs for the optimisation (ie, expected returns, standard deviations, and correlations) are unobserved, they need to be estimated from historical data. To this end, we use a rolling-window approach based on nine years of monthly returns, which yields a portfolio for each year-end in the sample period. We also employ *portfolio resampling* techniques that account for uncertainty in the estimation of inputs, and which result in more stable and inclusive portfolios.

Accounting for credit demand The weights from (resampled) mean-variance optimisation over representative assets do not consider potential credit demand. A small country, for example, does not possess the same capacity to absorb credit as larger countries do. However, pure mean-variance optimisation may assign a weight well above the small country's share of credit demand relative to the countries in the portfolio. Sensible benchmark portfolios ought to account for this and be anchored around the likely relative credit demands of countries. Borrowing the terminology of Black and Litterman (1992), those relative credit demands can be thought of as "neutral" starting points for an international credit portfolio. Mean-variance optimisation then provides a bank with views on the relative merit of investing in different countries from a diversification perspective, so that it can adjust the neutral weights accordingly. As the literature frequently proxies credit demand by GDP and the latter also has the desirable property of being largely unaffected by the country-specific frictions we examine, we use relative GDP shares as neutral anchors.[14] Because it is unclear how much confidence a bank would place

[14]See Haselmann (2006), Altunbas, Gambacorta, and Marques-Ibanez (2009), or De Haas and Van Lelyveld (2011) for the use of GDP as a demand proxy in different contexts.

in mean-variance optimisation as opposed to the neutral weights at any given point in time, we employ a simple heuristic and define the *final benchmark weight* for a country as the unweighted *average of* its weight from *resampled mean-variance optimisation* and its *relative GDP share*.[15] However, we later check the robustness of our results to alternative weighting schemes that put more weight on the outcome from mean-variance optimisation and less on relative GDP shares (see 1.5.3).

1.3.2 Deviations from the benchmark

Table 1.4 gives a first overview of how German banks' actual portfolios deviate from the benchmark portfolios for the top 10 lending destinations at the end of 2007. It reports the degree of overweighting, which is the difference between a country's median actual weight and its benchmark weight according to the optimisation procedure outlined in 1.3.1.

Eight of the 10 most important lending destinations are overweighted to varying degrees relative to the benchmark, while Italy and Russia are underweighted. Moreover, as throughout the sample period, the US and UK are the two most overweighted countries in German banks' credit portfolios (13.8 and 10.6 percentage points, respectively). Even though the actual weight on the US is about twice that of the UK, their degrees of overweighting are quite similar. This is due to the much higher benchmark weight for the US. In contrast, Russia is heavily underweighted (-9.2 percentage points) relative to a similarly high benchmark weight of 10.2 per cent.

[15] Similar heuristics are often applied in other contexts with multiple plausible selection criteria, but in which no single criterion is clearly superior. For instance, the shares of national central banks in the European Central Bank's capital are calculated using a key which is the unweighted average of countries' population and GDP shares. Also see Altman, Resti, and Sironi (2002) who propose a "fifty-fifty" weighting scheme as a simple and transparent reference point in the context of shock analysis.

Table 1.4: **Overweighting for main lending destinations (year-end 2007)**

Country	Overweighting	Actual weight	Benchmark weight
United States	13.8%	29.0%	15.2%
United Kingdom	10.6%	13.6%	3.0%
Netherlands	3.9%	4.7%	0.8%
France	1.2%	4.0%	2.8%
Switzerland	2.2%	2.9%	0.7%
Spain	1.2%	2.8%	1.6%
Ireland	1.5%	1.8%	0.3%
Italy	−1.2%	1.1%	2.3%
Russia	−9.2%	1.0%	10.2%
Poland	0.3%	1.0%	0.7%

Notes — This table shows the overweighting for the top 10 lending destinations of German banks at the end of 2007. Overweighting is defined as the difference between actual and benchmark weights. The actual weight for a given country is the median over the 18 sample banks' individual weights (see Table 1.2) relative to the representative set of 35 countries. Benchmark weights are calculated according to the methodology outlined in 1.3.1. Data are from the Deutsche Bundesbank's *External Position Reports of German Banks*.

Overall, Table 1.4 indicates a significant potential for diversification by lending to underweighted countries. In the next section, we analyse empirically which country-specific frictions explain the over- and underweighting of countries.

1.4 Empirical setup

1.4.1 Estimation framework

We use the benchmark portfolios as the reference point for banks' actual international credit portfolios to investigate the impact of country-specific frictions with the following econometric model:

$$ow_{c,b,t} = \alpha + INTEG_{c,t} \cdot \beta + INST_{c,t} \cdot \gamma + X_{c,t} \cdot \delta + \mu_{c,b} + \epsilon_{c,b,t} \,.$$

Here, $ow_{c,b,t} = w_{c,b,t} - opt_{c,t}$ is the degree of overweighting of country c in bank b's international credit portfolio at the end of year t, ie the difference between the actual weight $w_{c,b,t}$ and the optimal weight $opt_{c,t}$ from the benchmark.

$\mu_{c,b}$ is a bank-country specific effect that captures individual bank behaviour towards specific countries in our dataset. For instance, some banks may be better able to exploit investment opportunities in certain countries due to greater expertise or experience in a market. Banks may also single out strategically important countries without the aim to diversify. Due to the bank-country dimension of our dataset, we can control for such unobserved time-invariant heterogeneity.

The country-specific frictions, which will be described in greater detail in the following, are included in the vectors $INTEG_{c,t}$ and $INST_{c,t}$. $INTEG_{c,t}$ contains variables that measure the degree of economic integration between Germany and the destination country, while $INST_{c,t}$ controls for the latter's institutional and regulatory framework. $X_{c,t}$ is a matrix of additional control variables.

We estimate the model by random effects. This is due to the fact that the variables used in the investigation — in particular those that capture the institutional and regulatory environment in a country — exhibit much larger between than within variation, which would make fixed-effects estimates very imprecise (see, eg, Wooldridge, 2010). Moreover, some controls do not vary over time at all and could therefore not be identified with a fixed-effects estimator due to time-demeaning. Also note that we cannot include bank variables as level terms in our model since regression coefficients would be zero by definition.[16] In the robustness checks, however, we further exploit the bank-level dimension of our dataset by including interaction terms to identify whether the banks in our sample differ in their reactions to frictions (see 1.5.3).

[16]This is because we look at countries' *shares* in the international credit portfolios of German banks, which are defined as percentages. Hence, even though larger banks, on average, extend more credit to any given country than smaller banks, the portfolio shares for each bank in any given year always add up to 100 per cent. Equivalently, the overweighting or underweighting across countries for a given bank will add up to zero. The regression coefficient of any bank variable will therefore be zero as well.

1.4.2 Country-specific frictions

In the following, we present the variables used in the regression analysis to capture various frictions that might drive a wedge between banks' actual and benchmark portfolios. These frictions are related to the degree of economic integration between Germany and the destination country as well as the institutional environment in general, and banking regulations in particular.

Economic integration We would expect frictions to be lower if the degree of economic integration with Germany is higher. Countries that are more integrated with the German economy should thus be more overweighted, or less underweighted, in German banks' international credit portfolios. We measure the degree of economic integration with Germany by the following two variables:

FDI — We include in our regressions *FDI*, which is a country's share in the real-sector outward FDI stocks of German non-banks.[17] Because countries that receive larger volumes of German foreign direct investment should be characterised by lower frictions vis-à-vis Germany, we would expect *FDI* to be positively related to the degree of overweighting. Another reason that would suggest such a positive relationship is that German banks might follow domestic companies when those venture abroad and set up operations in a foreign country.[18] In this case, the decision to lend to a country would not be primarily driven by the desire to seek a particular foreign exposure but to retain an existing customer base at home. In a way, this follow-your-client motive can be viewed as competing with that of international

[17] We do not include FDI by banks or other financial firms in that measure. The establishment of subsidiaries in a foreign country by banks would not only be reflected in an increase of the FDI measure, but also of the country's overweighting in banks' portfolios. We would therefore introduce simultaneity into our estimation.

[18] This rationale for the international activity of banks has been stressed as early as Goldberg and Saunders (1980, 1981). However, empirical evidence has been mixed. Recent studies (eg, Focarelli and Pozzolo, 2005; Berger, Dai, Ongena, and Smith, 2003; Seth, Nolee, and Mohanty, 1998; Williams, 1998) tend to paint a more nuanced picture of the importance of the follow-your-client motive than earlier contributions (eg, Brealey and Kaplanis, 1996; Yamori, 1998).

diversification. It may be particularly relevant in a bank-dominated financial system like Germany, where many firms rely on their so-called "Hausbank" (see, eg, Onetti and Pisoni, 2009).

EURO — Eurozone membership might also affect whether a country is overweighted or underweighted against the benchmark as several empirical studies provide evidence that the adoption of the euro may enhance financial integration.[19] Hence, we include a corresponding dummy variable in our regressions.

Institutional and regulatory environment Overweighting or underweighting is also likely to depend on frictions related to the institutional and regulatory environment in the destination country.

INSTITUTIONS — We capture the overall institutional environment of the destination country by the Index of Economic Freedom (see Heritage Foundation, 2013). This covers, among other things, the strength of property rights, absence of corruption, and regulatory efficiency. Functioning institutions should reduce monitoring, information, and agency costs. Bureaucratic and legal efficiency, for instance, can alleviate agency costs by settling disputes arising from contract incompleteness. Banks might be unwilling to bear these costs despite potential gains from higher returns and better diversification opportunities that are in principle associated with lending abroad. Higher index values indicate a more developed institutional environment.

In addition to the general institutional environment, we include a set of controls to capture a number of banking regulations in the destination country. In particular, we capture the three pillars of the Basel II framework, namely regulatory capital (*CAPITAL*), supervisory review (*SUPERVISION*), and market disclosure (*TRANSPARENCY*):

[19] For instance, Lane and Milesi-Ferretti (2005) and Lane (2006) give evidence of a eurozone bias in the international holdings by eurozone countries in stocks and bonds, respectively. Similarly, Blank and Buch (2007) detect a positive and significant impact of the euro on the bilateral foreign assets held by banks.

CAPITAL — The Capital Regulatory Index from Barth, Caprio, and Levine (2001) controls for regulations pertaining to the capitalisation of banks in the destination country, with higher values corresponding to stricter requirements.[20] Capital regulations, which are the cornerstone and first pillar of the Basel II framework, apply to both genuinely domestic banks in the destination country and to the local operations of foreign banks in the form of subsidiaries. In contrast to branches, subsidiaries are incorporated under local law and are legally separate from their parent banks. The latter generally do not assume responsibility for the liabilities of their subsidiaries, which therefore need to be capitalised independently according to host country regulations.[21]

SUPERVISION — The second pillar of Basel II is captured by the Official Supervisory Power Index. It measures the degree to which supervisors have the authority to take specific actions to prevent and correct problems in a bank. These include, for example, the right of the supervisor to meet with and demand information from auditors, to force a bank to change its internal organisational structure, or to supersede the rights of shareholders.

TRANSPARENCY — Disclosure requirements in the banking industry, as measured by the Private Monitoring Index, capture the effect of scrutiny from private market forces. It reflects the amount of financial information that banks in the destination country have to disclose to the public, where higher values are associated with stricter

[20]This and all following regulatory variables are constructed from the World Bank's *Bank Regulation and Supervision Database* according to the methodology in Barth et al. (2001). We use values from the second and third waves to capture the situation in the years 2003–2004 and 2005–2007, respectively (see Barth, Caprio, and Levine, 2008).

[21]However, Cerutti, Dell'Ariccia, and Martínez Pería (2007) point out that the distinction between branches and subsidiaries has become increasingly blurred in practice. Parent banks have begun to use "ring-fencing" provisions to limit the responsibility of their branches, too. As host countries are likely to differ in the degree to which they allow the negotiation of such provisions, those with more stringent capital regulations might also be more inclined to demand from parent banks that they support their branches. Then, the impact of *CAPITAL* on overweighting would also work through the channel of branches.

requirements. In the Basel II regulations, market disclosure features as the third pillar.

We investigate further banking regulations by including *ENTRY*, the Entry into Banking Requirements Index. This quantifies the restrictiveness of the requirements that banks incorporated in the destination country have to meet in order to obtain a banking licence. Higher index values indicate stricter requirements. These include whether it is necessary to submit, for instance, organisational charts, financial projections and information, the prior banking experience of managers and directors, or the sources of funds for capitalisation.

Moreover, we control for restrictions on other bank activities (*RESTRICT*). The presence of such restrictions may have spillover effects on banks' decisions to extend credit and to overweight or underweight countries in their portfolios. We therefore include an index that captures the restrictions that banks face when pursuing alternative business in securities, insurance, or real estate or limits to the ownership of non-financial firms. Higher values of this index are associated with greater restrictiveness.

Apart from the above variables, we also control for the distance between Germany and the destination country (*DIST*). Distance has long been used in estimating gravity equations in international trade, and has recently been investigated in the literature on international holdings and flows of financial assets as well.[22] On the one hand, diversification considerations suggest that the *absolute* level of holdings or flows should increase with distance as business cycle correlations tend to decrease with distance (also see Table 1.3). On the other hand, distance may proxy for the severity of informational frictions because information flows are generally lower

[22]See Portes et al. (2001) and Portes and Rey (2005) for cross-border trade in equities, corporate bonds and government bonds, and Aviat and Coeurdacier (2007) for bilateral bank asset holdings.

between more distant countries.[23] In this chapter, we explicitly model diversification opportunities and evaluate international credit portfolios *relative* to the benchmark portfolios containing optimal country weights. Because benchmark portfolios already account for the distance-diversification nexus, in our regressions *DIST* should show up negative if informational frictions increased monotonically with distance.

Finally, we need to control for the presence of financial centres (*CENTRE*) because our lending aggregate also contains lending to insurance companies and other financial institutions, which are, technically, non-banks.[24] Since internationally oriented banks are highly active in the money markets, the overweighting we observe in financial centres is partly the consequence of lending to non-bank financial counterparties located there. However, such overweighting cannot be considered a strategic decision to seek exposure to a specific country risk.

For full variable definitions and data sources, see Table A.3. Descriptive statistics and correlations are shown in Tables A.4 and A.5 (all in the Appendix).

1.5 Results

1.5.1 Baseline results

As shown in Table 1.5, we first estimate a model with the frictions related to economic integration and the institutional environment in the host country (column (1)). In columns (2) and (3), we then analyse a set of key regulations as singled out in the Basel II framework, before examining the impact of further banking regulations in the destination country in specifications (4) and (5).

[23] See, eg, Portes et al. (2001) for a discussion of these two rival hypotheses on the impact of distance.

[24] The countries classified as financial centres in our dataset are Ireland, Switzerland, and the United Kingdom.

Table 1.5: **Baseline results**

	(1)	(2)	(3)	(4)	(5)
FDI	0.502***	0.516***	0.522***	0.494***	0.521***
	(0.122)	(0.123)	(0.131)	(0.125)	(0.131)
EURO	0.004	0.006	0.006	0.010	0.009
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
DIST	0.001	-0.001	0.000	-0.000	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
CENTRE	0.042***	0.040***	0.035***	0.046***	0.040**
	(0.014)	(0.013)	(0.013)	(0.014)	(0.019)
INSTITUTIONS	0.010***	0.008***	0.009***	0.008***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CAPITAL		0.006***	0.008***	0.007***	0.008***
		(0.001)	(0.001)	(0.001)	(0.001)
TRANSPARENCY		0.004*	0.007***	0.005**	0.004*
		(0.002)	(0.003)	(0.002)	(0.002)
SUPERVISION			0.007***		
			(0.002)		
ENTRY				0.006***	-0.001
				(0.002)	(0.001)
RESTRICT				0.001	-0.001
				(0.001)	(0.001)
GOVT					0.007***
					(0.001)
N	3,045	2,958	2,436	2,958	2,871
R^2	0.33	0.33	0.35	0.32	0.35

Notes — This table shows baseline regressions of the degree of overweighting, measured on the interval $[-1, +1]$, on destination countries' economic integration with Germany and their institutional and regulatory environment. For variable definitions and data sources, see Table A.3. Descriptive statistics and correlations are provided in Tables A.4 and A.5 (all in the Appendix). Marginal effects on *INSTITUTIONS*, *CAPITAL*, *TRANSPARENCY*, *SUPERVISION*, *ENTRY*, *RESTRICT*, and *GOVT* are reported for a change by one respective sample standard deviation. All estimations include a constant, and are based on the sample of 18 internationally oriented German banks and the representative set of 35 countries. Robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

We begin by discussing the impact of economic integration on overweighting. Our first variable, outward foreign direct investment in the real sector (*FDI*), turns out to be significantly positive.[25] This is consistent with the view that existing economic

[25]The coefficient of *FDI* is interpreted as follows. Taking the magnitude from specification (1) as an example, an increase in a country's share in German real-sector outward FDI (relative to

integration in the real sector promotes financial integration, and that countries that are more economically integrated with Germany should be characterised by lower frictions. It is also in line with the hypothesis that banks follow domestic companies abroad and set up operations in a foreign country in order to retain an already existing customer base at home (see, eg, Goldberg and Saunders, 1980, 1981; Brealey and Kaplanis, 1996; Yamori, 1998).

Our second indicator of economic integration, eurozone membership (*EURO*), is also positive but insignificant in the baseline specification, which points to a more limited impact of the euro on credit market integration.[26] This contrasts with significant euro-area biases detected in bond and equity portfolios by Lane (2006) and Jappelli and Pagano (2008).[27] At the same time, detecting a more muted euro effect in bank lending to the private non-bank sector is consistent with empirical literature which suggests that the integration of credit markets in the euro area has not kept pace with that of bond and stock markets (see, eg, Adam, Jappelli, Menichini, Padula, and Pagano, 2002; Baele, Ferrando, Hördahl, Krylova, and Monnet, 2004).

Turning to *DIST*, we find no evidence that countries with a greater distance to Germany are significantly underweighted. If informational frictions increased monotonically with distance, we would expect more distant countries to be less overweighted, or more underweighted, relative to the benchmark. Our results are in line with Buch et al. (2010) who do not detect a significant relationship between distance and the probability of a country's being overweighted against a mean-variance benchmark either.[28] Moreover, given that we control for real integration via *FDI*, the result

the set of 35 countries) by one percentage point is associated with an increase in its degree of overweighting by roughly 0.5 percentage points.

[26] As will be shown in the robustness section (see 1.5.3), however, there is somewhat more compelling evidence of a positive effect of *EURO* in alternative specifications.

[27] Further evidence is provided by De Santis and Gérard (2006). Also see Kalemli-Ozcan, Papaioannou, and Peydró (2010) who investigate more closely the channels of the euro's effects on financial integration.

[28] However, this issue is not settled empirically. For instance, Portes et al. (2001), Portes and Rey (2005), Buch (2005), Heuchemer et al. (2009), and Giannetti and Yafeh (2012) report a negative

can also be interpreted as mirroring that of Aviat and Coeurdacier (2007) who find that the effect of distance on bilateral bank asset holdings is massively reduced once goods trade — another form of real integration — is accounted for.

In contrast, the results indicate that the institutional environment does matter in explaining a country's overweighting relative to the benchmark. *INSTITUTIONS* is positive and highly significant in all regressions, pointing to the importance of such factors as the protection of property rights or freedom from corruption in fostering the extension of international credit.[29] Our results on German banks' credit portfolios therefore add to earlier evidence on international capital and bank flows that stresses the importance of institutional quality (eg, Alfaro et al., 2008; Papaioannou, 2009). They are also consistent with the finding that German banks lend more actively to countries with greater economic freedom (Buch and Lipponer, 2007).

In specifications (2) and (3), we include the variables *CAPITAL*, *SUPERVISION*, and *TRANSPARENCY* to capture the three pillars (regulatory capital, supervisory review, market disclosure) of the Basel II framework.[30] All three have a significantly positive impact on the destination country's degree of overweighting. This suggests that banking regulations are important in their own right rather than merely a reflection of general institutional quality as in Demirgüç-Kunt, Laeven, and Levine (2004).

In more detail, both supervisory toughness (*SUPERVISION*) and a higher degree of information disclosure (*TRANSPARENCY*) in the destination country might make its banks more attractive takeover targets for foreign banks, as suggested by Buch

association between distance and bilateral financial asset holdings, whereas Petersen and Rajan (2002) show that the role of distance has declined over time.

[29]Marginal effects for *INSTITUTIONS* and all remaining variables discussed for the baseline specifications are reported for a change by one respective sample standard deviation. Hence, in specification (1), an increase in a country's general institutional quality by one sample standard deviation is associated with an increase of its overweighting by roughly one percentage point.

[30]Note that because of a loss of observations when including *SUPERVISION*, we only report the results once in column (3) to show that the other two variables are not materially affected by this.

and DeLong (2004). Considering that a substantial number of German banks' foreign affiliates were not established as *de novo* entities but acquired in transactions, this explanation for the overweighting of such countries appears reasonable in our context as well. Moreover, with regard to *TRANSPARENCY*, a less literal interpretation might be that countries which require banks to provide the public with a significant amount of information tend to apply similar reporting standards to non-banks, too. In that case, increased transparency on the part of real-sector firms would make it easier for banks to screen or monitor potential borrowers and thus increase the attractiveness of the destination country in terms of both cross-border and affiliate lending.

Countries with stricter capital regulations are overweighted as well, as indicated by the significantly positive coefficient for *CAPITAL*. While this again reinforces the notion that German banks overweight countries with a solidly regulated banking system, one might also expect strict capital requirements to discourage banks from setting up operations by requiring them to raise costly equity capital. However, higher requirements could also give international banks a competitive edge over domestic banks because they may be better able to raise capital, and at lower costs, than domestic institutions due to their access to internal capital markets.[31] This might allow them to expand their lending and market share faster than domestic banks (De Haas and Van Lelyveld, 2006). Moreover, it is important to note that German banks are also subject to relatively strict capital regulation at home. Thus, if similarity between home and destination country regulations and institutions matters (see, eg, Lensink, Meesters, and Naaborg, 2008), the result can also be interpreted

[31] Internal capital markets are particularly advantageous for foreign banks if there are substantial market frictions, such as information asymmetries. Jeon and Wu (2013), for instance, show that internal capital markets allow multinational banks to better raise funds in emerging and developed countries than domestic banks.

as German banks preferring to be active in countries with a more familiar regulatory environment.[32]

Overall, therefore, German banks seem to be drawn to countries with strong institutions and a sound regulatory environment in the banking sector. This is in line with evidence that restrictions in the destination country are not necessarily a deterrent to foreign banks (see CGFS, 2010). In addition, our results are consistent more specifically with the studies by Buch and DeLong (2004) and Buch and Lipponer (2007), both of which also investigate the impact of supervision and transparency in determining international bank activity.

Model (4) additionally controls for restrictions on other bank activities (*RESTRICT*) and entry requirements (*ENTRY*) in the banking sector. Activity restrictions might reduce the ability of banks to diversify *within* countries, while entry restrictions could impose additional costs on entering foreign markets. Whereas *RESTRICT* is insignificant, *ENTRY* is positive and significant. This suggests that banks overweight countries with more severe restrictions on bank entry. However, according to Barth, Caprio, and Levine (2004), it is countries with strong government influence that tend to impose higher entry restrictions. We therefore add *GOVT*, the share of total bank assets controlled by government-owned banks, in specification (5). The results show that *ENTRY* turns negative and insignificant once the impact of government ownership is accounted for, indicating that the effect of *ENTRY* on overweighting comes through *GOVT*, which is positive and highly significant. This could be due to foreign — in our case, German — banks possessing a competitive edge over domestic institutions because the latter are generally less developed and efficient in countries where government ownership of the banking sector is higher (La Porta,

[32] At the same time, it has to be acknowledged that we cannot tell apart the impact of *level* differences in regulation across destinations from that of differences in the *deviations* between home and host country regulations. This is because we use a non-bilateral dataset in this chapter with Germany as the only home country. Of course, this applies not only to *CAPITAL*, but to all other regulatory and institutional variables in our investigation.

Lopez-De-Silanes, and Shleifer, 2002; Barth et al., 2004). Hence, we do not find evidence that the level of activity and entry restrictions affects a country's degree of overweighting.

1.5.2 Additional country controls

As a first robustness check and to learn more about further factors that influence the overweighting of countries in German banks' international credit portfolios, we augment baseline regression (4) from above by additional country controls. The results are presented in Table 1.6. The ratios of private credit to GDP ($CREDIT$) and stock market capitalisation to GDP ($STMKTCAP$) control for the size and development of banking and financial markets, respectively (models (6) and (8)). In addition, we include the average net interest margin (NIM) and concentration in the banking sector ($CONC$) to account for competition in the destination country (models (7) and (8)).

The ratio of private credit to GDP ($CREDIT$) has been used as a proxy for the size and development of banking markets (see, eg, Driessen and Laeven, 2007; Beck, Demirgüc-Kunt, and Levine, 2010). We include it for two reasons. First, we have so far treated all countries equally in that the ability of banks to diversify *within* markets has not been considered. More developed banking systems, or deeper markets, might offer banks better opportunities to do so. Larger banking sectors also offer a greater potential to generate economies of scale (Buch and DeLong, 2004). The degree of overweighting should therefore be positively related to $CREDIT$. Second, banking sector development is likely to be influenced by both the frictions included in the regressions and those "residual" frictions that cannot be readily measured. Hence, controlling for $CREDIT$ can be regarded as a robustness check for the impact of the frictions we have already investigated. Again, since frictions should be lower in

Table 1.6: **Results including additional country controls**

	(4)	(6)	(7)	(8)
FDI	0.494***	0.551***	0.488***	0.552***
	(0.125)	(0.127)	(0.123)	(0.125)
EURO	0.010	0.001	0.011	0.003
	(0.007)	(0.007)	(0.007)	(0.007)
DIST	-0.000	0.002	-0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
CENTRE	0.046***	0.044***	0.046***	0.043***
	(0.014)	(0.014)	(0.014)	(0.014)
INSTITUTIONS	0.008***	0.005*	0.009***	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
CAPITAL	0.007***	0.008***	0.007***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)
TRANSPARENCY	0.005**	0.005**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
ENTRY	0.006***	0.005**	0.006***	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
RESTRICT	0.001	0.003**	0.001	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
CREDIT		0.013***		0.015***
		(0.004)		(0.004)
STMKTCAP		-0.008***		-0.008***
		(0.002)		(0.002)
NIM			0.002**	0.004***
			(0.001)	(0.001)
CONC			-0.001	-0.000
			(0.001)	(0.001)
N	2,958	2,941	2,958	2,941
R^2	0.32	0.31	0.32	0.31

Notes — This table shows regressions of the degree of overweighting, measured on the interval $[-1, +1]$, on destination countries' economic integration with Germany and their institutional and regulatory environment. The regressions also include additional controls that capture the development of banking and stock markets as well as banking sector competition in the destination country. For variable definitions and data sources, see Table A.3. Descriptive statistics and correlations are provided in Tables A.4 and A.5 (all in the Appendix). Marginal effects on *INSTITUTIONS*, *CAPITAL*, *TRANSPARENCY*, *SUPERVISION*, *ENTRY*, *RESTRICT*, and *GOVT* are reported for a change by one respective sample standard deviation. All estimations include a constant, and are based on the sample of 18 internationally oriented German banks and the representative set of 35 countries. Robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

countries with developed banking sectors, we would expect the positive coefficient for *CREDIT* that we find.

Along with *CREDIT*, we also include the ratio of stock market capitalisation to GDP (*STMKTCAP*) to control for the level of financial market development. In contrast to banking sector development, *STMKTCAP* is significantly negative, indicating that German banks underweight countries with larger and more developed stock markets. This is possibly due to a lower demand for bank finance and greater competition with other non-bank intermediaries and financial markets in these countries (see, eg, Allen and Gale, 2001; Rosengren, 2002).

While *CONC* is insignificant, the fact that competition is a potentially important factor is also borne out by the positive and significant coefficient for *NIM*. The net interest margin is often used to measure the operational efficiency and competitive nature of a banking sector, where higher margins are generally associated with lower efficiency and less competition (Demirgüç-Kunt et al., 2004). This points into a similar direction as the earlier result on *GOVT*, namely that in less developed and efficient environments there can be opportunities to earn excess returns.

Most important of all, however, the key findings from the baseline specifications continue to hold in the augmented regressions.

1.5.3 Robustness checks

In the following, we subject our baseline results to a number of robustness tests. All of those are reported in Table A.6 in the Appendix.

Alternative benchmark weighting schemes

Because portfolio weights from mean-variance optimisation are invariant to the size of the different economies and their capacity to absorb credit, we correct for credit

demand by countries' relative GDP shares. Hence, as the final benchmark weight we have so far used the unweighted average of the weights from (resampled) mean-variance optimisation and GDP shares (see 1.3.1). Even though such a "fifty-fifty" weighting scheme is appealing as a natural starting point, one might still consider it to be somewhat arbitrary and be worried that our results hinge on this assumption. We therefore re-run our estimations using alternative weighting schemes that put more weight on mean-variance optimisation (60 and 70 per cent, respectively), and less on GDP shares (40 and 30 per cent, respectively). Our findings turn out to be robust to this, with only *EURO* becoming significant.

Bringing in the bank level

Our analysis focuses on 18 German banks that are sufficiently large, globally oriented, and have a business model to suggest that they consider diversifying their credit portfolios internationally. As a further check, we also re-run our regressions for those 14 banks that are considered systemically important financial institutions (SIFIs) by the Deutsche Bundesbank. While these banks stand out in terms of their size and foreign exposure, our results remain unchanged for this subset of banks.

More importantly, we also exploit the bank-level dimension of our dataset by including interaction terms between the country-specific frictions and bank size, proxied by (log) total assets, to identify whether banks react differently to country-specific factors.[33] The size of a bank can be regarded as a measure of its international orientation or its experience in different lines of business with a variety of customers. Larger banks may also have stronger incentives to diversify internationally (Focarelli and Pozzolo, 2005). On the one hand, deviations from the benchmark induced by

[33]Note that the fact that coefficients for the level terms change substantially in both magnitude and significance is due to adding interactions. They reflect the impact on overweighting for a hypothetical bank with log total assets of zero. Hence, level terms should not be directly compared to those in the other specifications, whereas the interaction terms are a meaningful guide to potential differences in bank behaviour.

a country-specific factor might differ across banks, for instance because it may be easier for larger banks to overcome informational asymmetries than for smaller banks. On the other hand, since we already focus on a group of large and internationally oriented banks, one might not expect major differences in reactions for our sample. Indeed, we find that the interaction terms are generally insignificant.[34] Hence, country-specific frictions seem to affect all banks in largely equal measure. This also indirectly supports our choice of bank sample.

Other samples

We also consider two further subsamples. First, we test whether our results hold for the shortened period 2003 to 2006. Even though the most severe period of the global financial crisis started in September 2008 with the collapse of Lehman Brothers, the first stage already began in 2007 when, in August of that year, banking flows started to slow down primarily among developed countries due to increased uncertainty among banks (Milesi-Ferretti and Tille, 2011). However, results for this subsample are very similar to those from the baseline, most probably because we focus on non-bank credit and the crisis was at first largely confined to the interbank market.

Second, we drop the US and UK from the regressions as these are the two most overweighted countries in our sample. While there is little change for the institutional and regulatory variables, the picture is slightly more complex for the economic integration and distance variables. As in the case of robustness to alternative weighting schemes, *EURO* is now significant, which is certainly driven by the strong overweighting of the non-eurozone countries US and UK. Surprisingly, *FDI* turns insignificant in this subsample. On a positive note, though, the coefficient is significantly positive again in another regression that in addition excludes the year

[34]The only exception is the interaction of the technical control *CENTRE* with bank size. Its coefficient is significantly positive, reflecting that the larger banks in our sample are more active in financial centres. This seems plausible.

2007. *DIST* is negative and significant, suggesting that, for this particular subset, informational frictions may rise when lending to more distant countries.

Drawing together the evidence from the baseline specifications and from the robustness checks, there is strong evidence that German banks overweight countries with both a sound institutional and regulatory environment. On the whole, our results also indicate that economic integration in the real sector promotes financial integration in that countries tend to be overweighted that are important destinations for German non-banks' outward FDI, too. Moreover, there is somewhat less evidence of eurozone membership having a major positive influence on overweighting relative to the benchmark. Finally, there is no compelling evidence overall that more distant countries are systematically underweighted. Therefore, information asymmetry in international banking does not increase monotonically with distance to the destination country, suggesting that it follows more complex patterns.

1.6 Conclusion

German banks have massively stepped up their foreign exposure over the past two decades by both an increase in their cross-border activities and the establishment of branches and subsidiaries abroad. Therefore, major German banks are now heavily dependent on the development of their foreign assets. However, while business cycles across the world exhibit notable asynchronicity — which gives rise to potential diversification opportunities —, the international credit portfolios of German banks continue to be highly concentrated.

In this chapter, we investigate whether the seeming inconsistency of these observations is due to the existence of country-specific frictions. More specifically, we ask which geographical, institutional, and regulatory variables drive a wedge between the potential and the effective risk and return in foreign lending and thereby shape

the portfolios that we observe. To this end, we construct a bank-country panel for the period from 2003 to 2007 on the basis of the *External Position Reports of German Banks*, a unique dataset provided by the Deutsche Bundesbank. For large, internationally oriented German banks and a representative set of 35 countries from all regions of the world, we compare banks' actual international credit portfolios to mean-variance based benchmark portfolios that we could expect to observe in the absence of country-specific frictions.

The results show that institutions and banking regulations are important determinants of the international credit portfolios of German banks. In particular, German banks tend to overweight those countries against our benchmark that have more developed institutions, stricter capital regulations, transparency in the banking sector, and stronger supervision. Furthermore, destinations which are characterised by a higher level of economic integration vis-à-vis Germany in the real sector are overweighted as well. Eurozone membership also introduces some bias towards those countries that have introduced the common currency. However, there is no compelling evidence that information asymmetries increase monotonically with distance since more distant countries are not systematically underweighted.

Overall, German banks' international credit portfolios do not seem to be shaped by factors that cannot change over time. Instead, deviations from our benchmark are primarily due to factors within the hands of policy makers. Therefore, changes and improvements of institutional and regulatory frameworks across the globe may reduce the overweighting or underweighting of countries relative to the benchmark. Although such changes would arguably take time, there is thus reason to believe that they could help increase the international integration of banking markets in the future.

Chapter 2

Credit Ratings and Cross-Border Bond Market Spillovers*

2.1 Introduction

Ever since tensions began to surface in the eurozone in late 2009, the announcements by credit rating agencies (CRAs) on the creditworthiness of member states have continuously made the headlines and rattled financial markets. In particular, while not specific to the ongoing crisis, the notion that rating actions pertaining to one country might have a major impact on the yields of other countries' sovereign bonds, too, has regained the attention of policy makers. In fact, concerns over so-called negative spillover effects have been running so deep that the European Commission was at one stage considering a temporary restriction on the issuance of ratings under exceptional circumstances (Financial Times, 2011). This provides the background for why the Commission has just recently set up stricter rules for the agencies. In particular, CRAs are now only allowed to issue three ratings for European Union

*This chapter is based on joint work with Michael Zabel.

member states' sovereign debt at pre-defined dates every year (European Union, 2013).

These considerations carry two major assumptions on the behaviour of sovereign bond markets in the wake of rating announcements. The first assumption is that, when a rating announcement is made for one country, there exist significant spillover effects on other countries' sovereign bond markets. Conditional on their existence, the second assumption posits that such spillovers must, in one way or another, be unwarranted to merit an intervention by the state. In more technical terms, it suggests that spillovers are unrelated to economic fundamentals. While both assumptions are highly policy-relevant and therefore deserve close scrutiny, they are not straightforward to test.

This chapter sets out to cleanly identify the existence of cross-border spillover effects of sovereign rating announcements, and to establish the economic conditions under which those effects are strongest, or which countries are affected most. To this end, we collect an extensive dataset which comprises a complete history of both the sovereign rating actions by the "Big Three" (Standard & Poor's, Moody's, and Fitch) and daily sovereign bond market movements for up to 73 countries between 1994 and 2011. The dataset contains substantial variation as it covers both crisis and non-crisis periods as well as a broad set of developed and emerging countries across all continents.

Crucially, the variation allows us to pursue a novel empirical strategy to identify potential spillover effects. More precisely, we perform an explicit counterfactual analysis which pits bond market reactions to small revisions in an agency's assessment of a country's creditworthiness against bond market reactions to all other, more major changes. As explained below, this not only helps us get around the problems associated with a classic event-study approach in a spillover context. It also does not require the additional assumptions made by a number of papers.

A traditional event-study procedure, where bond market movements in an estimation window serve as the counterfactual for bond market reactions in the event window, is suitable in principle but, in a spillover context, places too high demands on the necessary non-contamination of the estimation window. This is because, if one entertains the possibility of cross-border spillovers after rating announcements, each country's bond yields are potentially affected by any sovereign rating change in the world. The estimation window can therefore only be considered uncontaminated if no such change has occurred anywhere. As the number of instances where this can be ensured is extremely low, the classic event-study approach appears ill-suited to thoroughly identify spillover effects. Hence, in this chapter, we focus on a pooled cross section of short event windows, in which small changes of the actual rating serve as the counterfactual for larger changes.

While some papers also investigate spillovers in a pooled cross section framework, their analyses do not postulate an explicit counterfactual, as we do.[1] Instead, they rely on a "comprehensive credit rating" which combines two different types of rating announcements — actual rating changes and watch, or review, changes — into a single scale. Their identification therefore depends on rather strong additional assumptions on the relative informational content of reviews and ratings. We, however, focus solely on the class of actual rating changes. In detail, we test whether a country's sovereign bonds react more heavily to upgrades or downgrades elsewhere when those are "large" — ie, when the actual rating changes by two notches or more. The group of "small" one-notch changes serves as the counterfactual during that exercise. At the same time, we explicitly allow for differences in the informational content of sovereign rating changes by controlling for watch listings that may build anticipation in the market. Moreover, we are also able to account for the fact that

[1] See Gande and Parsley (2005), Ismailescu and Kazemi (2010), Afonso, Furceri, and Gomes (2012), and Alsakka and ap Gwilym (2012).

an announcement is often followed by a similar one from a different agency soon after, which may further influence the reception of the later announcements.[2]

Our findings on the existence of cross-border spillover effects point to an important asymmetry in the sovereign debt market's treatment of ratings. On the one hand, we find significant spillovers in the wake of sovereign rating downgrades, which turn out to be robust to a number of tests. On the other hand, reactions to upgrades appear to be much more muted, if anything.

We then investigate to what extent spillovers are driven by country characteristics. Importantly, we find that spillovers from downgrades tend to be significantly more pronounced for countries within the same region. We proceed by testing whether this can be explained by bilateral trade linkages, financial integration, or fundamental similarities between countries but, even after controlling for these factors, we continue to find that belonging to a common region amplifies cross-border spillover effects. Note that a limit to the amount of fundamentals that can be measured implies that no study can by design "prove" that negative spillovers are unwarranted in some way. At the same time, however, our findings do not suggest that policy makers' concerns over countries being found "guilty by association" can be dismissed out of hand.

This chapter is related to a broad strand of literature that investigates the effects of sovereign rating announcements on different segments of the financial markets. The most common exercise is to conduct an event study gauging the *direct* impact of rating changes on the bonds issued by the country concerned. However, there is also a substantial body of research analysing the reaction of the country's stock and, more recently, of its credit default swap (CDS) market. As a general result, this literature finds a strong and significant impact of sovereign rating downgrades, while upgrades have an insignificant or more limited impact (see, eg, Cantor and

[2]To the best of our knowledge, we are the first to consider such interactions between the major CRAs in identifying spillover effects.

Packer, 1996; Larraín, Reisen, and von Maltzan, 1997; Reisen and von Maltzan, 1999; Brooks, Faff, Hillier, and Hillier, 2004; Hooper, Hume, and Kim, 2008; Hill and Faff, 2010).

Moreover, in recent years a growing body of research has specifically studied whether sovereign rating changes also lead to *spillover* effects on other countries' sovereign bonds. Generally speaking, the literature affirms the existence of such spillovers, meaning that a rating action on one country is found to significantly affect the sovereign bond prices of other countries (eg, Ismailescu and Kazemi, 2010; Arezki, Candelon, and Sy, 2011; De Santis, 2012). Some studies also point out that spillovers are not limited to sovereign debt markets but that rating changes also affect foreign stock and exchange markets (Kaminsky and Schmukler, 2002; Arezki et al., 2011; Alsakka and ap Gwilym, 2012). Regarding a potential asymmetry in the spillover effects of negative and positive rating events, the results of the literature so far remain inconclusive. Whereas Afonso et al. (2012) find spillovers to matter most for downgrades, with little or no effects of sovereign upgrades, Ismailescu and Kazemi (2010) find positive rating events to have a greater spillover effect on foreign CDS prices than negative ones.

With the exception of Gande and Parsley (2005), these studies focus either on spillover effects during specific regional crisis episodes[3] or on an otherwise homogeneous sample of countries only, such as emerging countries (Kaminsky and Schmukler, 2002; Ismailescu and Kazemi, 2010). In addition to some of the shortcomings already mentioned, this leaves open the question to what extent their findings are of more general relevance.

The chapter is organised as follows. In the next section, we describe the dataset and highlight some important characteristics of rating announcements. Section 2.3

[3]See Arezki et al. (2011), Afonso et al. (2012), and De Santis (2012) for the eurozone crisis, and Kaminsky and Schmukler (1999) for the 1997/98 Asian crisis.

discusses the estimation strategy for identifying cross-border spillovers. Section 2.4 presents our empirical results and discusses their interpretation. We end with a brief conclusion.

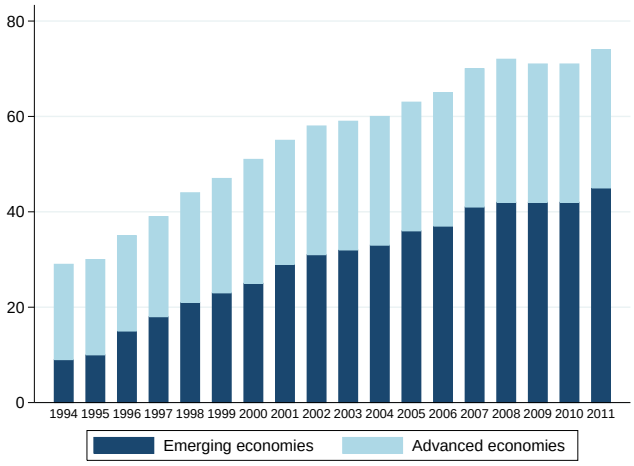
2.2 Data

2.2.1 The dataset

For our study, we compile a broad dataset of the yields of publicly traded sovereign bonds at daily frequency. The dataset starts in January 1994 and ends in December 2011. Since for many countries data are only available after 1994, we add those countries' sovereign bonds as soon as reliable information becomes available. Whereas our dataset only comprises sovereign bonds issued by 27 countries in 1994, this number increases to 74 countries towards the end of our sample period. This reflects both the increased financing needs of sovereigns and the growing prevalence of bond issuance, as opposed to bank financing, over the last 20 years. While for 1994 sovereign bond yields are mostly available for developed countries, the availability of emerging market bond yields picks up heavily over our sample period. Towards the end of the period, emerging markets even account for the bulk of sovereign bonds in the sample. Figure 2.1 illustrates the increasing scope of our dataset over time.

In order to consider a broad spectrum of sovereign bonds, our sample draws on data from different sources. Our preferred data source is Bloomberg, from which we use generic 10-year yields for up to 33 countries. If data are not available on Bloomberg, we supplement them with yields from Datastream's 10-year Government Bond Benchmark Index, ensuring that this does not induce structural breaks in the series. Since sovereign bond availability for emerging markets is quite limited both on Bloomberg and on Datastream, we also use data from the JP Morgan Emerging Markets Bond Index Global (henceforth EMBI Global, see JP Morgan, 1999). While

Figure 2.1: **Number of sovereign bonds in the dataset**



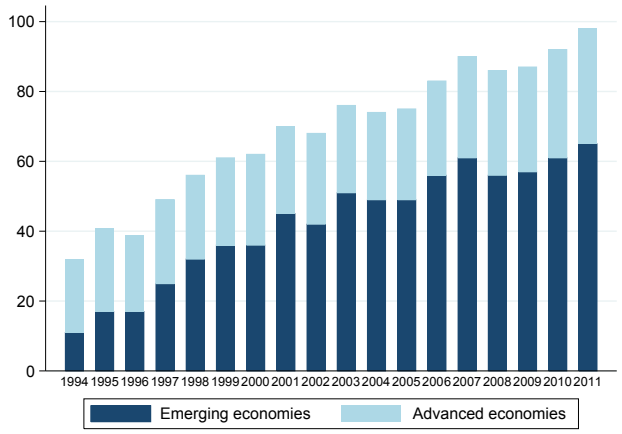
Notes — This figure shows the scope and composition, by economic development, of the sovereign bond sample between 1994 and 2011, highlighting a notable increase in the coverage of emerging economies over time. Countries are classified according to the IMF World Economic Outlook.

bonds included in the EMBI Global have to fulfil strict requirements regarding the availability of reliable daily prices, the average maturity of a country's bond index can vary remarkably from that of the other two sources. We therefore control for maturity in all regressions. Table B.1 in the Appendix gives a detailed overview of the sovereign bond market data included in our sample.

For the purpose of our later analysis, we compute sovereign bond *spreads*. The spread is the differential of the country's sovereign bond yield over that of a US Treasury bond of comparable maturity. We use 10-year maturities where possible, which is the case for the developed economies and some emerging markets. For the other emerging economies, we rely on the EMBI Global data. As those correspond to different maturities (depending on the average maturity of eligible instruments a country has issued), we obtain the relevant US Treasury yields by interpolating from the closest published yield curve rates.

Information on sovereign ratings comes from the rating agencies' websites and includes daily information both on rating changes and on sovereign watch listings by any of the "Big Three" (Standard & Poor's, Moody's, Fitch) from 1994 to 2011. We

Figure 2.2: **Number of rated countries**



Notes — This figure shows the scope and composition, by economic development, of the sample of countries rated by at least one of the major rating agencies (Standard & Poor's, Moody's, Fitch) between 1994 and 2011, with a notable increase in the coverage of emerging economies over time. Countries are classified according to the IMF World Economic Outlook.

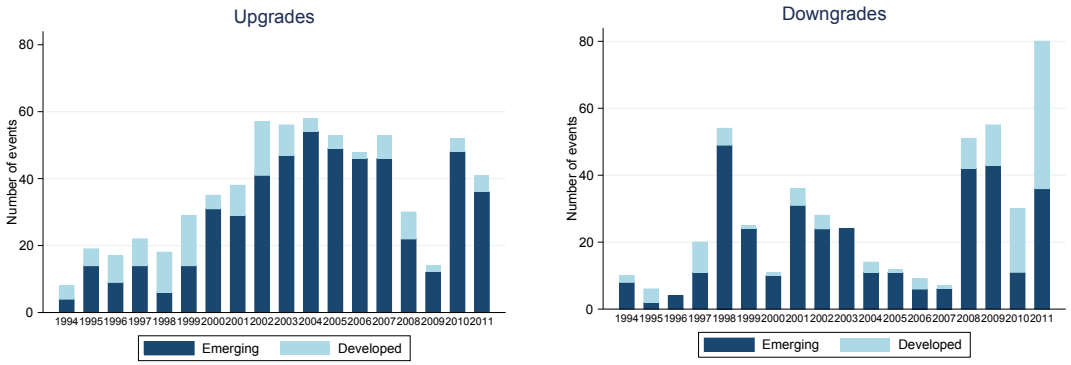
choose the year 1994 as a natural starting point for our sample period since Fitch only started to assign sovereign ratings in that year. Like the number of publicly traded sovereign bonds, the scope and composition of countries rated by the "Big Three" changes quite substantially during our sample period. While in 1994 only 34 sovereigns were rated by at least one of the agencies, this number had increased to 98 countries by 2011 (see Figure 2.2).

2.2.2 Characteristics of rating announcements

Over the sample period, we are able to consider a total of 1,097 rating changes, 635 of which were upgrades and 462 downgrades. Table B.2 in the Appendix provides a regional breakdown. In general, one can observe a significant increase in the number of sovereign credit ratings during our sample period, particularly in emerging market countries.

As Figure 2.3 illustrates, rating activity is not evenly distributed over time but, especially for downgrades, shows some hefty peaks during specific episodes of crisis.

Figure 2.3: **Rating actions over time**

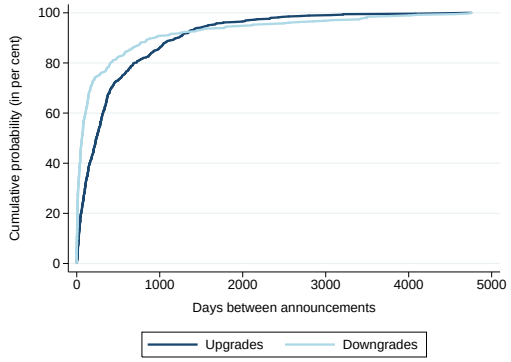


Notes — This figure shows upgrades and downgrades of developed and emerging economies made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. Countries are classified according to the IMF World Economic Outlook.

Whereas in "normal times", downgrades tend to be relatively scarce, a severe increase can be observed in the context of the 1997/98 Asian crisis (affecting mostly emerging countries plus South Korea and Hong Kong) and following the 2008–2011 financial and European debt crises (where for the first time advanced economies were exposed to downgrades at a large scale). This means that similar announcements tend to cluster around certain time periods.

In addition, it is an important stylised fact that the downgrading of a country is frequently followed by yet another downgrade announcement for that same country soon after. This is all the more probable because there is a strong overlap in country coverage by the "Big Three". Almost all countries in our sample are rated by more than one agency only and most are even rated by all three (70 out of 98 countries at the end of 2011). Hence, in what we term *within*-clustering, different agencies may make the same announcement for a *given country* in short succession or even on the same day. Figure 2.4 illustrates this issue by plotting the cumulative distribution function and summary statistics of the number of days between similar rating actions on the same country. As can be seen, clustering is particularly pronounced for downgrades. In around five per cent of all cases, a downgrade on a country is

Figure 2.4: **Clustering of rating announcements**



	Upgrades	Downgrades
Mean	453	364
Median	238	63
5^{th} pct	13	1
10^{th} pct	23	3
25^{th} pct	79	12

Notes — This figure shows the cumulative distribution functions and summary statistics of the number of calendar days between an upgrade (downgrade) announcement for a given country and a subsequent upgrade (downgrade) of the same country by any agency. Information is based on the sample of 1,097 rating announcements (635 upgrades, 462 downgrades) made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011.

followed by another downgrade on that country within just one day. For example, in the course of the Asian crisis, Standard & Poor's, Fitch and Moody's all downgraded South Korea's credit rating on successive days between 25 and 27 November 1997. Similarly, during the ongoing European debt crisis, Fitch issued a downgrade for Greece on 8 December 2009. One week later, Standard & Poor's downgraded the country as well, as did Moody's yet another six days later.

The presence of clustering might be of crucial importance when examining the spillover effects from a rating announcement since its informational content is likely to vary depending on whether it has been announced in isolation or just a few days after a similar announcement by another agency. Not to control for these cases could seriously bias estimation results for the impact of rating announcements on sovereign bond markets.

Clustering *across* countries may matter, too. When CRAs change the rating of a number of *different countries* in the same direction simultaneously, one needs to control for the fact that some countries will then be both "non-event" and event countries. Otherwise, one might erroneously detect spillovers across sovereign bond

markets when, in fact, one is looking at own effects of ratings. This is all the more important if the countries concerned share a common trait which leads CRAs to make simultaneous announcements in the first place, as appears to have happened on 3 October 2008 when Fitch downgraded Estonia, Latvia and Lithuania.[4] It is therefore a major advantage of our dataset that it enables us to explicitly take into account prior and parallel rating actions by other CRAs and on other countries.

Similarly, the informational content of a rating change might be conditional on whether it was preceded by the respective country being put on a watch list. As the literature on the effects of rating announcements on the refinancing conditions of the very same country shows (eg, Ismailescu and Kazemi, 2010; Afonso et al., 2012), rating changes are often preceded by a similar change in the market's assessment of sovereign risk, especially when countries have been put "on watch", or "review", before.[5] Ignoring these anticipation effects risks underestimating bond market reactions to a sovereign rating action. Since our dataset includes all sovereign watch listings by the "Big Three", we can directly control for a country's watch list status and mitigate potential problems with anticipation.

2.3 Identifying sovereign spillovers

2.3.1 Counterfactual choice and estimation strategy

The existence of rating spillover effects in the sovereign debt market requires, by definition, that the announcement by a CRA on the creditworthiness of one country (*event country*) impact significantly on the bond yields of another (*non-event country*). Yet, the mere observation of a change in non-event country yields when an event-

[4]Other examples may be seen in Standard & Poor's downgrade announcements for South Korea and Taiwan during the Asian crisis on 24 October 1997, or in Fitch lowering the ratings of Estonia, Ireland, Latvia, and Lithuania on 8 April 2009.

[5]In the following, we use the two terms interchangeably. While Standard & Poor's and Fitch issue watch listings, in the Moody's terminology those are called "reviews".

country announcement is made does not suffice to establish a causal relation because non-event country yields might have changed regardless. Hence, the key issue in identifying potential spillover effects is to find a suitable counterfactual.

We cannot apply the procedure traditionally used in event studies on *direct* announcement effects, however. This strand of literature focuses on, for instance, the bond yield response of a sovereign that has been downgraded. In this framework, effects are identified by the existence of abnormal returns, meaning that around the announcement (event window), returns are significantly different from normal, as estimated over a longer time frame before the announcement (estimation window). In order to be a reasonable guide to normal returns, the estimation window has to be chosen such that other events with a potentially significant impact on returns are excluded (see, eg, MacKinlay, 1997). In other words, the counterfactual for gauging the impact of rating announcements is "no rating change". While this represents a challenge in direct announcement studies already, which focus on countries in isolation, the identification of *spillover* effects based on this counterfactual is essentially impossible.

The reason is that, in a spillover context, we would require that there be no announcements on *any* rated country within the estimation window.[6] There is obviously a trade-off between the length of that window and the number of announcements eligible for inclusion in the estimation. However, even at a 30-day length commonly used in sovereign event studies, which is towards the shorter end of the event-study literature more generally, only 23 upgrades would be eligible, and 36 downgrades.

[6]The universe of all rated countries is the relevant benchmark when analysing potential spillover effects in this framework. Of course, if we only required the estimation window to be free of announcements pertaining to the non-event country, the number of events eligible for inclusion would increase substantially. However, this would amount to assuming from the outset that only direct effects, as opposed to spillover effects, could possibly matter, which would defy the purpose of the investigation.

We therefore pursue an identification strategy that does not rely on "no rating change at all" as its counterfactual, but which discriminates between rating changes according to their severity. More precisely, rating changes of a single notch serve as the counterfactual for more severe changes of two notches or more.[7] This approach is implemented in the following estimation equation, which we run on upgrades and downgrades separately:

$$\Delta Spread_{n,t} = \alpha + \beta \cdot LARGE_{e,t} + RatEnv_{e,n,t} \cdot \gamma + Other_{e,n,t} \cdot \delta + \omega_{e,n,t} \,.$$

The dependent variable $\Delta Spread_{n,t}$ is the change in non-event country n's bond spread vis-à-vis the United States over the two-trading-day window $[-1, +1]$ around the announcement on day 0 of a change in the rating of event country e ($\neq n$). The event window length accounts for the fact that by the time a CRA announces a rating change on day 0, markets in some parts of the world may have already closed (asynchronous trading). Hence, any impact on those would not materialise before day $+1$, and would go undetected using a shorter $[-1, 0]$ window. The same argument applies to rating announcements made after the exchange has closed in the country concerned, which we cannot distinguish from those made during trading.[8]

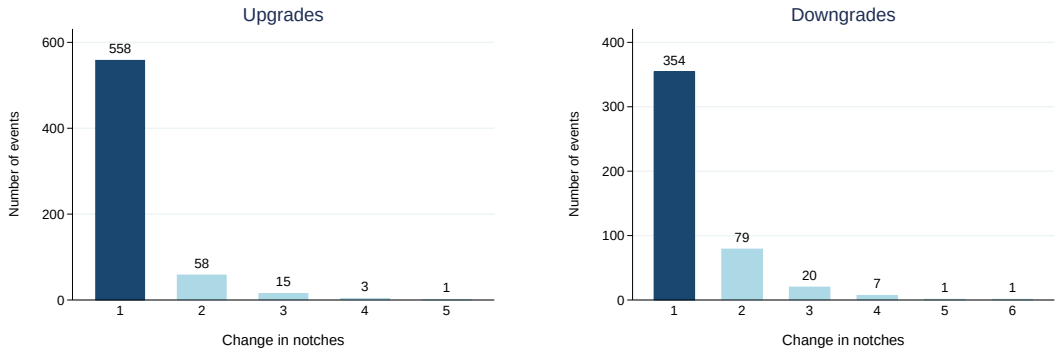
The key regressor in identifying possible spillover effects is $LARGE_{e,t}$, a dummy that takes on a value of one if e's rating is changed by two notches or more, and zero otherwise. We thereby treat rating changes of two notches or more as one single group. This is due to the distribution of the severity of upgrades and downgrades in our sample, which is shown in Figure 2.5.

The vast majority of rating announcements result in a one-notch change in a country's rating. Beyond that, we observe a significant amount of events only for changes of

[7] See Table B.3 in the Appendix on the mapping of CRAs' letter ratings into a linear 17-notch scale.

[8] CRAs have made post-trading announcements during the eurozone crisis, for instance (Financial Times, 2010; Wall Street Journal, 2012). In financial markets more generally, information which is deemed highly relevant is frequently released when exchanges are closed in order to limit or smooth the impact on prices.

Figure 2.5: **Distribution of rating changes**



Notes — This figure shows the distribution of the severity of rating changes, measured on a 17-notch scale (see Table B.3 in the Appendix). Numbers are based on the sample of 1,097 rating announcements (635 upgrades, 462 downgrades) made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011.

two notches, while changes of three notches or more occur only very rarely. Therefore, we do not include separate dummy variables for the latter categories but group all rating changes of two notches or more into a single bin.

In this framework, positive (negative) spillover effects are equivalent to a drop (rise) in the spreads of country n which is significantly more pronounced in response to a two-or-more-notches upgrade (downgrade) of country e than to a single-notch one. We would then expect β to be significantly negative (positive) in the upgrade (downgrade) regressions.

This counterfactual choice also has implications for the estimation technique. Since we do not use "no change" as the counterfactual (due to the estimation window problem outlined above), we identify spillover effects in a cross-section of upgrades and downgrades rather than in a true panel setup.[9] We estimate the model by OLS.

At this point, it seems important to address some potential concerns about a possible endogeneity of the large-change dummy. The implicit assumption in the above design is that the rating announcement and its severity are not systematically related to

[9]Thus, t denotes *generic* rather than actual time and can be thought of as indexing the different rating events.

other spread-relevant information in the event window. Otherwise, *LARGE* and the error term ω would be correlated, and β would be biased.

One concern might be, for instance, that CRAs downgrade a country instantaneously in reaction to "bad news" and do so by more notches for "particularly bad news". Note that an instantaneous response to other spread-relevant information *per se* would not induce any endogeneity in our framework whereas "fine-tuning" the severity of rating changes, *conditional* on an immediate response, clearly would. Hence, we demonstrate that there is very little to suggest instantaneous-response behaviour on the part of CRAs to begin with, and that endogeneity is therefore not a major issue in this regard. We would like to stress two points in particular.

Restricting the event window to two days already goes a long way towards alleviating the problem by limiting the amount of information that might potentially correlate with the large-change dummy. In other words, the scope for other relevant news to incite an immediate reaction from CRAs is rather small, even if such behaviour was characteristic of rating agencies and their announcements.

In addition, the proclaimed practice and a corresponding body of empirical literature suggest otherwise. The agencies state a preference for stable ratings (see, eg, Cantor, 2001; Cantor and Mann, 2003, 2007; Standard & Poor's, 2010), intending to announce a change only if it is unlikely to be reversed in the near future. This "through the cycle" approach contrasts with a "point in time" approach in that cyclical phenomena should not, in themselves, trigger rating changes. If CRAs actually pursued a stable rating policy, the fact that cyclical and permanent factors are difficult to disentangle (International Monetary Fund [IMF], 2010) should imply some delay between new information becoming available and an ensuing change in the credit rating. Empirical evidence for corporate bond rating indicates that this practice is indeed followed, thus reducing the timeliness of rating changes (Altman and Rijken, 2004; Liu, Jones, and Gu, 2011), and that the CRAs are "slow" in processing new information (Löffler,

2005). This perception has also been expressed in investor surveys (Association for Financial Professionals, 2002; Baker and Mansi, 2002). Moreover, Sy (2004) notes for the sovereign sector that it may simply be concerns about rating changes precipitating significant increases in borrowing costs or outright crises which make CRAs opt for somewhat less timely announcements.

A second concern might be biases arising from differences across agencies in a pooled setup, as pointed out by Alsakka and ap Gwilym (2012).[10] Suppose, for example, that the large rating changes in our sample stemmed primarily from an agency in whose judgments the market placed more trust. Then, by pooling the announcements of Standard & Poor's, Moody's, and Fitch, we would be picking up differences in the credibility of these CRAs rather than identifying spillover effects across sovereign bond markets. However, Figure B.1 in the Appendix shows that this is not very likely, in particular for downgrades where changes of two notches or more are distributed quite evenly across agencies: 32 for Standard & Poor's, 46 for Moody's, and 30 for Fitch.[11] We are therefore confident that our approach provides a sound identification of spillover effects.

2.3.2 The rating environment

The rating environment may play an important role for the bond market reaction to an upgrade or downgrade announcement. Our regressions therefore control for a number of different rating variables, contained in $RatEnv_{e,n,t}$. For example, the spillover potential of a rating action might depend on the creditworthiness of the event country, which we proxy by the rating it held with the announcing CRA on the day before ($InitRat_{e,t}$). We also include the absolute difference between the

[10] At the same time, the authors acknowledge that studies using pooled data (eg, Kaminsky and Schmukler, 2002; Sy, 2004) constitute the norm in the literature as opposed to examining rating changes by CRAs separately.

[11] While the picture is not quite as unambiguous for upgrades, we have already stressed in the introduction that those results should be taken with more of a grain of salt (see next section).

event country's initial rating and that of the non-event country ($\Delta InitRat_{e,n,t}$). This is because one might expect bilateral effects to differ depending on how similar countries are in terms of creditworthiness.

In addition, it is well established in the literature that the impact of rating announcements may vary according to whether they have been anticipated by the market (eg, Reisen and von Maltzan, 1999; Gande and Parsley, 2005; Ismailescu and Kazemi, 2010). One potentially important and convenient measure of such anticipation is whether the actual rating action has been foreshadowed by a CRA putting the respective country on watch, or review (Kaminsky and Schmukler, 2002; Afonso et al., 2012). Hence, we add a dummy that takes on a value of one if a review in the indicated direction has been ongoing at the time of the upgrade or downgrade, and zero otherwise ($OnWatch_{e,t}$).

Introducing an explicit control variable differs from Gande and Parsley (2005), who amalgamate a country's watch status into a "comprehensive credit rating". More precisely, for any given day their measure is defined as the country's actual letter rating on a 17-notch scale, raised (lowered) if the country is on review for an upgrade (downgrade). Presumably due to the counterfactual issue discussed in 2.3.1, Gande and Parsley (2005) then focus on those days as events on which there is a non-zero change in the comprehensive credit rating. However, this identification crucially involves additional assumptions on how changes in review status and actual rating changes relate to one another quantitatively. Furthermore, one might argue that, despite the potential anticipation effects of watch listings, the latter are not qualitatively the same as actual rating changes. In any case, our much larger sample allows us to avoid those assumptions. We focus instead on the class of actual rating changes and their relative strengths only while controlling for anticipation through watch listings. This should provide for a cleaner identification of spillover effects.

Moreover, we have shown in 2.2.2 that similar announcements by different CRAs tend to cluster around certain dates, and that this is particularly true for rating downgrades. We account for potential clustering *within* countries by a variable which captures the number of similar announcements made for a particular country by other agencies over a 14-day window before the respective event ($SimActsWdwEvt_{e,t}$). For clustering *across* countries, ie one or more CRAs changing the rating of more than one country in the same direction simultaneously, we include the number of similar announcements made on the same day for the "non-event" country ($SimActsDayNonEvt_{e,t}$).

Finally, we add the volatility measure for the Standard & Poor's 500 Index in the United States (VIX_t) to control for the "global market sentiment" in which the rating announcement is made. One might, for instance, imagine that in more turbulent times (ie, in which volatility is high) borrowing conditions deteriorate across the board, so that spreads over the event window would be more likely to increase in any case. In that sense, VIX_t can be regarded as a technical control, which also adds a genuine time component to the pooled cross sections.

Definitions and sources of the above variables are provided in Table B.4 in the Appendix. In addition, all regressions include the vector $Other_{e,n,t}$ which contains a fixed set of controls, such as event and non-event country dummies. Importantly, we also account for common time effects in the pooled cross sections through the inclusion of year dummies. These capture global macroeconomic trends which might be reflected in the yields of US Treasuries and, hence, spread changes. For instance, there may be a stronger tendency for investments to flow into the US in some years due to a (perceived) "safe haven" status, or a "global savings glut" that has been discussed for the early 2000s. Moreover, each regression includes the following technical controls: the maturity of non-event country bonds in levels and squares to account for different positions on the yield curve, a dummy for EMBI Global bond

yields, and a dummy for spread changes that need to be measured over weekends (as those correspond to longer intervals in terms of calendar days).

2.4 Results

2.4.1 Existence of cross-border spillover effects

Table 2.1 shows baseline estimation results on the existence of cross-border effects for upgrades and downgrades, respectively. We start with a parsimonious specification in column (1), which only contains our main variable of interest, the large-change dummy *LARGE* and initial ratings. We then control for potential anticipation effects from watch listings as well as clustering within and across countries in specification (2). Finally, specification (3) also accounts for global market turbulence, or risk aversion.

The key result is that the large-change dummy has the expected sign for both upgrades (ie, negative) and downgrades (ie, positive), and that it is highly significant in both cases. Moreover, this finding appears to be remarkably robust as the coefficient on *LARGE* is very stable and retains its significance across specifications. Comparison of the absolute coefficients, however, indicates an asymmetry in the spillover effects induced by upgrades and downgrades, respectively. Downgrades of two notches or more are associated with an average spread change over the event window which exceeds that of one-notch downgrades by about two basis points. In contrast, large upgrades are associated with spread changes that are roughly 1.2 basis points below those of one-notch upgrades. The asymmetry is also reflected in the lower significance levels for upgrades despite a larger number of rating events and observations. To further corroborate this, we confirm in a separate regression

Table 2.1: **Baseline regressions**

	Panel A: Upgrades			Panel B: Downgrades		
	(1)	(2)	(3)	(1)	(2)	(3)
LARGE	-0.0121**	-0.0124*	-0.0128*	0.0187***	0.0224***	0.0207***
	(0.0060)	(0.0064)	(0.0067)	(0.0061)	(0.0065)	(0.0066)
InitRat	0.0001	-0.0005	0.0000	-0.0013	-0.0013	-0.0008
	(0.0008)	(0.0009)	(0.0010)	(0.0014)	(0.0017)	(0.0017)
Δ*InitRat*	0.0010	0.0008	0.0009	0.0006	0.0008	0.0008
	(0.0006)	(0.0006)	(0.0007)	(0.0008)	(0.0009)	(0.0009)
OnWatch		0.0057	0.0070		-0.0100*	-0.0046
		(0.0055)	(0.0058)		(0.0054)	(0.0054)
SimActsWdwEvt		-0.0020	-0.0013		0.0170***	0.0141**
		(0.0057)	(0.0057)		(0.0064)	(0.0065)
SimActsDayNonEvt		-0.0863*	-0.0877		0.1210**	0.1477**
		(0.0512)	(0.0546)		(0.0558)	(0.0635)
VIX			0.0017***			0.0006*
			(0.0004)			(0.0004)
N	31,986	30,564	29,950	23,734	22,413	21,931
Event countries	104	92	92	95	84	84
Non-event countries	73	73	73	73	73	73
Rating actions	635	606	595	462	436	427
R^2	0.0230	0.0216	0.0223	0.0397	0.0400	0.0423

Notes — This table shows baseline regressions explaining the percentage point change Δ*Spread* in non-event country spreads around the rating announcement for up to 635 upgrades and 462 downgrades made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. For variable definitions, see Table B.4 in the Appendix. All specifications include a constant, dummies for event and non-event countries, years, spread reactions over weekends and JP Morgan EMBI Global data, as well as levels and squares of non-event country bond maturities. Robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

that the absolute coefficients for upgrades and downgrades are statistically different from each other (see Table B.5 in the Appendix).[12]

Asymmetries in the reactions to positive and negative events have frequently been documented in the literature. For instance, Gande and Parsley (2005) find for a 1990s sample of developed and emerging countries that negative rating events in one country affect sovereign bond spreads in others whereas there is no discernible impact for positive events.[13] Recently, however, there has also been evidence of symmetric spillover reactions to sovereign rating announcements in the foreign exchange market (Alsakka and ap Gwilym, 2012), or even that positive announcements in emerging countries have both stronger direct and spillover effects in sovereign CDS markets (Ismailescu and Kazemi, 2010).

Turning to the rating-environment controls, neither the initial rating of the event country just before the rating announcement nor the difference in initial ratings between event and non-event country seem to play a role in terms of spillover effects. Both coefficients are far from significant across specifications. Previous evidence on this has been inconclusive. While Alsakka and ap Gwilym (2012) and Ferreira and Gama (2007) detect stronger spillover effects in the foreign exchange and stock markets, respectively, for event countries with lower initial ratings, Gande and Parsley (2005) find the opposite for bond market reactions (to sovereign downgrades).

We do find some evidence, though, that the impact of an actual rating change on spreads depends on whether it has been foreshadowed by a watch listing. The corre-

[12]To this end, we pool *all* rating changes and replace the event-window spread changes for upgrades with their negative values for the sake of comparison. We then add a downgrade dummy (taking on a value of one for downgrades, and zero for upgrades) to all specifications both in levels and as interactions with the other explanatory variables. The interaction term of *LARGE* with the downgrade dummy is positive and highly significant throughout, pointing to statistically significant differences in the absolute coefficients for upgrades and downgrades.

[13]Similar results have been obtained regarding the *direct* effects in sovereign bond and CDS markets (Larraín et al., 1997; Afonso et al., 2012), mirroring a well-established finding from event studies on bond, stock, and CDS returns in the corporate sector (eg, Hand, Holthausen, and Leftwich, 1992; Goh and Ederington, 1993; Steiner and Heinke, 2001; Norden and Weber, 2004).

sponding dummy, *OnWatch*, is signed as expected for both upgrades and downgrades, yet there is again an asymmetry: the control variable turns out insignificant in all upgrade specifications but significant at almost the five per cent level for downgrades (specification (2) in Panel B). A possible explanation for this is given by Altman and Rijken (2007). They point out that watch listings partially ease the tension between the market's expectation of rating stability and the demand for rating timeliness. This suggests that watch listings contribute to the anticipation of actual rating changes. Given that investors tend to be more concerned about negative news, watch listings should be more important in building anticipation for downgrades than for upgrades. Figures from our dataset support this notion. While about a third of all downgrades are preceded by a watch listing, so are only 15 per cent of all upgrades. Finally, it has often been noted that there is an incentive to leak good news (eg, Holthausen and Leftwich, 1986; Goh and Ederington, 1993; Gande and Parsley, 2005; Alsakka and ap Gwilym, 2012; Christopher, Kim, and Wu, 2012), so the relevance of watch listings in building anticipation is conceivably much lower in the case of upgrades. We interpret the fact that our results are consistent with this literature as reassuring in terms of the validity of the regression specifications.

Our results also point to the importance of the clustering of rating announcements, especially for downgrades. While the controls for both clustering within (*SimActsWdwEvt*) and across countries (*SimActsDayNonEvt*) are highly significant in the downgrade regressions, the effect of across-clustering is only marginally significant once for upgrades. This appears plausible in light of the stylised facts presented in 2.2.2 because simultaneous announcements on several countries by one or more agencies occur much less frequently for upgrades than for downgrades. Moreover, the coefficients are correctly signed for both upgrades and downgrades, suggesting that the spread-decreasing (spread-increasing) spillover effects of an upgrade (downgrade)

are all the more pronounced when one or more upgrades (downgrades) are announced for the "non-event" country at the same time.

A similar statement regarding the signs cannot be made with the same degree of confidence for *SimActsWdwEvt*, which measures the number of upgrades (downgrades) announced by other agencies over a 14-day window before the respective upgrade (downgrade).[14] While we again find strong differences in significance between upgrades and downgrades as well as opposing signs, one need not necessarily expect within-clustering to have an additional spread-increasing effect over the event window for downgrades. Instead, the variable might subsume two opposing effects. On the one hand, the clustering of downgrades over a short interval could imply that any announcement is less relevant individually. In that case, one would expect a negative coefficient. On the other hand, clustering is much more prevalent in crisis times (see 2.2.2). Thus, *SimActsWdwEvt* tends to be higher in times of market turbulence or global risk aversion when spreads against a "safe-haven" investment like US Treasuries are upward-trending, too (eg, IMF, 2004, 2006; García-Herrero and Ortíz, 2006; González-Rozada and Levy Yeyati, 2008). As this is consistent with a positive sign, the significantly positive coefficients for downgrades suggest that we may be picking up a substantial turbulence component.

Since the literature provides little guidance on whether this is what is driving our results, we include the Standard & Poor's 500 Volatility Index (*VIX*), a commonly used proxy for global risk aversion (De Santis, 2012). As expected, its coefficient

[14] In choosing the window length, we follow Gande and Parsley (2005) who employ a two-week duration for a comparable control variable. However, using a one-week or three-week window instead does not alter the conclusions. Moreover, the reader may note that we do not report a variable capturing similar rating announcements made *on the same day* by other agencies in our baseline. This is due to the unattractive property that this variable drops out in the upgrade regressions since there is not a single event of multiple upgrades of a country on the same day in our sample. Therefore, in the interest of comparability, we choose not to report downgrade regressions with that control either. These regressions show, however, that the measure is always insignificant for downgrades, regardless of whether it is included in addition to, or as a stand-in for, *SimActsWdwEvt*. All results are shown in Table B.7 in the Appendix.

is positive and significant for both upgrades and downgrades, given the relation between market turbulence and yield spread drift. Interestingly, the coefficient on *SimActsWdwEvt* is still positive but slightly lower than before. This may be due to *VIX* picking up some of the turbulence effect previously captured by *SimActsWdwEvt*. Hence, there is indeed evidence that clustering may also reduce the spillover relevance of individual rating events that take place in a period of many similar announcements by other CRAs.

Finally, we subject our baseline regressions to a number of robustness checks. In doing so, we focus on downgrades because these are significantly more relevant from a policy perspective than upgrades and, as will be shown in 2.4.2, the findings on the latter should be taken with a grain of salt. The results of our robustness checks are reported in Table B.6 in the Appendix.

First, we address extreme rating events. One might be concerned, for instance, that grouping all downgrades of two notches or more into a single bin could obscure the impact of a few very severe rating changes that might be driving our results (see Figure 2.5). However, this is not the case as dropping downgrades of four notches or more and three notches or more, respectively, leaves the findings unchanged.

Second, we ensure that the results on negative spillovers are not merely the product of specific crisis episodes, namely the eurozone crisis of 2010/11 and the Asian financial crisis of 1997/98. Again, our results appear to be more general as the key coefficient of interest remains robust to controlling for these two crises.

Third, in 2.3.1 we have already argued that an estimation bias due to different degrees of trust being placed in the three CRAs is unlikely by pointing to the distribution of the severity of rating changes across agencies in Figure B.1 (see the Appendix). However, the figure also shows that Standard & Poor's stands out as the agency which is far less likely than the other two CRAs to issue a large downgrade conditional

on announcing any downgrade at all (only 32 out of 210 negative announcements). By virtue of their relative rarity, Standard & Poor's large downgrades might hint at particularly strong deteriorations in a country's creditworthiness and thus incite especially strong reactions as well. It could therefore be a concern that those might account for our baseline result.[15] Yet, controlling for this does nothing to alter the conclusion of significant cross-border spillover effects of sovereign rating downgrades.

Fourth, in 2.3.1 we have also dwelled quite extensively on literature which suggests that CRAs do not generally react instantaneously to other spread-relevant information. For lack of immediate-response behaviour in the first place, we then reasoned that it is even more unlikely that the agencies should "fine-tune" the severity of their rating changes to such information. However, concerns were pointed out to us that some large downgrades may have been motivated by particularly adverse spread developments in the run-up to the announcement.[16] Note that because we look at spillover effects on *other* countries, it is immaterial whether spreads in the event country also continue their particularly strong increase from prior to such announcements over the two-day event window. To interfere with our estimation results and bias the coefficient on *LARGE* upwards, not only would negative spread developments in the event country need to be at least partly representative of those in non-event countries, but spreads in the latter would also need to widen particularly

[15]Moreover, some studies, such as Ismailescu and Kazemi (2010), continue to single out Standard & Poor's and ignore other CRAs' announcements on the grounds that early research into sovereign credit rating announcements found Standard & Poor's to be less anticipated (eg, Reisen and von Maltzan, 1999; Gande and Parsley, 2005). It is worth emphasising, though, that an agency such as Fitch, for example, only entered the business as late as 1994. Therefore, not only were there no corresponding rating actions to examine by earlier studies to begin with, but it is also quite conceivable that part of Standard & Poor's alleged special position was eroded over time. The summary of more recent research provided in Alsakka and ap Gwilym (2012) also suggests that there is no single agency whose announcements are generally more relevant than those of the other two CRAs.

[16]The ratings rationale provided by Moody's for its four-notch downgrade of Portugal on 5 July 2011 may be viewed as a case in point, which names as the "first driver informing [the] downgrade ... the increasing probability that Portugal will not be able to borrow at *sustainable rates* in the capital markets" (emphasis added). One could interpret this to refer to a widening of spreads prior to the rating change.

strongly during the event window. Moreover, as a global turbulence component, *VIX* should already capture some common component of spread developments across countries. We nonetheless also run a regression which includes as an additional control variable the change in the event country's spread over the 14-day window prior to the event. While data limitations on event country spreads allow us to do so for only about 60 per cent of the original downgrades, our key finding continues to hold.

2.4.2 Spillover channels

After providing evidence for the existence of spillover effects in the sovereign bond market, in particular for downgrades, we now turn to potential channels of those spillovers. While the regressions presented so far control for a multiplicity of factors pertaining to event and non-event countries *on their own*, they do not — with the exception of $\Delta InitRat$ — account for *bilateral* characteristics of event and non-event countries. However, bond market reactions in the wake of rating announcements in other countries might differ depending on similarities and bilateral linkages, which may be highly relevant from the perspective of policy makers.

We therefore augment our final baseline specification (column (3) in Table 2.1) by whether the event and non-event country belong to the same geographical region (*Region*), whether they are members of a common major trade bloc (*TradeBloc*), and the importance of the event country as an export destination for the non-event country (*ExpImpEvt*). We also account for the degree of financial integration by the event and non-event country's capital account openness (*CapOpenEvt* and *CapOpenNonEvt*). Finally, we consider the size of the event country's GDP (*SizeEvt*) as well as differences between event and non-event countries in terms of GDP ($\Delta Size$) and trend growth ($\Delta TrendGrowth$). Definitions and sources for these variables are

also reported in Table B.4 in the Appendix. The estimation results are shown in Tables 2.2 and 2.3.

There is again a notable asymmetry between the findings on upgrades and those on downgrades. This applies to both the results on the potential channels themselves and to the impact that the inclusion of additional controls has on the robustness of our baseline findings. Whereas the results for downgrades are highly stable and intuitive, they paint a more nuanced picture for upgrades.

In more detail, we find consistently that spillover effects in the case of downgrade announcements are significantly stronger within the same region than to countries outside it (see Table 2.3). The coefficient on *Region* has the correct sign, indicating that borrowing costs increase by up to almost four basis points more for non-event countries in the same region as the event country than for those outside it. Our findings appear plausible since countries in the same geographical region are more likely to share institutional or cultural characteristics and to have important real and financial links to one another. Apart from fundamental factors, a more mundane explanation might posit that financial markets simply find non-event countries from the same region "guilty by association". The results are also in line with a number of studies which focus on one or more particular regions from the start (eg, Arezki et al., 2011; Alsakka and ap Gwilym, 2012; De Santis, 2012). Surprisingly, we obtain positive coefficients for upgrades in Table 2.2 as well, which would suggest that those are less likely to induce spillovers within than across regions. While one could imagine that belonging to a particular region does not matter for upgrade announcements due to an asymmetric perception by investors, the fact that the coefficients are often significant is not easily rationalised. On a positive note, though, the magnitude for upgrades is only about a third of that for downgrades — and statistical significance is also lower. Therefore, in the interest of comparability and as an important economic control, we retain *Region* in all specifications.

Table 2.2: **Spillover channels, upgrades**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LARGE	-0.0128*	-0.0128*	-0.0111	-0.0094	-0.0117*	-0.0142**	-0.0115*
	(0.0067)	(0.0067)	(0.0071)	(0.0071)	(0.0068)	(0.0066)	(0.0069)
InitRat	0.0000	0.0001	-0.0005	0.0012	0.0027**	0.0031***	0.0032**
	(0.0010)	(0.0010)	(0.0010)	(0.0012)	(0.0013)	(0.0012)	(0.0014)
Δ*InitRat*	0.0009	0.0010	0.0006	0.0006	0.0012*	0.0011	0.0008
	(0.0007)	(0.0007)	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0008)
OnWatch	0.0070	0.0070	0.0066	0.0065	0.0080	0.0085	0.0072
	(0.0058)	(0.0058)	(0.0060)	(0.0061)	(0.0059)	(0.0061)	(0.0063)
SimActsWdwEvt	-0.0013	-0.0013	-0.0058	-0.0071	-0.0026	-0.0032	-0.0090
	(0.0057)	(0.0057)	(0.0059)	(0.0060)	(0.0058)	(0.0059)	(0.0062)
SimActsDayNonEvt	-0.0877	-0.0903	-0.1024	-0.1059*	-0.0883	-0.0950	-0.1128*
	(0.0546)	(0.0549)	(0.0625)	(0.0642)	(0.0546)	(0.0578)	(0.0681)
VIX	0.0017***	0.0017***	0.0019***	0.0018***	0.0017***	0.0018***	0.0019***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Region		0.0109	0.0146*	0.0144*	0.0128*	0.0125*	0.0169**
		(0.0071)	(0.0080)	(0.0081)	(0.0073)	(0.0075)	(0.0084)
TradeBloc			-0.0100	-0.0093			-0.0125*
			(0.0065)	(0.0065)			(0.0069)
ExpImpEvt			-0.1080	-0.1112			-0.0916
			(0.2149)	(0.2154)			(0.2148)

(continued on next page)

Spillover channels, upgrades (continued)

CapOpenEvt				-0.0082***			-0.0099***
				(0.0024)			(0.0024)
CapOpenNonEvt				0.0002			-0.0021
				(0.0048)			(0.0051)
SizeEvt					0.0279	0.0257	0.0427*
					(0.0190)	(0.0196)	(0.0219)
$\Delta Size$					-0.0399**	-0.0404**	-0.0459**
					(0.0187)	(0.0194)	(0.0215)
$\Delta TrendGrowth$						-0.0001	-0.0001
						(0.0001)	(0.0001)
N	29,950	29,950	27,962	27,627	29,329	28,904	27,050
Event countries	92	92	90	89	92	91	88
Non-event countries	73	73	71	70	72	72	70
Upgrades	595	595	582	577	592	584	566
R^2	0.0223	0.0223	0.0221	0.0221	0.0235	0.0271	0.0269

Notes — This table shows regressions investigating potential spillover channels for up to 595 upgrade announcements made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. The dependent variable is the percentage point change $\Delta Spread$ in non-event country spreads around the rating announcement. For this and other variable definitions, see Table B.4 in the Appendix. All specifications include a constant, dummies for event and non-event countries, years, spread reactions over weekends and JP Morgan EMBI Global data, as well as levels and squares of non-event country bond maturities. Robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

Table 2.3: **Spillover channels, downgrades**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LARGE	0.0207***	0.0206***	0.0217***	0.0231***	0.0222***	0.0224***	0.0244***
	(0.0066)	(0.0066)	(0.0069)	(0.0069)	(0.0070)	(0.0070)	(0.0073)
InitRat	-0.0008	-0.0006	-0.0010	-0.0014	-0.0017	-0.0017	-0.0031
	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0019)	(0.0019)	(0.0021)
Δ*InitRat*	0.0008	0.0012	0.0017*	0.0015	0.0008	0.0008	0.0013
	(0.0009)	(0.0009)	(0.0010)	(0.0011)	(0.0010)	(0.0010)	(0.0011)
OnWatch	-0.0046	-0.0046	-0.0031	-0.0042	-0.0009	-0.0008	-0.0003
	(0.0054)	(0.0054)	(0.0058)	(0.0058)	(0.0056)	(0.0057)	(0.0059)
SimActsWdwEvt	0.0141**	0.0141**	0.0135**	0.0137**	0.0146**	0.0146**	0.0141**
	(0.0065)	(0.0065)	(0.0066)	(0.0067)	(0.0067)	(0.0067)	(0.0069)
SimActsDayNonEvt	0.1477**	0.1451**	0.1426**	0.1170*	0.1160*	0.1161*	0.1136*
	(0.0648)	(0.0643)	(0.0653)	(0.0610)	(0.0623)	(0.0623)	(0.0619)
VIX	0.0006*	0.0006*	0.0006	0.0006	0.0006*	0.0006*	0.0005
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Region		0.0376**	0.0329**	0.0350**	0.0379**	0.0380**	0.0348**
		(0.0153)	(0.0164)	(0.0166)	(0.0157)	(0.0157)	(0.0168)
TradeBloc			0.0159	0.0120			0.0120
			(0.0111)	(0.0116)			(0.0121)
ExpImpEvt			0.0687	0.0746			0.0580
			(0.2200)	(0.2237)			(0.2268)

(continued on next page)

Spillover channels, downgrades (continued)

CapOpenEvt				0.0102*			0.0126**
				(0.0060)			(0.0063)
CapOpenNonEvt				0.0090			0.0081
				(0.0083)			(0.0088)
SizeEvt					0.0222	0.0221	0.0247
					(0.0290)	(0.0294)	(0.0330)
$\Delta Size$					-0.0169	-0.0170	-0.0146
					(0.0218)	(0.0223)	(0.0253)
$\Delta TrendGrowth$						0.0000	0.0000
						(0.0000)	(0.0000)
N	21,931	21,931	20,633	20,352	21,031	20,885	19,724
Event countries	84	84	81	80	82	82	79
Non-event countries	73	73	71	70	72	72	70
Downgrades	427	427	416	414	416	416	405
R^2	0.0423	0.0428	0.0423	0.0416	0.0441	0.0442	0.0434

Notes — This table shows regressions investigating potential spillover channels for up to 427 downgrade announcements made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. The dependent variable is the percentage point change $\Delta Spread$ in non-event country spreads around the rating announcement. For this and other variable definitions, see Table B.4 in the Appendix. All specifications include a constant, dummies for event and non-event countries, years, spread reactions over weekends and JP Morgan EMBI Global data, as well as levels and squares of non-event country bond maturities. Robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

The two trade controls, ie common membership in a major trade bloc (*TradeBloc*) and the non-event country's ratio of exports to the event country to domestic GDP (*ExpImpEvt*), are signed as expected throughout, pointing to more pronounced spillover effects for both upgrades and downgrades when such linkages exist, or when they are stronger. However, they are only mildly significant once for upgrades (see specification (7) in Table 2.2). Moreover, the stability in magnitude and significance of *Region* upon inclusion of the trade variables, in particular for downgrades, seems to indicate that stronger spillover effects within regions cannot easily be explained by real linkages.[17]

Apart from real linkages, we would ideally also like to control directly for bilateral financial linkages, eg the exposure of non-event country investors to event country sovereign bonds. Unfortunately, even use of the most comprehensive data from the IMF's Coordinated Portfolio Investment Survey leads to a massive reduction in the number of observations and major selection effects along the time series and country dimensions. This renders virtually impossible any comparison with the baseline results.

However, to the extent that trade also captures a notable portion of variation in bilateral asset holdings, our findings for real linkages also hold for financial linkages. As shown by Aviat and Coeurdacier (2007), there is indeed strong evidence that trade is a powerful determinant of bilateral (bank) asset holdings.[18] The disadvantage of using trade as a proxy for financial linkages, though, is that we cannot discriminate between the effects of real and financial linkages.

[17]The fact that the correlation of the two trade variables with the region control is low does not support multicollinearity as a technical explanation for this result. Moreover, replacing *ExpImpEvt* by other proxies for bilateral trade does not change the picture either (see Table B.8 in the Appendix).

[18]In addition, through its correlation with FDI, trade may proxy for cross-country bank exposure since bank lending may follow domestic companies when those set up operations abroad (eg, Goldberg and Saunders, 1980, 1981; Brealey and Kaplanis, 1996; Yamori, 1998).

To get an idea of the distinct impact of financial linkages, we therefore approximate financial integration by the degree of the event and non-event country's capital account openness as measured by the Chinn-Ito index (Chinn and Ito, 2006).[19] While this index cannot be used to gauge the effects of *bilateral* financial linkages, it is still interesting in its own right to look at and control for level effects. The results show that the event country's capital account openness tends to significantly amplify cross-border spillover effects. Since bonds of financially open countries should be more likely to be held by foreign investors, this result is highly intuitive.

The evidence on the remaining potential channels is succinctly summarised for downgrades. In no specification do the size of the event country's GDP (*SizeEvt*), its increment over that of the non-event country ($\Delta Size$), or differences in trend growth between event and non-event countries ($\Delta\, TrendGrowth$) turn out to be significant determinants of the strength of bond market spillovers. At the same time, all results from the baseline and augmented baseline regressions (columns (1) and (2) in Table 2.3) prove remarkably stable in terms of both magnitude and significance.

This contrasts with the corresponding findings for upgrades. On the one hand, we obtain a number of interesting results for the size and growth controls. On the other hand, the augmented regressions raise some doubts on our main variable of interest, *LARGE*, in terms of statistical significance. The latter alternates between specifications and vanishes in some, yet in view of the considerably stronger baseline results for downgrades, this is not entirely surprising. It merely serves to underscore the asymmetry that exists between positive and negative rating changes. However, this also means that the evidence on the potential channels for upgrades should be taken with a grain of salt.

[19] We choose this index due to its broad coverage over time, which allows us to maintain comparability with the baseline results. The index has also been used extensively in recent literature (eg, Fratzscher, 2012; Hale and Spiegel, 2012; Frankel, Vegh, and Vuletin, 2013).

In this regard, the most interesting result is probably the observation that, given the event country's size and initial rating, positive spillovers are larger the smaller the non-event country relative to the event country ($\Delta Size$). The magnitude of the coefficient suggests that non-event countries which are half (two-thirds) the size of the event country experience an additional positive spillover effect of about four (two) basis points, as compared to non-event countries as large as the event country.[20] While the effect appears to be relatively small, its direction is still interesting, in particular when viewed in conjunction with the fact that, across the whole sample, larger and more highly rated countries induce smaller spillovers (columns (5) to (7) in Table 2.2). This would be consistent with a world in which positive spillover effects matter primarily within a group of small developed and emerging countries but less so within a group of large, developed countries, and in which the latter have little impact on the former. The insignificance of the absolute difference in trend GDP growth rates between event and non-event countries ($\Delta TrendGrowth$) as a further measure of differences in economic development does nothing to contradict this interpretation. In view of the generally more ambiguous results for upgrades, however, we do not wish to overemphasise this point.

2.4.3 Discussion

Our results can be condensed into the following stylised facts. First, there is strong evidence of statistically significant, negative spillover effects of downgrade announcements. This result proves highly robust to controlling for anticipation through watch listings and the clustering of rating announcements. Second, negative spillover effects are more pronounced among countries in a common region, which

[20] $\Delta Size$ is defined as the difference between the event and non-event country's log GDPs or, equivalently, the log of the ratio of the two GDP levels. Therefore, a decrease in relative non-event country size by half (two-thirds) amounts to an increase in $\Delta Size$ of about one hundred (fifty) per cent. With an absolute coefficient of roughly 0.04, the (semi-elasticity) marginal effects therefore obtain as four and two basis points, respectively.

cannot be explained by measurable fundamental links and similarities between countries. Third, reactions to upgrades are, if anything, much more muted than for downgrades, suggesting important asymmetries in the sovereign bond market's treatment of the two types of announcements. Fourth, evidence on the channels behind positive spillover effects, if any, offers a more complex picture and appears relatively ambiguous.

Which conclusion to draw from this? To begin with, there is a strong case for the notion that negative sovereign rating announcements, ie those of most concern to policy makers, do matter in inducing spillovers across markets. Such is the outcome of the explicit identification strategy used in this chapter, which demonstrates that, all other things equal, large downgrades of two notches or more cause larger hikes in spreads than small one-notch downgrades. This suggests a role for CRAs and their actions in sovereign bond markets, be it through the revelation of new information on creditworthiness which acts as a "wake-up call" for investors to reassess fundamentals in other countries (Goldstein, 1998), or simply by providing a coordinating signal that shifts expectations from a good to a bad equilibrium (Masson, 1998; Boot, Milbourn, and Schmeits, 2006).

However, a major regulatory focus on the activities of CRAs would also require negative spillover effects of substantial *economic* magnitude. In this chapter, we find the incremental impact of large downgrades to be a little over two basis points, which may appear limited at first glance. Yet, it is important to note that this does not represent the total effect that policy makers would be concerned about. This total effect can be thought of as consisting of a "base effect" that small downgrades have, compared to a benchmark scenario of no downgrades anywhere, plus an additional impact for large downgrades — which is what we measure. Of course, the reason we focus on the latter lies in the impossibility of cleanly identifying the "base effect" of rating changes unless one rules out the existence of rating-induced spillovers from the

beginning (see the discussion in 2.3.1). Nonetheless, the total effect is conceivably a multiple of the one we estimate. Suppose the "base effect" were only twice as large as the incremental one we measure. Then, the implied total effect would already amount to approximately six basis points. To put this into perspective, the average sovereign bond spread vis-à-vis US Treasuries at the time of the downgrade announcements in our sample is 3.25 per cent, or 325 basis points. While the total effect of downgrades is relatively small in comparison, one has to bear in mind that governments often need to refinance large amounts of debt, which magnifies the impact of even small spread differences. Moreover, there is still a regional effect of up to four basis points on top of that, suggesting that concerns about negative spillovers in the sovereign debt market should not be lightly dismissed.

Finally, from a policy maker's point of view, the finding that the increased strength of negative spillovers within regions cannot be explained away by measurable linkages and similarities between countries might also be a cause for concern. Even though limited data availability precludes an all-encompassing analysis of potential channels, there is little to suggest that one can comfortably rule out that some countries are found "guilty by association" with the event country. Moreover, such behaviour on the part of investors would likely extend to their reactions to news other than rating announcements. While it is hard to see an obvious remedy, the potential problem would seem to be much more general and, above all, rooted in investor behaviour. Hence, it is not clear that putting the primary emphasis on CRAs will prove effective in this regard.

2.5 Conclusion

Concerns about negative spillovers across sovereign debt markets in the wake of sovereign rating changes have recently resurfaced on the agenda of policy makers. In

this chapter, we study the existence and potential channels of such spillover effects. More specifically, we avail of an extensive dataset which covers all sovereign rating announcements made by the three major agencies and daily sovereign bond market movements of up to 73 developed and emerging countries between 1994 and 2011. Based on this, we propose an explicit counterfactual identification strategy which compares the bond market reactions to small changes in an agency's assessment of a country's creditworthiness to those induced by all other, more major revisions. In doing so, we account for a number of factors that might impact on the reception of individual announcements.

We find strong evidence in favour of negative cross-border spillovers in the wake of sovereign downgrades. At the same time, there is no similarly robust indication as to positive spillovers since reactions to upgrades are much more muted at best, which points to an important asymmetry in the sovereign debt market's treatment of positive and negative information. Regarding the channels of negative spillover effects, our results suggest that those are more pronounced for countries within the same region. Strikingly, however, this cannot be explained by fundamental linkages and similarities, such as trade, which turn out to be insignificant.

Therefore, there is reason to believe that policy makers' concerns about negative spillover effects are not unfounded. In fact, the lack of power of a set of fundamentals in explaining the added regional component may reinforce, or give rise to, concerns about the ability of investors to discriminate accurately between sovereigns. This could also be of more general interest because such behaviour is likely to carry over to reactions to various kinds of non-CRA news in other markets and sectors, too. Hence, important though they are, a sole focus on CRAs and their actions might be missing a bigger picture.

Chapter 3

Foreign Banks in Emerging Syndicated Loan Markets*

3.1 Introduction

Foreign banks are a major source of external finance for companies in emerging markets, and policy makers in these countries have long been concerned about their behaviour. In particular, due to the generally less stable economic environment in developing and emerging countries, the stability with which foreign institutions extend credit looms large on the agenda. Much attention has been devoted by a host of theoretical and empirical literature to the entry of foreign banks into emerging banking markets, mostly focusing on Latin America and Central and Eastern Europe.[1]

*This chapter is part of a larger research project in collaboration with Christoph Trebesch.

[1]Issues that have been addressed include the provision of credit to the private sector after large-scale foreign bank entry (eg, Detragiache, Tressel, and Gupta, 2008; Beck and Martínez Pería, 2010), whether foreign banks engage in "cherry-picking" and shun small and medium-sized domestic borrowers (eg, Brownbridge and Harvey, 1998; Berger, Klapper, and Udell, 2001; Bonin and Wachtel, 2003; Dell'Ariccia and Marquez, 2004; Clarke, Cull, Martínez Pería, and Sánchez, 2005; Mian, 2006; Gormley, 2007; Berger, Klapper, Martínez Pería, and Zaidi, 2008), and the impact of entry on competition and lending rates (eg, Berger, Genay, and Udell, 2000; Bonin, Hasan, and Wachtel, 2005; Chen and Liao, 2011; Havrylchyk and Jurzyk, 2011).

However, despite a significant increase in the local presence of foreign banks over the past two decades (see, eg, Clarke, Cull, Martínez Pería, and Sánchez, 2003), international syndicated loans — in which two or more banks jointly agree to lend to a borrower — continue to be a major element in the financing mix of emerging markets. Not only do they account for approximately two thirds of cross-border flows to emerging countries, but the growth in syndicated loan issuance has also kept pace with the growth of foreign banks' local claims (Bank for International Settlements Consolidated Banking and Securities Statistics). This is highly relevant from a policy perspective because, in the past, a number of emerging markets have been subject to "sudden stops", referring to an abrupt drying-up of capital inflows into their economies that was often followed by declines in output and a devaluation of the domestic currency (Calvo, 1998). With syndicated loans representing a large part of those flows and given the generally quite limited financial resources available domestically, this chapter asks whether there are differences in behaviour between foreign banks, or whether they all behave alike. More specifically, is there a group of foreign banks that participate more reliably in syndicated loan deals in a country than others?

Strikingly, there is evidence to suggest that there is. I begin by documenting an interesting pattern observed around 30 sudden stop episodes for the relative participation in 835 loan syndicates of two groups of foreign banks. While the share of syndicate members accounted for by banks that already took part in the first ever deals in a given country ("early participants") remains constant before and during the sudden stop incident itself, it increases markedly in the years after the sudden stop. In contrast, the share of foreign banks that did not participate in one of those first few deals ("late participants") tends to rise before the sudden stop, only to drop substantially while the sudden stop is still ongoing and thereafter. This hints at an

important discrepancy in behaviour between the two groups in an extremely adverse economic scenario.

I then proceed to investigate whether this observation holds with regard to changes in economic conditions more generally, and do so in two steps. In the first step, I analyse the participation shares of the two groups of foreign banks over the business cycle, controlling for heterogeneity at both the deal and country levels as well as industry and time-fixed effects. Considering a total of 5,593 loan deals in 68 emerging and developing countries, I find that the share of early participants on a syndicate bears a significantly negative relation to the respective country's real GDP growth, whereas the association for late participants is insignificant. This anti-cyclical behaviour on the part of early participants is consistent with the more specific patterns observed around sudden stops. In addition, the analysis points to differences in the willingness to take on longer-term credit risk and particularly exchange rate risk between the two groups. As indicated by their participation shares, late participants appear more hesitant than early participants to enter deals that carry longer maturities or deals that are not signed in a major reserve currency.

In the second step, I build on this analysis, acknowledging that the *relative share* of each of the two groups of foreign banks is to some extent a residual of the decision of the respective other group — and of domestic banks — to join or not join a syndicate. I therefore model the binary decisions of *individual* foreign banks whether to join a given deal in a country. More precisely, I estimate a linear probability model explaining a bank's participation probability in terms of its early or late-participant status. For one thing, this identifies a level effect, which reflects whether there is a wedge between early and late participants in that the former are generally more likely to sign up for deals than the latter. Moreover, an interaction term between early participation and real GDP growth captures whether a deterioration in economic conditions over the business cycle increases such a potential wedge between the

participation probabilities of the two groups of foreign banks. Importantly, the analysis accounts for bilateral linkages between the foreign bank's home country and the borrower country, micro-level lending relationships between the bank and individual borrowers, as well as bank-fixed effects. This enables me to isolate the effect of early participation that is characteristic of bank-country *pairs*.

The results show that foreign parent banks belonging to the group of early participants in a country are significantly more likely to sign up for further syndicated loan deals than other foreign banks. Their participation probability is approximately 0.9 percentage points higher, which is economically large given an average participation probability in the sample of about 3.2 per cent. This level effect speaks in favour of early participation introducing important path dependence into syndicated lending to emerging markets. Furthermore, the gap in participation probabilities between early and late participants tends to widen when economic conditions deteriorate. Both the statistical and economic relevance of this effect, however, turn out to be conditional on the set of foreign parent banks considered. That is, there is strong evidence of a major effect once non-Japanese banks are considered only.[2] For this set of parent banks, a one sample standard deviation drop in real GDP growth is linked to a widening of the wedge between early and late participants' probabilities of close to 0.4 percentage points. Hence, there are differences in responsiveness to economic conditions between the two groups on top of level differences in participation.

To the best of my knowledge, this chapter represents the first investigation of differential foreign bank behaviour in syndicated lending to emerging markets. Its main contribution lies in painting a richer picture, which could be relevant for policy makers who may want to monitor the composition of loan syndicates between early

[2]Japanese banks have been found in the empirical literature to behave distinctly in other aspects of international lending (see, eg, Peek and Rosengren, 1997; Martínez Pería, Powell, and Vladkova Hollar, 2002), which also shows up in the data used in this chapter. I will discuss this in more detail at the appropriate stage.

and late participants. At the very least, the results point to the risks that may be attached to a broadening of the creditor base at the expense of early participants who appear to be more reliable sources of financing. In terms of what lies behind the findings, one could argue that involvement in early deals gives banks an edge over non-participants because these very first deals are an opportunity to gain particularly profound knowledge of the institutional and legal environment of the country. This advantage may translate into lower lending costs and lead to higher participation in more deals on average and under worsening economic conditions.

I am aware of only one similar empirical contribution that distinguishes between the actions of foreign banks in emerging markets. Focusing on standard bank loans extended by the local affiliates of foreign banks in Central and Eastern Europe, De Haas and Van Lelyveld (2006) find that whereas greenfield affiliates assume a stabilising role on credit supply during times of crisis, those that were acquired by a foreign parent bank do not. The findings in this chapter therefore contribute to filling the gap for syndicated loans as another major element of the financing mix.

Moreover, the chapter is conceptually related to De Haas and Van Horen (2013) who also look at bank-country pairs in syndicated lending. However, they focus on the shock to banks' balance sheets around the collapse of Lehman Brothers and find that banks did not cut their lending to developed and emerging market borrowers indiscriminately. Banks instead reduced credit supply by less to countries that were closer along several dimensions, such as distance or lending experience.[3] In this chapter, I do not so much take the point of view of a given bank as that of a given emerging market. It is at the country level that economic conditions change and

[3]Also see Giannetti and Laeven (2012) and Popov and Van Horen (2013), who apply more coarse country-level distinctions in examining, respectively, the impact of home country banking crises on home versus foreign lending, and the impact of the euro area sovereign debt crisis on lending to GIIPS (Greece, Ireland, Italy, Portugal, Spain) versus non-GIIPS countries.

lead to differential reactions across foreign banks, depending on whether the latter participated in early deals or not.

Other facets of syndicated lending in emerging markets have been examined in Arteta and Hale (2008), Das, Papaioannou, and Trebesch (2010), and Ağca and Celasun (2012). These studies relate private sector access and borrowing conditions to sovereign risk and the structure of sovereign debt in emerging markets. Of those, the contribution by Arteta and Hale (2008) is closest to this chapter in that the authors find declines in foreign credit to domestic firms in the wake of sovereign debt crises. While the latter are in some sense a subset of sudden stop incidents, its scope is more narrow than in this chapter, and does not distinguish further between foreign banks. More general motivations for foreign bank activity and differences to domestic banks across developed and emerging markets are explored by Esty (2004), Qian and Strahan (2007), and Haselmann and Wachtel (2011). Broadly speaking, these papers stress the importance of creditor rights and legal enforcement in luring foreign banks, and the development of domestic financial systems in determining the dependence on external sources of finance.

The remainder of this chapter is structured as follows. The next section provides a background to syndicated loans and their role in the financing mix of emerging and developing countries. Section 3.3 describes the dataset used in the investigation and key lending patterns that emerge from it, before documenting the behaviour of foreign banks around sudden stops. The empirical strategy and results, including robustness checks, are shown in Section 3.4. In Section 3.5, I conclude with a discussion.

3.2 Background

3.2.1 The syndicated loan contract

Syndicated loans constitute a particular type of debt financing. These are loans in which two or more banks — or other financial institutions, such as finance or insurance companies — jointly agree to lend to a borrower. At least one of the banks typically serves as a "lead arranger" who establishes a relationship with the firm, negotiates the terms of the contract, and guarantees a certain loan volume within some price range. On the basis of such a preliminary loan agreement and in return for a fee, the lead arranger then turns to potential "participants" with information on the firm in order for them to fund a portion of the loan (Dennis and Mullineaux, 2000).[4]

Therefore, syndicated loans can be considered a hybrid of traditional bank loans and capital market instruments, or of commercial and investment banking (Boot, 2000). On the one hand, the lead bank is in charge of screening and monitoring the borrower, which closely resembles the role of banks as providers of relationship loans (see, eg, Petersen and Rajan, 1994; Berger and Udell, 1995). On the other hand, from the perspective of participant banks, funding part of the deal is often more akin to buying a bond in the capital markets than to granting a standard bank loan.

3.2.2 Syndicated lending in context

Since the 1960s the market for syndicated loans has become more organised and increasingly important. Initially serving almost exclusively large multinational firms, sovereigns, and quasigovernmental entities, over the past two decades the

[4]In order to incentivise the lead bank to fulfil its screening and monitoring duties properly, it also retains a share of the loan itself. Also see Sufi (2007) and Chaudhry and Kleimeier (2013) who provide evidence that, in line with this reasoning, the portion funded by the lead arranger is larger in the case of more opaque borrowers.

market has come to provide financing for many medium-sized corporations as well (Carey and Nini, 2007). Companies from emerging and developing countries have also significantly increased their borrowing through international syndicated loan facilities.[5]

At the same time, liberalisations of the capital account and local banking markets have further expanded the scope of the (foreign) sources of finance available to emerging market borrowers. It is therefore informative to briefly put into perspective the role played by syndicated loans in this financing mix. In essence, firms can borrow directly from foreign financial institutions in cross-border transactions, including syndicated loans, or through local branches and subsidiaries maintained by global banks in the respective emerging market. Figure 3.1 juxtaposes the capital flows that arise from these transactions against those that arise from syndication activity.

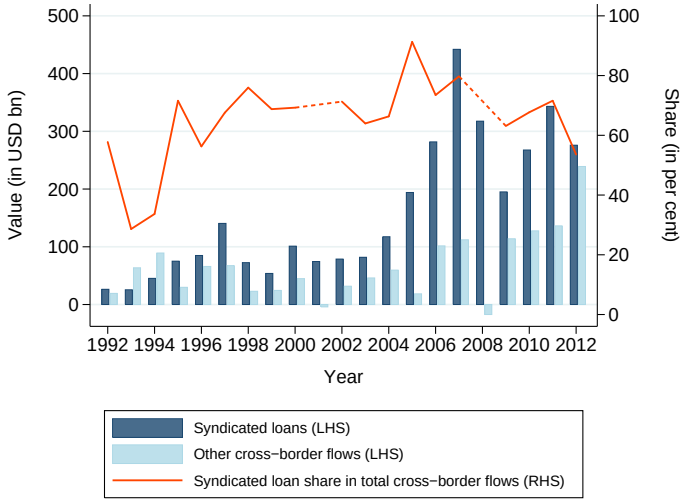
For comparability reasons, Figure 3.1 is based on data compiled by a single institution, the Securities and the Consolidated Banking Statistics from the Bank for International Settlements (BIS), and covers the set of developing countries as defined by the BIS. For the years 1992 through 2012, Panel A shows the volume of newly signed syndicated loan facilities involving at least one foreign lender and the flows of other cross-border funding, which refers to borrowing through the issuance of money market instruments, bonds, or notes in the international markets. Total cross-border funding is then defined as the sum of the two.[6] Note that flow values for other cross-border funding have to be approximated by changes of amounts outstanding in the above instruments on a yearly basis, and that they are not corrected for write-downs or revaluations. Hence, numbers are quite reliable in tranquil times when only a minor fraction of claims are subject to write-downs, but less so in times of crisis. Thus focusing on the relatively calm years up to 2007, Panel A gives evidence of a major role of syndicated

[5] In this chapter, I often use the term *emerging* for brevity. Unless stated otherwise, this refers to both emerging and developing countries.

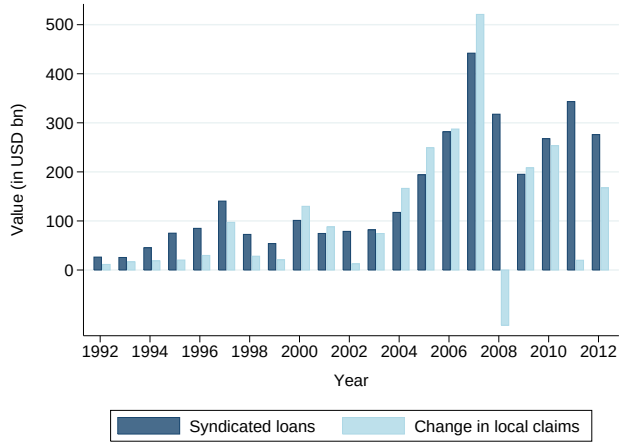
[6] In doing so, I follow De Haas and Van Horen (2013).

Figure 3.1: **Syndicated lending to emerging markets in context**

Panel A: Syndicated loans and other cross-border flows



Panel B: Syndicated loans and changes in local claims



Notes — This figure shows syndicated lending to emerging markets over the 1992–2012 period and compares it to the dynamics of both cross-border funding (Panel A) and foreign banks' local claims in emerging markets (Panel B). In both panels, syndicated loans refer to the volume of newly signed credit facilities with at least one foreign lender on the syndicate (BIS Securities Statistics, Table 10). Other cross-border flows are derived from year-on-year changes of the sum of amounts outstanding of international money market instruments and international bonds and notes (Tables 14a, 14b). The share of syndicated loans in total cross-border flows, which is the sum of newly syndicated loans and other cross-border flows, is shown on the right-hand scale of Panel A. Because other cross-border flows are proxied by changes in the respective stock values and are not corrected for write-downs or revaluations, comparisons are less reliable in crisis times. This is indicated by the dashed lines around 2001 and 2008, where negative values obtain for the proxied flows of other cross-border funding, which would understate total cross-border flows and thus overstate the importance of syndicated loans. In Panel B, local claims refer to local-currency claims on local residents by the foreign offices of BIS reporting banks (BIS Consolidated Banking Statistics).

lending, which consistently accounts for roughly two thirds or even more of total cross-border funding provided to emerging markets.

The opening up of local banking markets has led to substantial entry by foreign banks into emerging economies, either by setting up greenfield affiliates or by acquiring erstwhile local banks, and has stirred much debate among policy makers and academics alike (see, eg, Clarke et al., 2003). A natural question is whether this trend has marginalised syndicated lending in that the latter may well be relevant compared to other sources of cross-border funding, but that emerging market finance may now be almost exclusively a local matter. Panel B in Figure 3.1 suggests this is not the case. It shows the volume of newly signed syndicated loan facilities from Panel A next to year-on-year changes in the amounts outstanding of local claims, again uncorrected for write-downs and revaluations. Because the BIS Consolidated Banking Statistics only reports claims on local residents by the foreign offices of BIS reporting banks that are denominated in local currency, the corresponding numbers in Panel B are likely to somewhat underestimate the total volume of local business.[7] Nonetheless, it is worth noting that syndicated loan issuance has kept pace with the increase in local claims. Overall, syndicated loans must therefore be considered an important component of the foreign financing mix.

Finally, this might not matter much from the perspective of an emerging market policy maker were it not for the fact that, over the past two decades, the dependence on foreign bank credit has shown few signs of decreasing (McGuire and Tarashev, 2008). Therefore, with only limited domestic sources of financing and generally less stable macroeconomic environments than in developed economies, foreign syndicated

[7] While the extent to which foreign banks extend local credit in foreign currency — such as US dollars, other reserve currencies, or the currency of their home country — is not directly reported by the BIS, there has been a tendency for emerging market *bonds* to be issued increasingly in domestic currency. For this shift away from the "original sin" hypothesis (Eichengreen and Hausmann, 1999), according to which emerging markets can typically only borrow in foreign currency, and towards local currency bond markets, see Committee on the Global Financial System (2007) and Burger, Warnock, and Cacdac Warnock (2012).

loans and the stability with which they are extended should be of major policy concern.

3.3 Syndicated lending to emerging markets

3.3.1 Dataset and sample selection

This chapter uses the Dealogic Loan Analytics database, which provides detailed information on deals signed in the global syndicated loan market. Most importantly, it includes information on the key terms of each deal, such as loan volume, maturity, interest rate, and currency of denomination.[8]

The names and countries of incorporation of the banks involved in a deal are also given, as are the names and countries of incorporation of their parent banks. This information is particularly relevant considering that some large, international banks maintain branches and subsidiaries in emerging markets through which they extend syndicated loans. Because foreign parent banks are likely to have a say in the actions of their local affiliates, it is important to acknowledge these loans as different from those made by other domestic banks. Consequently, I conduct the analysis at the parent-bank level whilst accounting for a possible local-affiliate dimension.[9]

The information is similarly granular for borrowers, with full names and country details provided for the firm itself and its parent company, which may be foreign. I also account for that dimension in my analysis. In addition, Loan Analytics reports the firm's sector and industry classification.

I obtain information on all loans in the database between the beginning of coverage in January 1980 and December 2012 before performing a number of data-cleaning

[8] If a deal consists of more than one tranche, these items are further broken down at the tranche level. However, given that tranches are signed jointly as part of one deal, the analysis is at the deal level, aggregating information from the different tranches where necessary.

[9] Note that I will therefore use the terms *bank* and *parent bank* interchangeably.

exercises. First, I drop all bilateral deals in which a firm borrows from a single bank because those correspond to traditional relationship loans rather than to the hybrid nature of syndicated loan contracts as described in 3.2.1. For convenience, I also drop a minor number of deals in which multiple borrowers are involved. Second, all loans with incomplete information on the date of signing, the volume of the loan, or on banks and borrowers as well as their respective parent companies are also dropped. Third, I focus on newly signed or refinanced deals as opposed to those that have been announced, amended, or which are merely expected to be signed. Fourth, I drop loans to banks or other financial institutions and special purpose vehicles, central governments, or supranational institutions in order to focus specifically on credit to the real sector.

Finally, to account for mergers and acquisitions between banks and name changes, I match the Loan Analytics data with Bankers' Almanac records, including fuzzy merges and manual checks, and consolidate affected banks into a single entity starting from the date provided by Bankers' Almanac.

3.3.2 Lending patterns

The data selection process yields a full sample of 9,038 syndicated loans in 124 emerging and developing countries with a total value of almost $2 trn. As Table 3.1 shows, syndication activity is rather unevenly distributed across markets. The top 10 countries by number of deals account for roughly 60 per cent of both the number of deals in the sample (5,608 out of 9,038) and the total loan volume in end-of-2012 US dollars ($1,161.1 bn out of $1,997.2 bn).

The table also reports the composition of the average syndicate between domestic and foreign banks for each country and for the full sample. For each deal, I calculate the share of parent banks on the syndicate represented by foreign and domestic institutions in terms of simple participation. That is, if there are 10 different parent

Table 3.1: **Major syndicated loan markets**

Country	Number of deals	Loan volume ($ bn)	Syndicate composition	
			Domestic	Foreign
China	960	155.0	18.6%	81.4%
Indonesia	723	92.9	16.2%	83.8%
Brazil	658	171.5	8.4%	91.6%
India	612	157.6	33.4%	66.6%
Thailand	600	80.1	10.4%	89.6%
Malaysia	511	83.5	41.8%	58.2%
Mexico	500	173.9	3.6%	96.4%
Russia	432	135.7	8.3%	91.7%
Philippines	307	47.5	24.2%	75.8%
Argentina	305	63.4	6.5%	93.5%
Full sample	9,038	1,997.2	14.4%	85.6%

Notes — This table shows the 10 most important emerging syndicated loan markets from the full sample in terms of the total number of deals, including the total volume of deals in end-of-2012 US$ bn. Syndicate composition is obtained by calculating the share of parent banks on the syndicate represented by foreign (domestic) institutions at the deal level, and then averaging over all deals in the given country.

banks on a syndicate, eight of which are from a country foreign to the emerging market in question, the foreign and domestic shares for the deal obtain as 80 and 20 per cent, respectively. Note that shares are based on the extensive margin, ie mere participation, rather than the intensive margin, ie loan volumes, because of data limitations on the loan volumes underwritten by individual banks.[10] I average these shares over all deals in a given country as well as over all deals in the sample to arrive at the figures reported in Table 3.1.

It is worth noting that, despite some heterogeneity, the top 10 markets do not differ much from the full sample in terms of syndicate composition. Foreign institutions account for roughly 86 per cent of all participants on a typical syndicate in the full sample, and figures are not systematically lower for the top 10 countries. With the exceptions of India and Malaysia, at least three quarters of the average syndicate are

[10]The availability of individual underwriting amounts is quite low in Dealogic Loan Analytics in general, with such information being given for only about a quarter of all loans (De Haas and Van Horen, 2013), and for emerging markets in particular.

represented by foreign parent banks. The Latin American countries (Brazil, Mexico, Argentina) and Russia stand out in particular with more than 90 per cent foreign banks on a syndicate. Overall, these numbers emphasise the major role played by foreign banks.

While some of the banks that are foreign to a certain emerging market are themselves incorporated in an emerging or developing country — imagine a Brazilian parent bank participating in a syndicated loan deal in Argentina —, the syndicated loan market is dominated by banks from developed countries. This is also borne out by Table 3.2, which lists the 20 most active banks in the emerging syndicated loan market as measured by the total number of deals that they participated in.

These banks are from a set of only eight developed countries. With the exception of BBVA, all banks participated in a syndicated loan deal at least once in 50 different countries or even more. BNP Paribas, the most active bank, even did so in 91 different countries and was involved in a total of 2,281 deals, which amounts to a quarter of the full sample. The other banks stand out as being highly active, too, in that all but five of them took part in over 1,100 deals. Moreover, if one ranks markets for each of the 20 banks according to the number of deals, the set unsurprisingly reflects quite well the top 10 countries from Table 3.1, with minor differences in the rank ordering between banks. In other words, all banks tend to sign most of their loans in China, Indonesia, Brazil, or the other major syndicated loan markets.

To gain a better understanding of differences in lending patterns across banks, it is therefore more instructive to examine which destinations a bank overweights relative to other banks. The most overweighted countries for each bank, labelled focus markets, are reported in the last three columns of Table 3.2. They obtain as follows. I focus on the subsample of 21 countries in which all 20 lenders were active at least once and compute the share of deals in this subsample accounted for by each market. Then, I calculate for each bank individually the share of deals accounted for by each

Table 3.2: **Syndication activity of major lenders**

Parent bank	Home country	Total number of		Focus markets		
		Deals	Countries			
BNP Paribas	France	2,281	91	Morocco	Kuwait	Egypt
Mitsubishi UFJ Financial Group	Japan	1,936	69	Malaysia	Indonesia	Thailand
Royal Bank of Scotland	United Kingdom	1,893	81	South Africa	Indonesia	India
Crédit Agricole CIB	France	1,882	79	Egypt	Morocco	Turkey
Citigroup	United States	1,830	78	Mexico	Kuwait	Philippines
Mizuho Financial Group	Japan	1,720	59	Thailand	China	Indonesia
Sumitomo Mitsui Financial Group	Japan	1,500	62	Indonesia	Thailand	Qatar
UniCredit	Italy	1,444	74	Hungary	Russia	Turkey
Société Générale CIB	France	1,426	77	Morocco	Egypt	Russia
Commerzbank	Germany	1,393	74	South Africa	Russia	Hungary
HSBC	United Kingdom	1,393	70	United Arab Emirates	Egypt	Kuwait
ING	Netherlands	1,370	72	Philippines	Russia	Hungary
JPMorgan Chase	United States	1,260	67	Venezuela	Mexico	Kuwait
Bank of America Merrill Lynch	United States	1,168	59	Argentina	Mexico	Brazil
Deutsche Bank	Germany	1,128	74	Hungary	Argentina	Brazil
Standard Chartered Bank	United Kingdom	966	53	United Arab Emirates	Malaysia	Qatar
Helaba	Germany	936	65	Argentina	Hungary	United Arab Emirates
Natixis	France	857	70	Russia	Morocco	Turkey
BayernLB	Germany	703	50	Hungary	Russia	Qatar
BBVA	Spain	692	39	Chile	Mexico	Argentina

Notes — This table shows the 20 most active parent banks in the sample as measured by the total number of emerging market syndicated loan deals that they participated in. It also reports the number of countries in which a given bank signed up for a deal at least once as well as three focus markets for each bank. Focus markets are identified by looking at the subsample of 21 countries in which all 20 banks were active at least once, before computing (a) the share of deals in this subsample accounted for by each market across all banks, and (b) the share of deals in the subsample accounted for by each market in the syndicated loan portfolio of each individual bank. The strength of a bank's focus on a given market then obtains as the ratio of (a) to (b), which indicates how much the bank overweights the market relative to the other 19 major lenders. Consequently, the table reports for each bank those three emerging markets with the highest overweighting ratios. The 21-country subsample consists of Argentina, Brazil, Chile, China, Egypt, Hungary, India, Indonesia, Kuwait, Malaysia, Mexico, Morocco, Philippines, Qatar, Russia, Saudi Arabia, South Africa, Thailand, Turkey, United Arab Emirates, and Venezuela.

of the 21 countries and form the ratio of those bank-specific country shares to the country shares from before. This ratio can be interpreted as measuring the degree to which a bank overweights a given country relative to the other banks.

Table 3.2 shows each bank's focus markets as those three destinations with the highest overweighting ratios. It reveals that links between the bank's home and the destination country are important determinants of whether a bank focuses more on one market than on others. French banks, for instance, are relatively active in Morocco and Egypt, both of which were to different extents within France's sphere of influence at some point and, in the case of Morocco, share a widely used working language. On a similar note, Chile, Mexico, and Argentina are focus markets for BBVA from Spain. Geographical proximity also tends to increase a bank's focus on a country, as indicated by US banks' preference for Mexico, for example, or Hungary and Russia featuring prominently in German, Italian, and Dutch banks' portfolios.

3.3.3 Sudden stops and the behaviour of foreign banks

As the discussion in 3.2.2 has highlighted, the supply of syndicated loans and its stability should be of vital interest to policy makers because it accounts for a major portion of cross-border flows to emerging markets. In the past, a number of them have been subject to "sudden stops", meaning abrupt slowdowns of private capital inflows that tend to be followed by declines in output, in credit to the private sector, and the value of the domestic currency in foreign exchange markets (Calvo, 1998).

Given the dominant role of foreign banks in funding syndicated loans, it is worth examining whether there are some foreign banks that are more likely than others to continue to extend credit to affected countries. Before being able to perform such an analysis, a sensible dividing line has to be drawn first between at least two groups of banks. In doing so, I draw inspiration from De Haas and Van Lelyveld (2006) who investigate the stability of traditional bank credit granted locally by

subsidiaries of foreign banks in Central and Eastern Europe. The authors find that whereas domestic banks contracted their credit base during crisis periods, it was in particular greenfield foreign banks that did not. While the mechanisms behind the latter finding are unobservable, setting up a greenfield subsidiary as opposed to acquiring a local bank may signal that the bank is willing to bear a larger amount of risk in the short and medium term, and/or that it expects this to be outweighed in the long term. Alternatively, it may simply be taking a more benign look at the country's risk to begin with.

There is arguably a range of other possible explanations, but a foreign bank's assessment of country risk and potential is likely to feature in its decision whether to participate in a syndicated loan deal. This is conceivably even more relevant with regard to the first ever deals through which an emerging market and its companies borrow in international markets since information asymmetries should be relatively high at that time. Hence, a foreign bank's decision to be a participant or not in the first ever deals of a country shares some similarities with the motives for choosing to be a greenfield or takeover entrant. Whereas the costs involved are certainly not comparable between the syndicated loan and traditional banking businesses, the signal contained in choosing to participate in an early deal might well be.

Within the group of foreign banks, I therefore distinguish between "early participants" that were involved in the first syndicated loan deals ever signed in a respective country and "late participants" that were involved in a deal with a borrower from that country at some point, but not as part of the first few deals. I then examine syndicated loan issuance in and around times of stress. The results of this examination suggest that there actually are differences in the behaviour of these two groups of foreign banks.

This is shown in Figure 3.2, which plots changes in syndicate participation observed around 30 sudden stop episodes in emerging markets for the two groups of banks: early participants ("Foreign Early") and late participants ("Foreign Late"). A foreign

bank's status as either an early or a late participant is based on whether it has taken part in the first five deals in a given country. Sudden stops are taken from Calvo, Izquierdo, and Mejía (2008).

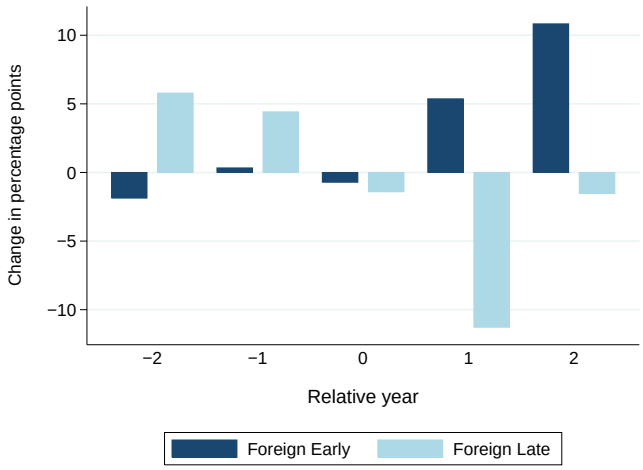
The changes depicted in the figure obtain as follows. First, I calculate for each deal the percentage share of parent banks on the syndicate accounted for by each group. Consider the following simple example. If 10 different parent banks participated in a deal in Poland in 1999, and three of those belong to the group of early participants that signed up for one of the first five loan deals recorded for Poland, early participants' share on the 1999 deal would be 30 per cent. Shares for late participants are computed accordingly. Second, I consider all deals in the affected countries around and during the sudden stop incidents, sorting them by the year relative to the sudden stop in which they were signed, with all deals observed during the sudden stop itself being assigned to period zero.[11] Third, I calculate the mean of the two groups' participation shares across all deals for each relative year. Suppose there were only two sudden stops, one in Poland between March 1999 and May 2000 and one in Mexico between March 1994 and November 1995. Shares would be averaged over Polish March 1998 to February 1999 and Mexican March 1993 to February 1994 deals for relative year -1, over Polish June 2000 to May 2001 and Mexican December 1995 to November 1996 deals for relative year $+1$, and so on. Figure 3.2 then shows the year-on-year changes in the average shares so obtained.[12]

The share of early participants changes very little before and during the sudden stop period, but increases noticeably thereafter. In contrast, the syndicate participation of late-participant foreign banks increases in the years before the sudden stop, only to

[11] This seems appropriate for purposes of comparison as the average length of sudden stops listed in Calvo et al. (2008) is almost exactly one year.

[12] The figure only considers non-overlapping sudden stops to ensure that a year does not count as both a post and a pre-crisis year. For example, Indonesia had sudden stops in short succession from December 1997 through November 1998 and from December 1999 through November 2000. In that particular case, it would not be clear whether to treat December 1998 through November 1999 as relative year -1 or $+1$. Both sudden stops are thus not included.

Figure 3.2: **Changes in syndicate participation around sudden stops**

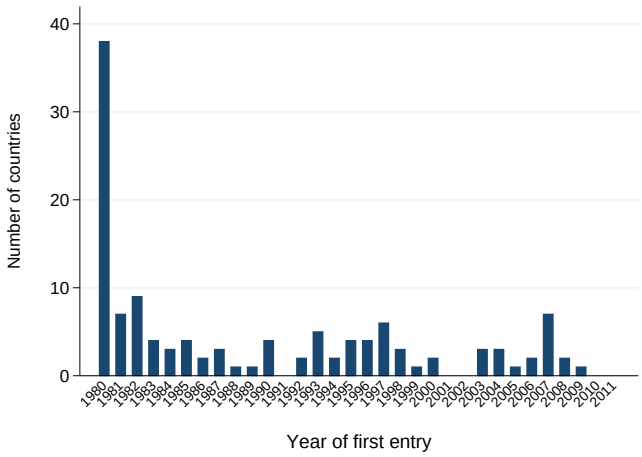


Notes — This figure shows the changes in syndicate participation for two groups of banks (Foreign Early, Foreign Late) based on 835 deals around 30 non-overlapping sudden-stop episodes in 30 emerging and developing economies from Calvo et al. (2008). "Foreign Early" refers to foreign parent banks that participated in the first five syndicated loan deals in the respective country, "Foreign Late" refers to foreign parent banks that did not. The values in the figure obtain by computing the participation shares for each of the two groups at the deal level, forming the mean over all deals across countries for the years relative to sudden stops in year 0, before calculating the year-to-year changes of the means.

drop during the sudden stop and particularly in the year after. Hence, the dynamics of late participant shares look more like a "hot money" story that is often attributed to capital flows to emerging markets in general (see, eg, Chari and Kehoe, 1997), while those of early participant shares do not. This is not to say that the number and volume of syndicated loans that early participants are involved in during a sudden stop do not decrease. However, on those deals that *are* signed, early participants are relatively more active than before the crisis.

With regard to how banks are classified as being either early or late participants, one might ask two questions: first, whether the first deals *recorded* in the data are a reasonable guide to *actual* first deals, which relates to database coverage; and second, whether the number of first deals being considered is appropriate. On the first issue, recorded first deals seem to reflect actual deal signings quite accurately as depicted in Figure 3.3, which reports the number of emerging markets in the sample

Figure 3.3: **Emerging markets with first syndicated loan, by year**



Note — This figure shows the number of emerging markets for which the first syndicated loan deal is recorded in a given year in the sample.

for which the first ever loan deal is recorded in a given year. Noting that emerging syndicated loan markets only developed in the 1970s as primarily a sovereign business (Gadanecz, 2004), it appears plausible for first deals involving the real sector and non-central government public entities in this sample to occur in 1980. Moreover, 11 of those countries that first show up in 1980 are from Latin America, which was "introduced" to syndicated loans by US banks rather early. The first deals in Central and Eastern Europe, in contrast, tend to be recorded some years later (eg, Poland in 1987, the Czech Republic and Romania in 1990, Estonia in 1993) as one might expect given the liberalisations that took place around the fall of the Iron Curtain.

As to the second issue, the number of deals on which early or late-participant status is based has to be chosen carefully. On the one hand, just focusing on the very first deal would appear too restrictive as only few banks may be needed to satisfy the financing needs of the firm in question. In other words, a bank's non-participation in the very first deal should probably not be taken as evidence of, for example, its unwillingness to take on the specific country risk. On the other hand, discriminating on the basis of too many deals would make the partition equally unselective. The

appropriateness of doing so for a given number of deals must be evaluated against the total number of deals in a country over the sample period and the frequency with which signings take place. While early participation is based on the first five deals throughout the chapter, I will dwell more on this point and address the robustness of my results to changes in the measure's definition (see 3.4.3).

3.4 Empirical strategy and results

The previous section suggests differences in the behaviour of foreign banks in emerging syndicated loan markets around sudden stops. However, despite the fact that the latter are of major concern to policy makers in those countries, the patterns presented so far still relate to only a relatively limited number of episodes in which conditions were extremely adverse, and they are also merely descriptive in nature.

The goal in this section is to investigate more thoroughly whether the above observations are of more general relevance. In other words, are early-participant foreign banks likely to "stick with" an emerging market, and do they tend to be a more stable source of funding in "bad times" than other foreign banks?

As a first step, I follow up on the previous section by analysing the participation shares of the two groups over the business cycle in a regression framework. This allows for both deal and country heterogeneity and paints a nuanced picture of foreign banks. In a second step, I model the individual decision of a foreign bank whether to join the syndicate in a given deal and economic climate. In doing so, I account for relationships at the micro level as well as cross-country linkages.

3.4.1 Aggregate analysis

To gain a first understanding of whether the behaviour of foreign banks around sudden stops holds more generally, I look at how early and late participants respond to

economic conditions, ie the business cycle. I do so following Qian and Strahan (2007), who explain the participation shares of different groups of banks by simple OLS regressions.[13] The regression equation for the groups of early and late participants, respectively, is given by:

$$Share_{d,i,c,t} = \alpha + \beta \cdot \Delta GDP_{c,t} + Controls_{d,c,t} \cdot \gamma + \mu_c + \psi_i + \eta_t + \epsilon_{d,i,c,t} \,.$$

Here, $Share_{d,i,c,t}$ is the participation share (in per cent) of the given group of banks on loan deal d in industry i in country c signed in year t. Because a foreign bank's status as being an early or late participant is based on the first five deals recorded in a country, those deals are not themselves considered in the estimation.

I account for borrower-country fixed effects μ_c and year-fixed effects η_t. The former capture time-invariant institutional factors, which have been found to be important determinants of foreign bank participation in emerging syndicated loan markets (eg, Esty, 2004; Qian and Strahan, 2007).[14] The latter control for global trends in foreign bank activity in emerging markets, for example because emerging markets are often regarded as a single asset class. Industry-fixed effects ψ_i are also included.

The key variable in the regression is $\Delta GDP_{c,t}$, the year-on-year change (in per cent) in real GDP in the borrower country. By proxying the business cycle, it is meant to capture economic conditions in a country at the time a syndicated loan deal is signed. Because ΔGDP varies at the country-year level and there can be a substantial number of deals signed in a given country and year, I cluster standard errors at that level.

[13] In Qian and Strahan (2007), the groups examined are government-owned and domestic banks. Because the authors use a sample starting in 1994 and also consider developed markets in their analysis, they are able to include a sufficient number of deals for which participation shares can be calculated on the basis of loan volume rather than binary participation decisions, as I do.

[14] I cannot directly control for such variables because they are either time-invariant themselves, like legal origin, and therefore perfectly collinear with μ_c, or virtually collinear due to minimal within variation. Creditor rights in the standard Djankov, McLiesh, and Shleifer (2007) database, for example, remain constant for 106 out of 129 countries over a period of up to 25 years.

This also explains why I estimate the model by pooled OLS as opposed to a panel setup. The latter would demand some aggregating of information from those multiple deals for a country-year pair before estimation. However, this is undesirable because it would not exploit the richness of the deal data. Pooled OLS allows me to control for variation at the deal level whilst imposing the necessary structure on the data via the inclusion of country and year dummies, and by the clustering of standard errors.

Controls is a vector of time-varying country-level variables and deal-level controls. At the country level, it includes the domestic banking system's claims on the real sector relative to the size of the economy, which proxies for financial development and differences across countries in their reliance on foreign sources of funding, as well as (log) GDP per capita to measure economic development (see Qian and Strahan, 2007). The latter also makes business cycles comparable across countries, which matters in terms of the interpretation of ΔGDP. To see this, consider two countries, both posting the same real GDP growth rate, but with the first country being significantly more developed than the second. Since more developed countries tend to have lower potential growth rates, country number one is likely to find itself in a relatively more favourable position over the business cycle than country number two. Hence, including GDP per capita helps towards the interpretation of the coefficient on ΔGDP as reflecting the response of early and late participants' shares *in a given country over time*, rather than differences in growth rates *across countries*. I also control for sudden stops and systemic banking crises as defined by Calvo et al. (2008) and Laeven and Valencia (2012), respectively, to separate general business cycle patterns from extremely adverse incidents.

At the deal level, I account for the major dimensions of the loan agreement — value, maturity, spread, currency, and borrower sector. The deal value, measured in (logs of) US$ mn, is the total volume of the deal supplied by all foreign and domestic banks on the syndicate. The deal maturity, in years, is the maturity of the deal,

obtained as a volume-weighted average of the maturities of the different tranches, where necessary. The deal spread is the spread, in basis points, of the (average) loan interest rate over the agreed reference rate, such as LIBOR. I also include whether a deal has been signed in a major reserve currency and whether the borrower is from the public or the private sector.

Definitions and data sources of all variables are provided in Table C.2 in the Appendix. Note that through the inclusion of a wide range of control variables, the final estimation sample covers a total of 5,593 deals in 68 emerging and developing countries.[15] For purposes of comparison, all results presented will henceforth refer to this sample, including the micro-level analysis that follows in 3.4.2.

Before moving on to the discussion of the estimation results, I check whether ΔGDP primarily reflects the macroeconomic situation of a country rather than a different selection of borrowers. It is important to bear in mind that despite possible differences between early and late participants, syndication activity is generally lower in "bad times" than in "good times", and that this is true for both the normal business cycle and around sudden stop episodes. Therefore, in bad years only the very best firms in a country might be able to obtain credit, whereas the threshold for banks to provide funding in good years may be more generous. While the deal-level controls described above are included to account for that, I perform a simple exercise to see whether the within-country distribution of the deal variables changes with the business cycle. In a country-year panel, I run fixed-effects regressions of the percentiles of the continuous variables (deal value, deal maturity, deal spread) and the mean of the reserve-currency dummy on ΔGDP. If those percentiles were significantly related to changes in real GDP growth across the board, one might be concerned about borrower selection interfering with the interpretation of ΔGDP as a "clean" proxy

[15] See Table C.1 in the Appendix for the full list of borrower countries in the estimation sample and the number of deals accounted for by each of them.

for economic conditions. However, as shown in Table C.3 in the Appendix, it is reassuring that the coefficients are generally far from conventional significance levels.

Table 3.3 reports the results from the participation share regressions. They lend first support to the idea that early-participant foreign banks may represent a more stable source of funding in loan syndicates under unfavourable economic conditions. Although the shares of both groups of foreign banks are negatively related to ΔGDP, the coefficient for early participants is significant at five per cent, whereas that for late participants is insignificant at any conventional level (p-value of 38 per cent). This is indicative of anti-cyclical behaviour on the part of early participants. At the same time, it has to be acknowledged that the evidence should be taken as preliminary since there are some factors that the shares analysis cannot incorporate. I will shortly elaborate on and address these issues (see 3.4.2).

That notwithstanding, many findings on the control variables also turn out to be interesting in their own right. For example, contrary to early participants, the other foreign banks appear to be more hesitant to get involved in syndicated loan deals that carry longer maturities. To the extent that this observation is not driven by differences in composition between the two groups — for example, if early participants were drawn from a pool of less risk-averse banks that might be more willing to extend longer loans more generally —, being an early participant in a country may come with learning effects and a (downward) re-appraisal of risk. Therefore, those banks might sign up for loans of longer maturity in later deals.

On a similar note, while both groups of foreign banks are unsurprisingly more active suppliers of funds on deals that are agreed upon in a major reserve currency, early and late participants also seem to differ with regard to their appetite for exchange rate risk. The coefficient on the corresponding dummy variable is approximately three times as high for late participants, showing the latter to be much more concerned about currency risk as well. Moreover, the results also point to cross-country differences in

Table 3.3: **Participation share regressions**

	Early participants	Late participants
ΔGDP	-0.2419**	-0.1070
	(0.1212)	(0.1217)
Deal value	0.3949	0.0969
	(0.3357)	(0.4625)
Deal maturity	0.1019	-0.5059***
	(0.1132)	(0.1203)
Deal spread	-0.0103***	-0.0076***
	(0.0030)	(0.0028)
Deal in reserve currency	6.3330***	19.0188***
	(1.7598)	(1.7851)
Private-sector borrower	-2.3057	1.3134
	(2.1846)	(2.5703)
GDP per capita	-5.9667**	6.9074***
	(2.3271)	(2.4655)
Domestic credit	-0.0289	-0.0386
	(0.0265)	(0.0280)
Sudden stop	-1.0629	1.9982
	(1.6776)	(1.5877)
Systemic banking crisis	-1.9196	1.1593
	(1.2295)	(1.3272)
N	5,593	5,593
R^2	0.2743	0.3026

Notes — This table shows regressions explaining the participation shares (in per cent) of early and late-participant foreign parent banks in syndicated loan markets. Estimation is based on a total of 5,593 deals in 68 emerging and developing countries. For variable definitions, see Table C.2 in the Appendix. All specifications include a constant as well as borrower-country, industry, and year dummies. Standard errors clustered at the country-year level in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

the importance of distinguishing between the two groups since early participants' shares tend to be higher in less developed countries, as measured by per-capita GDP, whereas the opposite holds true for late participants' shares. If one subscribes to the idea that (perceived) country risk and frictions are higher in less developed economies, this observation rounds off the picture that early participation matters when it comes to different types of risk a bank faces in signing up for a syndicated loan deal.

3.4.2 Micro-level analysis

There remain a number of important factors that have not yet been considered. Four caveats are worth emphasising in particular. First, the participation shares of each group of banks do not only depend on the decisions made by parent banks belonging to that group, but also on the decisions made by other banks. The relative participation of early-participant foreign banks, for instance, is to some extent a residual of the decision of late-participant banks — and domestic banks, for that matter — to join or not join a syndicate. As will be described in more detail below, I therefore model the binary choice of *individual* banks whether to participate in a given syndicate loan or not.

Second, the aggregate analysis has taken as given whether a foreign bank is an early or a late participant. However, a bank's early-participant status is unlikely to be random. It is quite conceivable that links between the parent bank and the emerging market in question, or between the foreign parent bank's country of incorporation and that of the borrower, affect the decision (see Table 3.2). Strong links to the borrower country, for example, might not only increase the probability of a parent bank's being an early participant, but also result in a more stable supply of credit to that country more generally. Without accounting for such linkages, through the prism of early-participant status one may simply be looking at a gravity story.

Third, it may be misleading to conclude that being an early participant in a given country makes banks more willing to keep providing funds in syndicated loan deals to that *country* even under adverse economic conditions as long as bank-borrower relationships at the micro level are ignored. Suppose that, in each country, syndicated loans went to only a small number of *borrowers*, and that banks repeatedly interacted with those borrowers. In that case, the observation of bank-country ties developing

through early participation could mask a standard relationship-lending story at the micro level.

Fourth, some international banks are — and have long been — considerably more important players in the syndicated loan market than others (see Table 3.2). Therefore, as they have been involved in a substantially larger number of countries in general, one would also think them more likely to be an early participant in any given country. Detecting path dependence in syndicated lending to countries might therefore be driven by such bank heterogeneity, as might more muted responses to unfavourable economic conditions, perhaps because large, globally oriented banks look more towards their overall international loan portfolio than to individual countries.

In the following, I address these caveats and incorporate them into the analysis. More specifically, I model the binary choice of individual foreign banks in emerging and developing economies whether or not to participate in a given syndicated loan deal as

$$\begin{aligned} Pr(Partic_{b,d,i,c,t} = 1) = \alpha + \beta \cdot Early_{b,c} + \gamma \cdot \Delta GDP_{c,t} + \delta \cdot Early_{b,c} \times \Delta GDP_{c,t} \\ + Controls_{b,d,c,t} \cdot \theta + \mu_c + \psi_i + \eta_t + \lambda_b + \epsilon_{b,d,i,c,t} \ , \end{aligned}$$

where $Partic_{b,d,i,c,t}$ is a dummy variable that takes on a value of one if parent bank b participates in syndicated loan deal d in industry i in country c in year t, and zero otherwise.

This setup requires that the sample be inflated in the sense that foreign parent banks are also matched with deals in which they did not actually participate. Inflation is conducted at the country level, matching a bank with all deals in a given country if it has participated in at least one deal in that country, and assigning a value of zero or one for *Partic* accordingly. I do so since the key issue lies in telling apart the behaviour of banks in a country depending on early or late-participant status. Therefore, adding banks that never signed up for deals in a given country does not

come with any gains in terms of identification. Also, since those banks cannot be early participants by definition, including them would create a bias towards finding a positive level effect β. Overall, inflating the data results in $Partic$ being zero for about 97 per cent of the observations.

I estimate the participation probability $Pr(Partic = 1)$ using a linear probability model, which seems the most appropriate choice in this context. Note that the central interest is in the marginal effects β and δ that capture, respectively, level differences in early and late participants' probabilities of taking part in syndicated loan deals in a country and differences in responsiveness to local economic conditions. A linear probability model, while not strong at predicting individual probabilities, provides reasonable estimates of marginal effects and the significance of variables without additional distributional assumptions (Cameron and Trivedi, 2009). Consider further that the key variable $Early$, a bank's early or late-participant status, can only take on two possible values. Hence, there is little apparent benefit in running a probit or logit model that evaluates the variable at a hypothetical sample mean of between zero and one that it can never take on. Moreover, the substantial number of dummy variables may generate problems when performing the maximum-likelihood estimation that would be required to do so (Popov and Van Horen, 2013). Finally, the coefficient on the interaction term $Early \times \Delta GDP$ is readily interpretable in a linear as opposed to a non-linear model (see Ai and Norton, 2003).

In all regressions, bank-fixed effects λ_b account for time-invariant differences between foreign parent banks to alleviate concerns about bank heterogeneity (caveat four from above). This is in addition to country-fixed effects μ_c, year-fixed effects η_t, and industry-fixed effects ψ_i already included in the aggregate analysis. I continue to cluster standard errors at the country-year level. In the absence of parent bank balance sheet or profit-and-loss data, I also cluster at the bank-year level in order to capture shocks to the parent bank's financial health in period t, which is likely to

influence the participation probabilities in deals across countries. Two-way clustering is implemented following Cameron, Gelbach, and Miller (2011). Other clustering schemes are also explored in the robustness checks (see 3.4.3).

Controls contains all variables from the aggregate analysis. In addition, there are two sets of variables to account for linkages at the country level and micro-level relationships, respectively, addressing caveats two and three from above. I include the distance between the parent bank's country of incorporation and the borrower country, whether the former used to be a coloniser of the latter, and whether the two countries share a common language. This is to net out a common effect of bilateral linkages on the level of $Pr(Partic = 1)$ on the one hand, and the potentially higher stability with which credit is granted to more closely affiliated emerging markets on the other. These controls are widely used in the gravity literature and have been shown to correlate with other bilateral measures such as trade or FDI as well as cross-country financial holdings (see, eg, Portes and Rey, 2005; Aviat and Coeurdacier, 2007; Eichengreen and Tong, 2007; Buch, Driscoll, and Ostergaard, 2010). Ideally, one would want to control directly for trade and/or FDI linkages in those years in which banks' statuses as early or late participants are determined. However, data are only available more broadly from around the mid-1990s and thus unlikely to be more indicative of the early-participation years in mostly the 1980s than the variables used here. Therefore, their inclusion would merely reduce the universe of emerging markets available for identification.

At the bank level, I control for a range of indicators to capture a bank's participation in at least one syndicated loan deal prior to the deal in question with the same borrower, the same borrower parent, or any borrower in the country. The first two of those variables are important to separate the pure relationship lending decision at the micro level from whatever might make an early-participant foreign bank more willing to extend credit to the emerging market in which the borrower is based.

The logic that applies to the borrower itself also carries over to a prior relationship with the borrower parent, which may provide a financial backstop for its affiliates. Moreover, it is crucial to disentangle simple serial correlation in a bank's syndicate lending from the effect of its early-participant status by including a variable that measures the mere occurrence of prior lending. I also add an analogous variable on whether there has previously been syndicated lending via a bank's local affiliate to capture possible spillovers from standard banking business in the country in terms of lending experience gained or a demonstrated commitment to the market. Finally, GDP growth in the parent bank's country of incorporation is included as a "push" factor, mirroring the "pull" factor of GDP growth in the borrower country (see De Haas and Van Lelyveld, 2006). Definitions and data sources of all variables are provided in Table C.2 in the Appendix.

The results of the linear probability model regressions are reported in Table 3.4, where all coefficients have been scaled up by the factor 100. Column (1) picks up from the aggregate analysis, using the same set of macro and deal-level controls. Columns (2) and (3) add, respectively, different kinds of prior lending by the foreign parent bank and gravity variables, including GDP growth in the parent bank's country of incorporation. In column (4), the levels of these variables are considered jointly, before their interactions with the business cycle are investigated in column (5).

The first thing to note is that *Early* is highly significant across all specifications. This suggests that foreign parent banks belonging to the group of early participants in a country are more likely to sign up for further syndicated loan deals in that country as compared to the other foreign banks. In the most conservative specification, the probability is roughly 0.9 percentage points higher for early than for late participants. Considering that the average participation probability in the sample is about 3.2 per cent, this is also economically significant. Hence, there is evidence that early

Table 3.4: **Linear probability model regressions**

	(1)	(2)	(3)	(4)	(5)
Early	2.4241***	1.4247***	1.9016***	1.0641***	0.8862***
	(0.2911)	(0.2767)	(0.2650)	(0.2568)	(0.2234)
ΔGDP	0.0049	0.0176	-0.0015	0.0108	0.0142
	(0.0168)	(0.0163)	(0.0166)	(0.0161)	(0.0297)
$\Delta GDP \times Early$	-0.1265***	-0.0963**	-0.0927**	-0.0683*	-0.0327
	(0.0401)	(0.0408)	(0.0379)	(0.0387)	(0.0324)
Prior lending to country		0.3423***		0.2258**	0.1379
		(0.1136)		(0.1135)	(0.1751)
Prior local lending in country		5.5864***		5.0373***	7.0119***
		(0.6062)		(0.5851)	(1.1109)
Prior lending to borrower		9.6194***		9.4535***	9.4428***
		(0.5256)		(0.5260)	(0.5245)
Prior lending to borrower parent		6.0339***		5.8737***	5.8232***
		(0.5381)		(0.5362)	(0.5343)
Distance			-0.0004***	-0.0003***	-0.0003***
			(0.0000)	(0.0000)	(0.0000)
Common language			1.5495***	1.3091***	1.3469***
			(0.1949)	(0.1774)	(0.2479)
Coloniser			2.8059***	2.0672***	2.1399***
			(0.4095)	(0.3629)	(0.4785)
GDP growth in parent bank country			0.0465***	0.0455***	0.0449***
			(0.0132)	(0.0121)	(0.0122)
$\Delta GDP \times$ Prior lending to country					0.0155
					(0.0229)
$\Delta GDP \times$ Prior local lending in country					-0.3211**
					(0.1328)

(continued on next page)

Linear probability model regressions (continued)

$\Delta GDP \times$ Distance					-0.0000
					(0.0000)
$\Delta GDP \times$ Coloniser					-0.0249
					(0.0695)
$\Delta GDP \times$ Common language					-0.0081
					(0.0292)
Deal value	1.3662***	1.1768***	1.3644***	1.1783***	1.1818***
	(0.0687)	(0.0647)	(0.0690)	(0.0650)	(0.0651)
Deal maturity	-0.0909***	-0.0469**	-0.0908***	-0.0475**	-0.0483***
	(0.0167)	(0.0186)	(0.0167)	(0.0186)	(0.0185)
Deal spread	-0.0009***	-0.0001	-0.0009***	-0.0001	-0.0001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Deal in reserve currency	0.9665***	0.9078***	0.9649***	0.9047***	0.9030***
	(0.1368)	(0.1419)	(0.1363)	(0.1412)	(0.1409)
Private-sector borrower	0.0630	0.5538**	0.0590	0.5322**	0.5458**
	(0.2675)	(0.2643)	(0.2675)	(0.2636)	(0.2637)
GDP per capita	-0.2491	-0.8279***	-0.2078	-0.7338***	-0.6289**
	(0.2474)	(0.2429)	(0.2453)	(0.2395)	(0.2647)
Domestic credit	0.0017	0.0008	0.0016	0.0009	0.0010
	(0.0030)	(0.0030)	(0.0031)	(0.0030)	(0.0030)
Sudden stop	-0.2133	-0.2591	-0.2137	-0.2619	-0.2705
	(0.2221)	(0.2106)	(0.2215)	(0.2114)	(0.2118)
Systemic banking crisis	-0.3316**	-0.4053***	-0.3192**	-0.3882***	-0.4126***
	(0.1442)	(0.1479)	(0.1447)	(0.1475)	(0.1469)
N	1,112,847	1,112,847	1,112,847	1,112,847	1,112,847
R^2	0.1032	0.1285	0.1079	0.1313	0.1315

Notes — This table shows linear probability model regressions explaining the participation of a foreign parent bank in a syndicated loan deal. Estimation is based on a total of 5,593 deals in 68 emerging and developing countries, involving 3,175 borrowers and 1,174 foreign parent banks. For variable definitions, see Table C.2 in the Appendix. Coefficients scaled up by the factor 100. All specifications include a constant as well as borrower-country, industry, parent-bank, and year dummies. Standard errors clustered at the country-year and bank-year levels in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

participation introduces a major element of path dependence into syndicated lending to emerging markets.

Moreover, the gap in participation probabilities between early and late participants tends to widen with falling real GDP growth. In other words, early participants are less responsive than late participants to changes in economic conditions. Yet, for the full set of foreign parent banks considered in Table 3.4, this result is only statistically significant for the more parsimonious models (1) through (4), but not for the most conservative specification in column (5). Taken literally, a change in a country's real GDP growth by one sample standard deviation (circa 4.3 percentage points) is accompanied by a change in participation probability that is roughly 0.1 percentage points smaller for early participants. As this is also economically small, the micro-level analysis can only substantiate to a limited amount the behavioural patterns documented around sudden stops and the findings of the aggregate analysis. I will shortly demonstrate, however, that this is driven by Japanese parent banks, which the empirical literature has shown to be behaving distinctly, and that the evidence for non-Japanese banks is strongly in favour of early participants reacting less to changes in economic conditions.

It is also instructive to take a closer look at the newly added control variables and how they affect the magnitude of the main coefficients of interest. For example, there is an interesting and highly plausible cascade of the relative importance of country and borrower-level relationships. The marginal effect on the probability of participating in a syndicated loan deal is highest if a bank has already been involved in a prior deal with the same borrower (9.4 percentage points [pps] in column (5)). This is followed by whether it has extended a syndicated loan to a borrower from the country via a local affiliate (7.0 pps) and whether it has previously lent to the borrower's parent (5.8 pps), although this order is reversed in specifications (2) and

(4). However, it is striking that the coefficient on prior local lending far exceeds that of prior lending *per se*, which is quite small and even insignificant in specification (5). It is also worth noting that prior lending in itself is a lot less important in determining participation probability than whether a bank is an early participant or not.

Similar to traditional bank loans, and unlike standard capital market instruments, these findings speak in favour of syndicated loan deals containing important relationship elements at both the country and borrower levels, too. In particular, the discrepancy in participation probabilities between banks that previously lent cross-border and those that did so locally is in line with a host of theoretical and empirical contributions from the classic banking literature. They point to the limited amount or outright lack of soft information and knowledge of the destination country faced by pure cross-border lenders, at least as compared to lending through affiliates that became part of a foreign banking group via acquisition (eg, Dell'Ariccia and Marquez, 2004; De Haas and Van Lelyveld, 2006; Claeys and Hainz, 2007; Van Tassel and Vishwasrao, 2007; Lehner, 2009; De Haas, Ferreira, and Taci, 2010).[16] The results presented in Table 3.4 therefore suggest that learning effects by granting loans locally, or perhaps simply a stronger commitment to the given country, "spill over" to the syndicated business as well.

With regard to the magnitude of *Early*, column (2) shows that the impact of controlling for other lending relationships is sizeable — the coefficient is almost halved —, but that it continues to be statistically and economically significant. Moreover, as expected, gravity variables account for part of a bank's early-participant status, yet reduce the coefficient on *Early* only slightly and much less so than the set of relationship controls (compare specifications (1) and (3)). Distance, common

[16] However, Detragiache et al. (2008) note that local market knowledge and customer relationships may even be lost when foreign banks enter by purchasing local banks if geographic and/or cultural distance are large.

language, and the parent bank's home country having at some point colonised the borrower country are all signed as anticipated and highly significant throughout.

GDP growth in the parent bank country is always highly positive and significant, indicating that there are strong positive "push" factors at work in syndicated lending to emerging and developing countries. However, this is again driven by Japanese banks whose exclusion from the sample immediately renders the parent country growth insignificant. This is in line with empirical literature that has investigated "push" and "pull" factors in cross-border and affiliate bank lending. On the one hand, evidence is mixed with some papers documenting positive "push" relationships, others negative (see, eg, Moshirian, 2001; Jeanneau and Micu, 2002). On the other hand, both Peek and Rosengren (1997) and Martínez Pería et al. (2002) identify a positive effect of the health of the Japanese economy on Japanese banks' international lending. Peek and Rosengren (1997) show that drops in stock prices in the early 1990s precipitated a reduction in lending by the US branches of Japanese banks. Martínez Pería et al. (2002) find negative "push" factors in the sense that foreign banks overall increased their credit supply to Latin America when home country conditions deteriorated, but that this was not the case for Japanese banks. The fact that I make the same observation as part of my regression analysis further supports the idea of also looking at a sample excluding Japanese banks and, crucially, how this affects the key coefficients of interest.

Finally, column (5) reports the coefficients on interactions of prior bank-country relationships and bilateral, gravity-type linkages at the country level with ΔGDP. These are generally insignificant, but the interaction term of ΔGDP and prior local lending is large and highly significant. It is signed negatively as expected, reinforcing the notion that having a local presence in a country not only matters in terms of the general willingness to grant syndicate loans, but also in terms of the responsiveness to the business cycle.

3.4.3 Robustness and subsample analysis

Changing the set of parent banks

It has already been stressed that, depending on the set of parent banks considered, the results from the micro-level analysis may differ in terms of significance. In particular, the inclusion or exclusion of Japanese parent banks, whose distinct behaviour has also been singled out by other empirical papers, has a bearing on the magnitude and significance of the interaction term $\Delta GDP \times Early$, ie differences in responsiveness to the business cycle between early and late participants. As soon as Japanese banks are dropped from the regression, the coefficient is highly significant and economically large even in the most conservative specification. This is shown in Table 3.5, which examines the results that obtain by running the most conservative specification (5) from Table 3.4 for four different sets of parent banks. It focuses on the two key coefficients of interest, with full results reported in Table C.4 in the Appendix.

Excluding Japanese banks, a drop in real GDP growth by one sample standard deviation of roughly 4.3 percentage points is accompanied by a widening of the wedge between early and late banks' participation probabilities of almost 0.4 percentage points (column "All ex JPN"). This is sizeable when compared to an average participation probability in the now smaller sample of 3.4 per cent and points to important differences in the two groups' responsiveness to changes in economic conditions. I also look at whether there are major differences in behaviour between all foreign parent banks ("All") and the group of banks incorporated in developed countries ("Dev"), which still dominate the global syndicated loan market, but do not find any. Again, however, dropping Japanese institutions from the set of developed country banks ("Dev ex JPN") yields a significant interaction term $\Delta GDP \times Early$. In the following, I will therefore refer to the results from further robustness checks for the full set of parent banks ("All") and excluding Japanese banks ("All ex JPN").

Table 3.5: **Key coefficients for different sets of banks**

	Set of foreign parent banks			
	All	All ex JPN	Dev	Dev ex JPN
Early	0.8862***	1.0240***	0.9319***	1.1297***
$\Delta GDP \times Early$	-0.0327	-0.1050***	-0.0162	-0.1034***

Notes — This table shows the coefficients on the two key variables of interest, *Early* and $\Delta GDP \times Early$, in linear probability regressions explaining the participation in a syndicated loan deal for four different sets of foreign parent banks and based on the most conservative specification as in Table 3.4, column (5). "All" denotes the set of all foreign parent banks, including those that are themselves incorporated in an emerging country but foreign from the point of view of the emerging market borrower in question. "Dev" only refers to those parent banks that are incorporated in a developed country. For both cases, the table also reports the corresponding sets when Japanese parent banks are excluded ("ex JPN"). ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively. Full results of the above regressions are shown in Table C.4 in the Appendix.

Alternative clustering schemes

I have so far clustered standard errors at the country-year and bank-year levels. This was to account for the fact that ΔGDP, which is a key ingredient in the analysis, only varies at the country-year level and to capture shocks to the parent bank's financial health in a given year, which may affect its participation probability in deals across countries.

The other key ingredient is the early-participant status dummy *Early*, which varies only at the bank-country level. Moreover, important controls such as prior (local) lending to a given emerging market will be zero until a bank signs its first (local) deal in the country, and one thereafter. These can be thought of as treatment variables that are highly serially correlated at the bank-country level. Not correcting for this could lead to the underestimation of standard errors (Bertrand, Duflo, and Mullainathan, 2004). I therefore re-run the most conservative specification from Table 3.4, column (5), using two-way clustered errors at (a) the country-bank and bank-year levels, and (b) the country-bank and country-year levels. As shown in Table C.5 in the Appendix, the results are unaffected by this.

Alternative early-participation measures

Up to now, a bank's status as either an early or a late participant has been based on the first five deals. I have already pointed out that there exists a trade-off in choosing this number (see 3.3.3). It would be too restrictive to focus on only the very first deal because the loan amount is essentially fixed in negotiations between borrower and lead arranger before the latter turns to potential participants, and because there is a natural lower bound to individual underwriting amounts. For that reason — and probably simple organisational ones —, the number of banks on a given syndicate is bounded from above. Hence, not finding a bank on the very first syndicate in a country reveals little about its desire or willingness to join and, in consequence, its view of country risk. With a larger number of first deals considered, the dividing line between early and late participants thus becomes more meaningful by increasing the likelihood that a bank that is willing to join a syndicate will actually be able to do so.

At the same time, including ever more deals in the measure also risks diluting it. By extending the time span covered, it becomes harder to argue that banks signing up for the later of those deals can still be considered early participants, and that their decision to participate or not is made under the same veil of uncertainty as in, say, the first five cases. This makes it harder to narrow down the measure's interpretation. Moreover, from a more technical point of view, it is also important to consider the number of deals on which the definition of *Early* is based relative to the total number of deals signed in a country. To see this, suppose the five-deals measure is used and regressions include countries with just very few additional deals. For instance, only one further deal was signed in Bolivia, Guinea, Latvia, and Lebanon after the first five (see Table C.1 in the Appendix). The early-participation and prior-participation dummies are thus identical for the sixth deal in those countries, which hampers the ability of regression analysis to accurately distinguish between

mere repeated lending and the impact of early participation. If, in contrast, there are many deals from the sixth one onwards, the prior participation dummy and *Early* — and their interactions with ΔGDP — can be identified independently through further distinct variation at the bank-country level.

I therefore re-estimate specification (5) from Table 3.4 with early participation based on the first three and 10 deals for the entire estimation sample, as well as based on the five-deals measure, but for countries with a total number of at least 30 and 50 deals only. The results for all banks and excluding Japanese banks, respectively, are shown in Tables C.6 and C.7 in the Appendix.

For both sets of banks, any measure used, or subsample considered, early participants are significantly more likely to sign up for deals in a country. Differences in participation probabilities between early and late participants also continue to increase with deteriorating economic conditions, in particular for non-Japanese parent banks, as evidenced by consistently negative and economically large coefficients on $\Delta GDP \times Early$ in all specifications. With the exception of the three-deals measure, which is only significant at the 18 per cent level, the interaction terms are also highly significant statistically.[17]

3.5 Discussion and concluding remarks

In this chapter, I provide evidence that foreign parent banks that took part in the first ever deals in an emerging or developing country are more likely to participate in further deals, and that they are less responsive to changes in economic conditions than other foreign banks. Importantly, these patterns possess explanatory power over and above rival explanations such as relationship lending at the borrower level, simple repeated cross-border and local lending at the country level, as well as gravity-style

[17] This is what one might expect given the lack of power with which one can discriminate between banks and their willingness to be active in a country on the basis of only three deals.

linkages between lender and borrower countries. These findings are interesting from several points of view.

For one thing, the results are relevant for emerging markets regardless of the channel through which they come about. Policy makers may, for instance, want to monitor loan syndicates as to the composition between these two groups of foreign banks, given the fact that the gap in participation probabilities tends to widen with deteriorating economic conditions and given the changes in participation shares observed around sudden stop episodes. A major concern of policy makers in that regard would have to be whether early participants contribute to the stability of syndicated lending.

Because only signed deals are observed in equilibrium but credit demand from firms is not, no direct evidence can be provided on this. However, one could argue that early participants do constitute a source of stability if one thinks of the syndication process in which the lead arranger turns to participants that signal their interest in signing up for a deal. Unless the lead arranger changes the way it selects banks from the pool of potential banks depending on the economic conditions, no systematic differences in actual participation should be found. Considering that the results in this chapter tell otherwise, it seems plausible that some deals would not have been finalised, and thus observed, had it not been for early participants. Hence, while broadening the creditor base may be a desirable policy goal for emerging markets, the results in this chapter can be interpreted as pointing to the risk of doing so indiscriminately and as contributing to a more nuanced picture.

Turning to potential channels behind differences in banks' observed behaviour, a combination of two factors is likely to be at work. On the one hand, early participation can be viewed as revealing a bank's assessment of country risk (and return) that is at variance with that of other banks to begin with. Considering that first deals are signed in a more insecure and informationally opaque environment, the information conveyed by a bank's choice to grant a loan could be considered

particularly strong. This interpretation takes early participation to be primarily a signal, or a good summary measure, of otherwise unobserved bank-specific attitudes to different countries.

On the other hand, participation in the first ever deals may provide banks with a particular kind of learning about the emerging market. Repeated lending more generally helps to reduce information asymmetries and to acquire proprietary information about borrowers (Boot, 2000), which can be re-used in assessing whether to grant another loan (Greenbaum and Thakor, 2007). By building informational advantages over other banks, experienced ones have to bear lower lending costs and may therefore supply more loans on average and under worsening economic conditions. This chapter's findings are consistent with the potential to gain such advantages extending not only beyond the borrower level, but also beyond prior lending to other borrowers in the country. They suggest that involvement in early deals might give participant banks an additional edge, perhaps because these very first deals represent an opportunity to gain particularly profound knowledge of the intricacies of lending to a country, such as the institutional and legal environment (see De Haas and Van Horen, 2013). Possessing or not possessing that knowledge could then carry over to different behaviour of foreign banks when it comes to signing up for further deals.

The results are also interesting in view of the nature of syndicated loans as a hybrid between standard bank loans and capital market instruments. They point to an important relationship-lending element at the bank-country level, underscoring the idea that participation in syndicated loan deals is distinctly different from the purchase of, say, a standard corporate bond. The relationship side of syndicated lending is commonly attributed primarily to lead arrangers, who organise the deal before turning to further participant banks and who bear the brunt in terms of loan volume underwritten as well as screening and monitoring duties.

However, it need not be confined to lead arrangers, but may also be relevant for the non-lead participants on a deal. At least there is no clear evidence from tentative analysis that being an early participant only matters in terms of future participation in case a bank has arranged an early loan syndicate (see Table C.8 in the Appendix, where adding controls for early lead arrangers does not alter the conclusions). While based on admittedly fragmentary information — banks' lead-arranger statuses are only available occasionally for earlier deals —, this reinforces the notion that syndicated loans constitute complex financial contracts that are still not fully understood. The results in this chapter therefore also highlight the need for future research to shed more light on the nature of syndicated lending more generally.

Appendix A

Appendix to Chapter 1

A.1 The methodology of benchmark portfolios

A.1.1 Mapping the credit allocation decision

We map the international credit allocation problem into a mean-variance choice among national equity indices, which serve as representative assets for a typical company located in a given country. The necessary link between a representative company's loan repayments and the development of its equity and asset values is established by the Merton (1974) firm-value model and practitioners' implementations of it. The key points for the purpose of our analysis are described in the following.

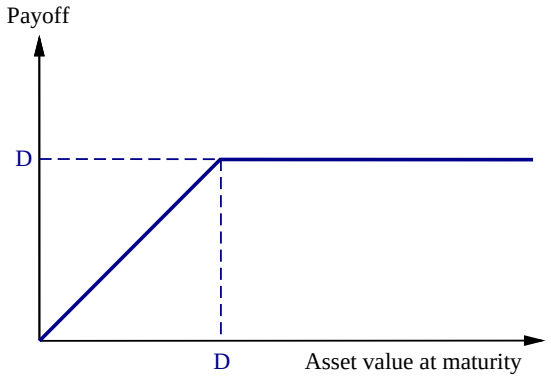
The Merton (1974) model postulates a closed-form solution for the pricing of a firm's risky debt on the basis of Black and Scholes (1973) option pricing theory under the following main simplifying assumptions:

- A single, homogeneous debt issue and equity as the residual claim constitute the firm's only liabilities.
- The debt liability is a promise to pay back the face value D to the creditor at a fixed maturity date T.
- The firm can only default at maturity. If it does, the company is taken over by the creditors.
- The firm cannot issue new claims, pay dividends, or engage in share repurchases before maturity.

Hence, a firm will default if its total asset value V_A falls short of the face value of debt D at maturity T, in which case creditors collect the residual value $V_A < D$. Otherwise, it will repay the face value of debt in full. The payoff to holders of the firm's debt can be interpreted as the sum of payoffs from safe debt and a short put

option on the company's asset value with strike price D. This is illustrated in Figure A.1.

Figure A.1: **Repayment profile of risky debt**



Whether or not the firm defaults and creditors are repaid in full therefore depends on the asset value at maturity. According to Black and Scholes (1973), the market value of the firm's assets follows the stochastic process

$$dV_A = \mu V_A dt + \sigma_A V_A dz\,,$$

where μ is the drift of the firm's asset value, σ_A its volatility, and dz a standard Brownian motion.

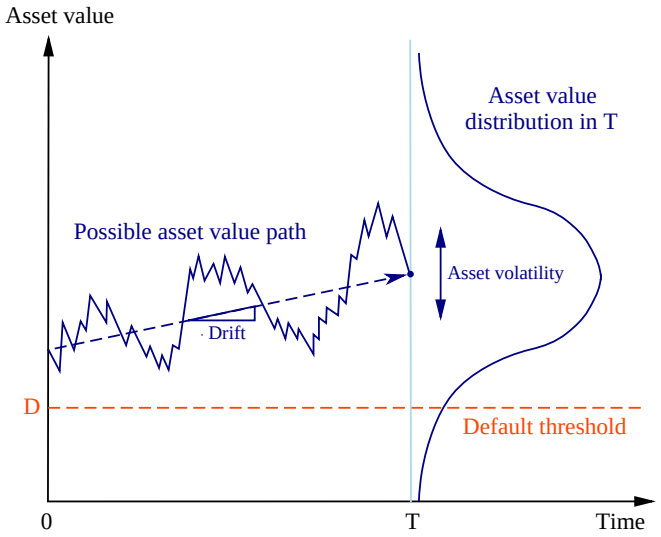
Due to only a firm's equity being publicly traded, the market value of assets V_A and the parameters of the stochastic process have to be estimated on the basis of stock market information, for which Black and Scholes (1973) option-pricing theory provides the link:

$$V_E = V_A\,\Phi\left(\frac{\ln\left(\frac{V_A}{D}\right) + \left(r + \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right) - e^{-rT} D\,\Phi\left(\frac{\ln\left(\frac{V_A}{D}\right) + \left(r - \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right).$$

Here, V_E denotes the value of equity, and r is the risk-free rate. Industry models, such as Moody's KMV, arrive at the parameters of the asset value process through complex iterative processes (see, eg, Crouhy et al., 2000; Crosbie and Bohn, 2003; Kealhofer, 2003). It is more important for our analysis, however, that there is a

monotonic relationship between equity volatility σ_E and asset volatility σ_A. Moreover, with D fixed, there is also a positive association between the expected return on equity μ_E and the expected return on assets μ. Therefore, our estimates $\widehat{\mu_E}$ and $\widehat{\sigma_E}$ contain valuable information on μ and σ_A as well and, consequently, the distribution of V_A at maturity.

Figure A.2: **Asset value process and default**



Note — Adapted from Crosbie and Bohn (2003), using the notation introduced in this section.

Figure A.2 shows that this distribution determines the expected repayment via the probability of whether default occurs in case of $V_A < D$, and only a fraction of the face value of debt D can be collected, or whether the full face value of debt D is repaid in case of $V_A \geq D$. Crucially, the probability of default depends negatively on the drift μ of the asset value process — as it results in a higher mean of the distribution at maturity that is farther away from the default threshold —, and, under plausible assumptions, negatively on the asset volatility σ_A. To see this, note that the asset value stochastic process implies

$$\ln V_A^T = \ln V_A^0 + \left(\mu - \frac{\sigma_A^2}{2}\right) T + \sigma_A \sqrt{T} \epsilon \,,$$

where V_A^0 and V_A^T are the asset values at times 0 and T, respectively. ϵ is the random component of the firm's asset return, which is assumed to follow a standard normal distribution in Black and Scholes (1973). The probability of default therefore obtains as

$$PD = Pr\left[\ln V_A^T \leq \ln D\right] = Pr\left[\ln V_A^0 + \left(\mu - \frac{\sigma_A^2}{2}\right)T + \sigma_A\sqrt{T}\epsilon \leq \ln D\right]$$
$$= Pr\left[\epsilon \leq -\frac{\ln\frac{V_A^0}{D} + \left(\mu - \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right] = \Phi\left[-\frac{\ln\frac{V_A^0}{D} + \left(\mu - \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right].$$

Differentiation with respect to μ and σ_A yields

$$\frac{dPD}{d\mu} = -\underbrace{\frac{\sqrt{T}}{\sigma_A}}_{>0}\underbrace{\phi\left(-\frac{\ln\frac{V_A^0}{D} + \left(\mu - \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right)}_{>0} < 0$$

and

$$\frac{dPD}{d\sigma_A} = \underbrace{\frac{1}{\sigma_A^2\sqrt{T}}}_{>0}\underbrace{\phi\left(-\frac{\ln\frac{V_A^0}{D} + \left(\mu - \frac{\sigma_A^2}{2}\right)T}{\sigma_A\sqrt{T}}\right)}_{>0}\left[\ln\frac{V_A^0}{D} + \left(\mu + \frac{\sigma_A^2}{2}\right)T\right].$$

Plausibly assuming that the firm is not already in default when the loan is granted, $V_A^0 \geq D$, implies $\ln\frac{V_A^0}{D} \geq 0$. Moreover, in the context of long-term portfolio optimisation — we estimate return properties over a period of nine years —, it is also reasonable to assume that $\mu \geq 0$.[1] We therefore have that $\frac{dPD}{d\sigma_A} \geq 0$. In terms of maximising expected loan repayments, banks should therefore prefer to invest in countries with higher μ's and lower σ_A's.

However, as already argued in the main text, a country's business cycle is more aligned with that of some countries than with that of others. It can thus be beneficial to exploit the asynchronicity of business cycles by granting loans even to countries with a relatively risky individual lending environment, but where loans are more

[1] This is also borne out by our mean return estimates. Calculating a mean return as an input to the optimisation procedure for each of the $35 \cdot 5 = 175$ country-year combinations, (mildly) negative values are obtained in only six cases.

likely to be repaid precisely when conditions are bad in other countries. In our framework, this should be reflected in how strongly the asset value processes of countries' representative firms correlate, which we proxy by the estimates of bilateral correlations ρ of returns on national equity indices.

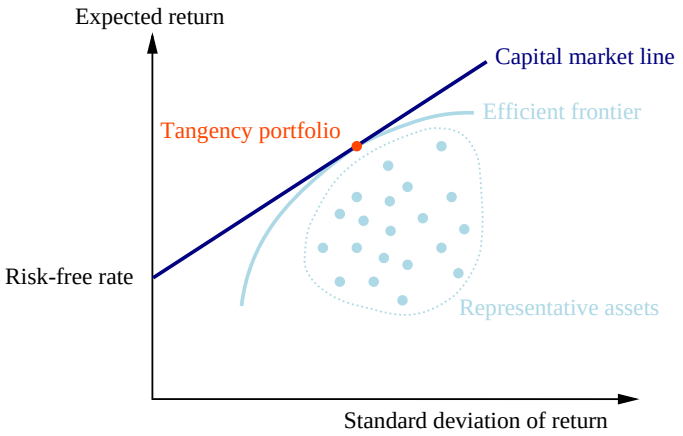
A.1.2 Portfolio optimisation and resampling

With μ's, σ_A's, and ρ's characterising the representative assets of countries in the sample, the efficient frontier can be traced out (see Figure A.3). It indicates the highest expected return for a given level of risk (ie, standard deviation of return) or, conversely, the lowest risk for a given level of expected return. The lower the correlations between the different representative assets' returns, the higher the potential benefits from international diversification will be, and the more the efficient frontier will shift towards the upper left.

Given the risk-free rate r, only investments that yield μ-σ combinations along the capital market line are optimal, which obtain as a mixture of the risky tangency portfolio and the riskless asset. However, by the Tobin (1958) separation theorem, the composition of the risky part of each bank's portfolio is equal to that of the tangency portfolio. Therefore, the latter helps us recover the optimal country weights as the relative amounts invested in countries' representative assets. For example, if five per cent of the tangency portfolio are invested in the equity index for France, the share for France before adjusting for credit demand (see 1.3) will also be five per cent. Due to the imposition of short-selling constraints, all weights are non-negative.

We estimate the inputs μ^i, σ_A^i, and $\rho^{i,j}$ for all countries $i, j = 1, ..., 35; i \neq j$ based on a nine-year rolling window of monthly euro/deutschmark returns of national MSCI Barra equity indices. The window length is chosen to ensure two things. First, we are interested in rather long windows to give reliable estimates of returns — the asset allocation literature often uses 120 months of data to this end —, and to

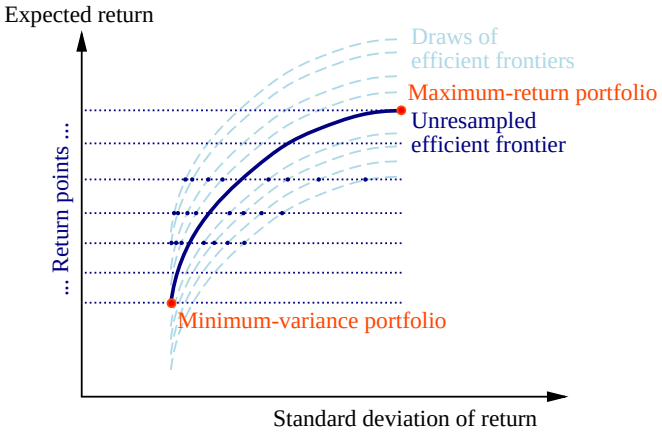
Figure A.3: **Mean-variance portfolio choice**



reflect country fundamentals through the business cycle rather than the impact of short-term developments, such as stock market rallies. Second, starting in 2003, we would like to consider a broad range of countries for reasons of identification. In particular, several Eastern European countries have a major foreign bank presence (see, eg, De Haas and Van Lelyveld, 2006; Havrylchyk and Jurzyk, 2011) and are of potentially strategic importance for German banks. We therefore decide to estimate return moments over a nine-year window to be able to include those countries for the 2003–2007 period as well.

As a further refinement, we *resample* the above mean-variance portfolios because these can be severely impaired when point estimates are treated as if they were known with certainty (Michaud, 1989), leading to unrealistically exclusive and/or unstable portfolios. The resampling approach is essentially a bootstrapping technique, as described in more detail in Jorion (1992), Michaud (1998), and Scherer (2002). The main idea is to calculate a separate efficient frontier and optimal representative-asset, ie tangency, portfolio for each draw, with the bootstrapped optimal portfolio obtaining as the average of portfolios from those draws. This is illustrated in Figure A.4.

Figure A.4: **Portfolio resampling**



In our case, we use a parametric method (see Scherer, 2002) and sample 1,000 times from a multivariate normal distribution characterised by our initial estimates of μ^i, σ_A^i, and $\rho^{i,j}$ to trace out a new efficient frontier for each draw. We then divide the return scale into 100 equally spaced points between the return associated with the minimum-variance portfolio of the unresampled efficient frontier and the maximum return of the unresampled efficient frontier. Afterwards, we compute for each draw the portfolio with the lowest standard deviation that generates the return value associated with each of the 100 return points, before forming an average over the composition of all 1,000 portfolios for each return point. Finally, the resampled frontier obtains by evaluating the averaged portfolios with the original, unresampled variance-covariance matrix. The resampled mean-variance portfolios weights indeed turn out to be more balanced and much less volatile.

A.2 Further information and results

Table A.1: **List of countries**

Name	Development	Region
Argentina	Emerging and developing	South America
Australia	Advanced	East Asia and Oceania
Austria	Advanced	Western Europe
Belgium	Advanced	Western Europe
Brazil	Emerging and developing	South America
Canada	Advanced	North America
Chile	Emerging and developing	South America
China	Emerging and developing	East Asia and Oceania
Colombia	Emerging and developing	South America
Czech Republic	Advanced	Eastern Europe
Denmark	Advanced	Western Europe
France	Advanced	Western Europe
Greece	Advanced	Western Europe
Hungary	Emerging and developing	Eastern Europe
India	Emerging and developing	South and Southeast Asia
Indonesia	Emerging and developing	South and Southeast Asia
Ireland	Advanced	Western Europe
Israel	Advanced	Middle East and Africa
Italy	Advanced	Western Europe
Japan	Advanced	East Asia and Oceania
Mexico	Emerging and developing	North America
Netherlands	Advanced	Western Europe
Norway	Advanced	Western Europe
Philippines	Emerging and developing	South and Southeast Asia
Poland	Emerging and developing	Eastern Europe
Russia	Emerging and developing	Eastern Europe
South Africa	Emerging and developing	Middle East and Africa
South Korea	Advanced	East Asia and Oceania
Spain	Advanced	Western Europe
Sweden	Advanced	Western Europe
Switzerland	Advanced	Western Europe
Thailand	Emerging and developing	South and Southeast Asia
Turkey	Emerging and developing	Middle East and Africa
United Kingdom	Advanced	Western Europe
United States	Advanced	North America

Notes — Countries are classified according to the IMF World Economic Outlook. Region is self-defined.

Table A.2: **Return characteristics, by development (year-end 2007)**

	Monthly return		Correlations	
	Mean	Std dev	Advanced	Emerging
Advanced economies	0.8%	5.3%	0.55	0.39
Emerging and developed economies	1.7%	9.5%		0.39

Notes — This table characterises the monthly return moments of the 35 representative assets in the sample by their individual means and standard deviations, and by correlations with the other assets. For individual return characteristics, the reported figures represent median values of the constituent assets' means and standard deviations of return for the given stage of economic development (see Table A.1). For correlations, the table reports the median of pairwise return correlations among constituent assets. All figures are based on nine years of monthly euro/deutschmark returns between January 1999 and December 2007. Section A.1 provides further details.

Table A.3: **Variable definitions**

Variable	Definition	Sources
Overweighting	Difference between actual country weights in a bank's portfolio and weights in the benchmark portfolio (see 1.3).	Deutsche Bundesbank *External Position Reports of German Banks*, MSCI Barra, OECD; authors' calculations and simulations
Outward FDI in the real sector (*FDI*)	Share of the destination country (relative to the sample) in real-sector outward FDI stocks of German real-sector companies.	Microdatabase Direct Investment, Deutsche Bundesbank (Lipponer, 2009)
Eurozone membership (*EURO*)	Dummy variable taking on a value of one if the destination country is a member of the eurozone; zero otherwise.	Authors' definition
Distance (*DIST*)	Logarithm of the great-circle distance between the most important cities or agglomerations of Germany and the destination country.	CEPII Gravity Dataset
Financial centre (*CENTRE*)	Dummy variable taking on a value of one if the destination country hosts a major international financial centre (United Kingdom, Ireland, Switzerland); zero otherwise.	Authors' definition
Overall institutional environment (*INSTITUTIONS*)	Index of Economic Freedom, ranging from 0 to 100, measuring the destination country's degree of economic freedom. This includes, for instance, the protection of property rights, absence of corruption, as well as bureaucratic and legal efficiency.	Heritage Foundation (2013)
Capital Regulatory Index (*CAPITAL*)	Index ranging from 0 to 9, measuring the regulatory requirements regarding the amount of capital and the sources of funds that qualify as regulatory capital. Higher values indicate greater stringency.	Bank Regulation and Supervision Database (Barth et al., 2001)

Private Monitoring Index (*TRANSPARENCY*)	Index ranging from 0 to 7, measuring the degree to which banks are subject to market or private supervision. Higher values indicate more private oversight.	Bank Regulation and Supervision Database
Official Supervisory Power Index (*SUPERVISION*)	Index ranging from 0 to 16, measuring the degree to which supervisors have the authority to take specific actions to prevent and correct problems. Higher values indicate more supervisory power.	Bank Regulation and Supervision Database
Entry into Banking Requirements Index (*ENTRY*)	Index ranging from 0 to 8, measuring the required legal submissions for obtaining a banking licence. Higher values indicate more restrictiveness.	Bank Regulation and Supervision Database
Restrictions on bank activities (*RESTRICT*)	Index ranging from 1 to 4, measuring the restrictions on banks with regard to securities, insurance, or real estate business and ownership of non-financial firms. Higher values indicate more restrictiveness.	Bank Regulation and Supervision Database
Government ownership (*GOVT*)	Percentage share of total bank assets controlled by government-owned banks.	Bank Regulation and Supervision Database
Private credit (*CREDIT*)	Domestic private credit to the real sector by deposit money banks, relative to GDP.	Financial Structure Database (Beck et al., 2010)
Stock market capitalisation (*STMKTCAP*)	Value of shares listed on the destination country's stock exchange, relative to its GDP.	Financial Structure Database
Net interest margin (*NIM*)	Accounting value of banks' net interest revenues as a share of their average interest-bearing assets, computed at the country level.	Financial Structure Database
Concentration (*CONC*)	Percentage share of deposits accounted for by the five largest banks.	Bank Regulation and Supervision Database

Table A.4: **Descriptive statistics**

	Mean	Median	Std dev	Minimum	Maximum
FDI	0.029	0.012	0.045	0.000	0.269
EURO	0.229	0	0.420	0	1
DIST	0.923	0.725	1.324	-1.751	2.807
CENTRE	0.086	0	0.280	0	1
INSTITUTIONS	66.004	65.300	8.810	50.600	82.600
CAPITAL	5.524	6	1.527	2	9
TRANSPARENCY	4.239	4	0.966	2	7
SUPERVISION	11.557	12	2.422	7	16
ENTRY	7.354	8	1.411	0	8
RESTRICT	2.302	2.250	0.598	1.000	3.500
GOVT	13.464	9.300	16.565	0.000	75.270
CREDIT	0.745	0.719	0.477	0.096	1.918
STMKTCAP	0.692	0.561	0.488	0.152	3.015
NIM	0.039	0.029	0.026	0.007	0.144
CONC	0.577	0.564	0.192	0.148	1.000

Notes — This table provides descriptive statistics of all variables used in the investigation. For definitions and data sources, see Table A.3.

Table A.5: **Variable correlations**

	Overweighting	*FDI*	*EURO*	*DIST*	*CENTRE*	*INSTITUTIONS*	*CAPITAL*	*TRANSPARENCY*	*SUPERVISION*	*ENTRY*	*RESTRICT*	*GOVT*	*CREDIT*	*STMKTCAP*	*NIM*	*CONC*
Overweighting	1.000															
FDI	0.576	1.000														
EURO	0.001	0.089	1.000													
DIST	-0.121	-0.202	-0.474	1.000												
CENTRE	0.334	0.258	-0.153	-0.350	1.000											
INSTITUTIONS	0.355	0.455	-0.024	-0.211	0.455	1.000										
CAPITAL	0.178	0.184	-0.028	-0.018	0.294	0.046	1.000									
TRANSPARENCY	0.201	0.185	-0.089	0.046	0.200	0.074	0.028	1.000								
SUPERVISION	0.089	0.091	-0.195	0.192	0.158	0.106	-0.093	-0.270	1.000							
ENTRY	0.063	0.170	-0.004	-0.241	0.155	0.122	0.147	0.120	0.070	1.000						
RESTRICT	-0.203	-0.141	-0.256	0.433	-0.387	-0.091	-0.245	-0.277	0.018	-0.276	1.000					
GOVT	-0.204	-0.335	-0.263	0.384	-0.120	-0.594	-0.120	-0.131	0.076	-0.244	0.257	1.000				
CREDIT	0.200	0.177	0.259	-0.427	0.519	0.694	0.126	0.208	-0.047	0.170	-0.306	-0.449	1.000			
STMKTCAP	0.313	0.379	-0.082	-0.137	0.691	0.641	0.116	0.223	0.146	-0.035	-0.188	-0.217	0.630	1.000		
NIM	-0.078	-0.153	-0.360	0.430	-0.211	-0.399	0.056	-0.142	0.325	-0.034	0.038	0.420	-0.597	-0.344	1.000	
CONC	-0.004	-0.207	0.281	-0.499	0.206	0.264	-0.167	-0.120	0.165	0.135	-0.329	-0.338	0.357	0.110	-0.189	1.000

Notes — This table shows the correlations among all variables used in the investigation. For definitions and data sources, see Table A.3.

Table A.6: **Robustness checks**

	Baseline	Weighting schemes		Bank level		Other samples	
		60/40	70/30	SIFIs	Interactions	Ex 2007	Ex US & UK
FDI	0.494***	0.591***	0.691***	0.468***	-0.715	0.595***	-0.027
	(0.125)	(0.125)	(0.125)	(0.115)	(2.329)	(0.114)	(0.142)
EURO	0.010	0.012*	0.015**	0.004	0.107	0.003	0.023***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.125)	(0.007)	(0.007)
DIST	-0.000	0.002	0.005	-0.000	-0.083	-0.002	-0.005**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.062)	(0.003)	(0.003)
CENTRE	0.046***	0.046***	0.045***	0.055***	-0.403*	0.042***	0.024**
	(0.014)	(0.014)	(0.014)	(0.016)	(0.223)	(0.014)	(0.010)
INSTITUTIONS	0.008***	0.009***	0.010***	0.007***	-0.008	0.007***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.028)	(0.002)	(0.002)
CAPITAL	0.007***	0.008***	0.009***	0.007***	0.006	0.007***	0.005***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.020)	(0.001)	(0.001)
TRANSPARENCY	0.005**	0.006***	0.007***	0.004*	0.050	0.005**	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.039)	(0.002)	(0.002)
ENTRY	0.006***	0.006***	0.006***	0.006**	-0.007	0.002	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.024)	(0.001)	(0.002)
RESTRICT	0.001	0.002	0.002	-0.000	0.030	0.003**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.022)	(0.001)	(0.001)
FDI × *Size*					0.064		
					(0.122)		
EURO × *Size*					-0.005		
					(0.007)		

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Robustness checks (continued)

DIST × *Size*					0.004		
					(0.003)		
CENTRE × *Size*					0.024**		
					(0.012)		
INSTITUTIONS × *Size*					0.001		
					(0.001)		
CAPITAL × *Size*					0.000		
					(0.001)		
TRANSPARENCY × *Size*					-0.002		
					(0.002)		
ENTRY × *Size*					0.001		
					(0.001)		
RESTRICT × *Size*					-0.002		
					(0.001)		
N	2,958	2,958	2,958	2,278	2,958	2,380	2,784
R^2	0.32	0.36	0.40	0.35	0.35	0.34	0.12

Notes — This table shows the robustness of our baseline results. For purposes of comparison, the first column reports the results from baseline specification (4) in Table 1.5. The second and third columns explore alternative weighting schemes for the benchmark portfolios by putting 60 (70) per cent on the weights from mean-variance optimisation and 40 (30) per cent on countries' relative GDP shares. The fourth and fifth columns show, respectively, regression results when the bank sample is restricted to those 14 banks classified as systemically important financial institutions (SIFIs) by the Deutsche Bundesbank, and when the baseline specification is augmented by interactions with *Size*, the log of banks' total assets. Note that level terms in the latter case are not directly comparable to those in the other specifications presented here because they refer to the impact of country-specific frictions for a hypothetical bank with $Size = 0$. Interaction terms, however, are indicative of potential differences in bank reactions to the frictions examined. Finally, the sixth and seventh columns report robustness tests that exclude the year 2007, in which the first signs of the US subprime mortgage crisis began to show, and the United States and United Kingdom as the two most overweighted countries in the sample.

Appendix B

Appendix to Chapter 2

Table B.1: **Sovereign bond yield data sources and availability**

Bloomberg (33 countries)	
1994	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, United Kingdom, United States (January), Switzerland (February)
1997	Portugal (February), Greece (July)
1998	Hong Kong (March), Singapore (June), India (November)
1999	Taiwan (April)
2000	Thailand (January), Czech Republic (April), South Korea (December)
2002	Slovakia (June), Romania (August)
2006	Israel (February)
2007	Slovenia (March)
2008	Iceland (April)
JP Morgan EMBI Global (41 countries)	
1994	Argentina, Mexico, Nigeria, Venezuela (January), China (March), Brazil (April), Bulgaria (July), Poland (October), South Africa (December)
1995	Ecuador (February)
1996	Turkey (June), Panama (July), Croatia (August), Malaysia (October)
1997	Colombia (February), Peru (March), Philippines, Russia (December)
1998	Lebanon (April)
1999	Hungary (January), Chile (May)
2000	Ukraine (May)
2001	Pakistan (January), Uruguay (May), Egypt (July), Dominican Republic (November)
2002	El Salvador (April)
2004	Indonesia (May)
2005	Serbia (July), Vietnam (November)
2007	Belize (March), Kazakhstan (June), Ghana, Jamaica (October), Sri Lanka (November), Gabon (December)
2008	Georgia (June)
2011	Jordan (January), Senegal (May), Lithuania, Namibia (November)

Notes — This table lists the sources of the sovereign bond yield data in the sample and the years in which the respective time series are first observed (months in parentheses). If there are gaps in the Bloomberg 10-year generic yield series, we add observations of 10-year generic yields from Datastream, ensuring that this does not induce structural breaks. Moreover, for some emerging countries we include 10-year generic yields until the EMBI Global series become available.

Table B.2: **Rating changes, by region**

Region	Upgrades	Downgrades
Caribbean	26	29
Central & Southwestern Asia	24	9
Central America	12	18
Central Europe	53	19
Eastern Asia	46	26
Eastern Europe	41	38
Middle East	61	24
North America	17	9
Northern Africa	5	14
Northern Asia	23	12
Northern Europe	23	14
Oceania	17	12
South America	108	77
Southeastern Asia	50	34
Southeastern Europe	55	32
Southern Asia	14	13
Southern Europe	28	54
Sub-Saharan Africa	23	10
Western Europe	9	18
	635	462

Notes — This table shows the regional distribution of the sample of 1,097 upgrade and downgrade announcements made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. Regions are defined based on the CIA World Factbook.

Table B.3: **Rating scales and transformation**

Characterisation of debt and issuer		Letter rating			Linear transformation
		S&P	Moody's	Fitch	
Highest quality	Investment grade	AAA	Aaa	AAA	17
High quality	Investment grade	AA+	Aa1	AA+	16
	Investment grade	AAA	Aa2	AA	15
	Investment grade	AA–	Aa3	AA–	14
Strong payment capacity	Investment grade	A+	A1	A+	13
	Investment grade	A	A2	A	12
	Investment grade	A–	A3	A–	11
Adequate payment capacity	Investment grade	BBB+	Baa1	BBB+	10
	Investment grade	BBB	Baa2	BBB	9
	Investment grade	BBB–	Baa3	BBB–	8
Likely to fulfil obligations, ongoing uncertainty	Speculative grade	BB+	Ba1	BB+	7
	Speculative grade	BB	Ba2	BB	6
	Speculative grade	BB–	Ba3	BB–	5
High credit risk	Speculative grade	B+	B1	B+	4
	Speculative grade	B	B2	B	3
	Speculative grade	B–	B3	B–	2
Very high credit risk	Speculative grade	CCC+	Caa1	CCC+	
	Speculative grade	CCC	Caa2	CCC	
	Speculative grade	CCC–	Caa3	CCC–	
Near default with possibility of recovery	Speculative grade	CC	Ca	CC	1
	Speculative grade			C	
Default	Speculative grade	SD	C	DDD	
	Speculative grade	D		DD	
	Speculative grade			D	

Notes — This table shows how the letter ratings used by Standard & Poor's S&P, Moody's, and Fitch correspond to one another and to different degrees of credit risk, and how they are mapped into the linear 17-notch scale used in the investigation. The transformation is the same as in Afonso et al. (2012), from which this table is adapted.

Table B.4: **Variable definitions**

Variable	Definition	Sources
$\Delta Spread$	Change in the non-event country spread vis-à-vis US Treasuries of comparable maturity over the two-trading-day window $[-1, +1]$ around the rating announcement (day 0), measured in percentage points.	Bloomberg, Datastream, JP Morgan, US Department of the Treasury
LARGE	Dummy variable taking on a value of one for "large" rating changes of two notches or more; zero otherwise. Notches are measured according to the linear transformation in Table B.3.	Standard & Poor's, Moody's, Fitch
InitRat	Credit rating held by the event country with the announcing CRA prior to the event, measured on the 17-notch scale from Table B.3.	Standard & Poor's, Moody's, Fitch
$\Delta InitRat$	Absolute difference between *InitRat* and the average of all credit ratings held by the non-event country with the three CRAs, measured on the 17-notch scale from Table B.3.	Standard & Poor's, Moody's, Fitch
OnWatch	Dummy variable taking on a value of one if the event country was on watch, or review, by the announcing CRA at the time of the event; zero otherwise.	Standard & Poor's, Moody's, Fitch
SimActsWdwEvt	Number of upgrade (downgrade) announcements made on the event country by respective other CRAs over the two-week interval $[-14, -1]$ (calendar days) before the upgrade (downgrade) event.	Standard & Poor's, Moody's, Fitch
SimActsDayNonEvt	Number of upgrade (downgrade) announcements made on the non-event country by any CRA on the same day as the upgrade (downgrade) of the event country.	Standard & Poor's, Moody's, Fitch

VIX	Volatility measure for the Standard & Poor's 500 stock market index in the United States.	Bloomberg
Region	Dummy variable taking on a value of one if the event and non-event country belong to the same geographical region (also see Table B.2); zero otherwise.	CIA World Factbook
TradeBloc	Dummy variable taking on a value of one if the event and non-event country are members of a common major trade bloc; zero otherwise. The trade blocs are: EU, NAFTA, ASEAN, Mercosur, CARICOM, Andean Community, Gulf Cooperation Council, Southern African Customs Union, Economic Community of Central African States, Economic Community of West African States, Organisation of Eastern Caribbean States.	Authors' definition
ExpImpEvt	Importance of the event to the non-event country in terms of exports, measured as the non-event country's ratio of exports to the event country to domestic GDP.	World Bank
CapOpen(Non)Evt	*De jure* measure of the event (non-event) country's degree of capital account openness. Based on dummy variables, it codifies the restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions.	Chinn and Ito (2006)
SizeEvt	Size of the event country, measured in logs of US dollar GDP.	World Bank
$\Delta Size$	Size differential of the event over the non-event country, measured in logs of US dollar GDP.	World Bank
$\Delta TrendGrowth$	Absolute difference between the event and non-event country's GDP trend growth, calculated for the sample period 1994–2011 on the basis of annual data using a Hodrick-Prescott filter with smoothing parameter 6.25.	World Bank

Table B.5: **Baseline regressions — Pooling all rating changes**

LARGE	0.0102
	(0.0064)
LARGE × *Down*	0.0178**
	(0.0087)
InitRat	-0.0012
	(0.0008)
InitRat × *Down*	-0.0005
	(0.0009)
Δ*InitRat*	-0.0005
	(0.0006)
Δ*InitRat* × *Down*	0.0012
	(0.0008)
OnWatch	-0.0023
	(0.0056)
OnWatch × *Down*	-0.0153*
	(0.0078)
SimActsWdwEvt	-0.0036
	(0.0053)
SimActsWdwEvt × *Down*	0.0206**
	(0.0082)
SimActsDayNonEvt	0.0935*
	(0.0541)
SimActsDayNonEvt × *Down*	0.0598
	(0.0849)
VIX	-0.0001
	(0.0004)
VIX × *Down*	0.0008**
	(0.0004)
Down	-0.0217
	(0.0141)
N	51,881
Event countries	104
Non-event countries	73
Rating actions	1,022
R^2	0.0183

Notes — This table shows regressions based on the full baseline specification (see column (3) in Table 2.1) after pooling 635 upgrades and 462 downgrades made by Standard & Poor's, Moody's, and Fitch between 1994 and 2011. For reasons of comparability, the dependent variable equals Δ*Spread* for downgrades, and -Δ*Spread* for upgrades. *Down* is a dummy variable taking on a value of one for downgrades, and zero otherwise. The interaction term *LARGE* × *Down* indicates that there is a statistically significant difference between the absolute coefficients for upgrades and downgrades.

Table B.6: **Baseline regressions, downgrades — Robustness checks I**

	Baseline	Ex notches ≥ 4	Ex notches ≥ 3	Crises	S&P effect?	Endogenous downgrades?
LARGE	0.0207***	0.0206***	0.0263***	0.0184***	0.0273***	0.0179**
	(0.0066)	(0.0068)	(0.0077)	(0.0063)	(0.0065)	(0.0078)
InitRat	-0.0008	-0.0020	-0.0019	-0.0006	-0.0010	-0.0061***
	(0.0017)	(0.0018)	(0.0019)	(0.0017)	(0.0017)	(0.0023)
Δ*InitRat*	0.0008	0.0007	-0.0001	0.0008	0.0008	-0.0014
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0011)
OnWatch	-0.0046	-0.0026	0.0023	-0.0048	-0.0052	0.0291***
	(0.0054)	(0.0056)	(0.0059)	(0.0055)	(0.0054)	(0.0071)
SimActsWdwEvt	0.0141**	0.0173***	0.0192***	0.0138**	0.0140**	-0.0080
	(0.0065)	(0.0066)	(0.0074)	(0.0065)	(0.0065)	(0.0055)
SimActsDayNonEvt	0.1477**	0.1540**	0.1538**	0.1472**	0.1480**	0.2223***
	(0.0648)	(0.0658)	(0.0674)	(0.0649)	(0.0649)	(0.0712)
VIX	0.0006*	0.0008**	0.0008**	0.0006*	0.0006*	0.0013***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
Euro $\times$ *LARGE*				0.0107		
				(0.0118)		
Asian $\times$ *LARGE*				0.0261		
				(0.0395)		

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Baseline regressions, downgrades — Robustness checks I (continued)

S&P × *LARGE*					-0.0234*	
					(0.0128)	
Δ*Spread* [−15, −1]						0.0131***
						(0.0026)
N	21,931	21,519	20,510	21,931	21,931	13,953
Event countries	84	84	84	84	84	47
Non-event countries	73	73	73	73	73	73
Downgrades	427	418	399	427	427	268
R^2	0.0423	0.0434	0.0437	0.0423	0.0425	0.0551

Notes — This table shows the robustness of our baseline results on the main variable of interest, *LARGE*. For purposes of comparison, the first column reports the results from the full baseline specification for downgrades (see Panel B, column (3) in Table 2.1). Since we group all rating downgrades of two notches or more into a single bin, we ensure that our findings are not driven by downgrades of four and three notches or more, respectively, by dropping those rating events from the sample (Ex notches ≥ 4, Ex notches ≥ 3). Moreover, to check that the results are not solely due to the main crisis episodes over the sample period, namely the eurozone and Asian crises, we add two dummy variables, *Euro* and *Asian*, and interact them with the large-change dummy (Crises). *Euro* takes on a value of one if the downgrade was announced in 2010 or 2011 and if both the event and non-event country were members of the eurozone at that time, and zero otherwise. Similarly, *Asian* takes on a value of one for all downgrades between July 1997 and December 1998 in which both the event and the non-event country are from either of the following countries: Indonesia, Malaysia, Philippines, Singapore, South Korea, Thailand. We also interact the large-change dummy with *S&P*, which takes on a value of one if the downgrade was announced by Standard & Poor's, to test whether this agency's relatively infrequent large downgrades (see Figure B.1) account for our results (S&P effect?). Finally, we add Δ*Spread* [−15, −1], the change in the event country's spread over the 14-day period before the announcement, to control for downgrades that may have come about as timely reactions to adverse spread developments (Endogenous downgrades?).

Table B.7: **Baseline regressions, downgrades — Robustness checks II**

		Window length		Same day actions	
	Baseline	Seven days	21 days		
LARGE	0.0207***	0.0207***	0.0200***	0.0166**	0.0208***
	(0.0066)	(0.0066)	(0.0067)	(0.0065)	(0.0066)
InitRat	-0.0008	-0.0011	-0.0009	-0.0007	-0.0008
	(0.0017)	(0.0017)	(0.0017)	(0.0014)	(0.0017)
Δ*InitRat*	0.0008	0.0008	0.0008	0.0005	0.0008
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
OnWatch	-0.0046	-0.0029	-0.0044	-0.0040	-0.0047
	(0.0054)	(0.0055)	(0.0055)	(0.0054)	(0.0054)
SimActsWdwEvt	0.0141**	0.0244**	0.0175***		0.0143**
	(0.0065)	(0.0109)	(0.0063)		(0.0067)
SimActsDayNonEvt	0.1477**	0.1489**	0.1481**	0.1654***	0.1477**
	(0.0648)	(0.0646)	(0.0649)	(0.0634)	(0.0648)
VIX	0.0006*	0.0007*	0.0006*	0.0007**	0.0006*
	(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0004)

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Baseline regressions, downgrades — Robustness checks II (continued)

SimActsDayEvt				0.0173	-0.0024
				(0.0146)	(0.0151)
N	21,931	21,931	21,895	23,252	21,931
Event countries	84	84	84	95	84
Non-event countries	73	73	73	73	73
Downgrades	427	427	426	453	427
R^2	0.0423	0.0425	0.0426	0.0430	0.0423

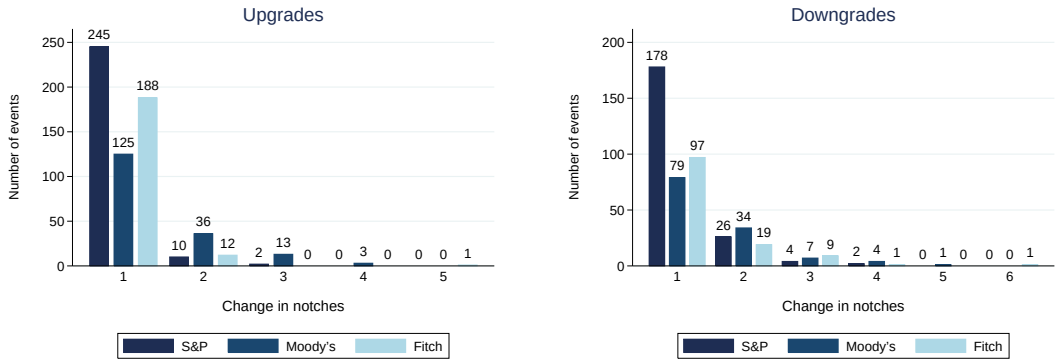
Notes — This table shows the robustness of our baseline results with regard to variables on clustering and anticipation. For purposes of comparison, the first column reports the results from the full baseline specification for downgrades (see Panel B, column (3) in Table 2.1). The second and third columns report regression results when the within-clustering control *SimActsWdwEvt* takes on the number of downgrades announced by other agencies before the respective downgrade over a seven and 21-day period, respectively, as opposed to a 14-day period in the baseline. The fourth and fifth columns add as replacement and additional control, respectively, *SimActsDayEvt*. The latter indicates the number of downgrades announced by other agencies on the day of the respective downgrade.

Table B.8: **Spillover channels, downgrades — Different trade measures**

	Trade measure			
	ExpImpEvt	*TradeImpEvt*	*ExpShEvt*	*TradeShEvt*
LARGE	0.0244***	0.0246***	0.0244***	0.0246***
	(0.0073)	(0.0073)	(0.0073)	(0.0073)
InitRat	-0.0031	-0.0030	-0.0031	-0.0030
	(0.0021)	(0.0021)	(0.0021)	(0.0021)
Δ*InitRat*	0.0013	0.0013	0.0013	0.0013
	(0.0011)	(0.0011)	(0.0011)	(0.0011)
OnWatch	-0.0003	-0.0005	-0.0003	-0.0004
	(0.0059)	(0.0060)	(0.0059)	(0.0060)
SimActsWdwEvt	0.0141**	0.0145**	0.0141**	0.0145**
	(0.0069)	(0.0069)	(0.0069)	(0.0069)
SimActsDayNonEvt	0.1136*	0.1129*	0.1137*	0.1129*
	(0.0619)	(0.0619)	(0.0619)	(0.0619)
VIX	0.0005	0.0005	0.0005	0.0005
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Region	0.0348**	0.0324*	0.0345**	0.0326*
	(0.0168)	(0.0167)	(0.0168)	(0.0167)
TradeBloc	0.0120	0.0139	0.0118	0.0139
	(0.0121)	(0.0122)	(0.0120)	(0.0121)
Trade measure	**0.0580**	**0.0517**	**0.0298**	**0.0247**
	(0.2268)	**(0.1143)**	**(0.0659)**	**(0.0538)**
CapOpenEvt	0.0126**	0.0131**	0.0127**	0.0131**
	(0.0063)	(0.0063)	(0.0063)	(0.0063)
CapOpenNonEvt	0.0081	0.0088	0.0081	0.0088
	(0.0088)	(0.0088)	(0.0088)	(0.0089)
SizeEvt	0.0247	0.0259	0.0244	0.0258
	(0.0330)	(0.0333)	(0.0330)	(0.0332)
Δ*Size*	-0.0146	-0.0187	-0.0144	-0.0186
	(0.0253)	(0.0255)	(0.0253)	(0.0255)
Δ *TrendGrowth*	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
N	19,724	19,511	19,715	19,502
Event countries	79	79	79	79
Non-event countries	70	70	70	70
Downgrades	405	405	405	405
R^2	0.0434	0.0435	0.0434	0.0435

Notes — This table shows the robustness of our results on the spillover channels of downgrade announcements to different measures of bilateral trade linkages. For purposes of comparison, we first report the results from the most comprehensive specification using *ExpImpEvt*, the non-event country's exports to the event country relative to non-event country GDP (see column (7) in Table 2.3). Alternatively, we use *TradeImpEvt*, which is bilateral trade (imports + exports) with the event country relative to non-event country GDP. Finally, *ExpShEvt* and *TradeShEvt* measure the event country's share in the non-event country's total exports and total bilateral trade, respectively.

Figure B.1: **Distribution of rating changes, by agency**



Notes — This figure shows the distribution of the severity of rating changes by agency, measured on a 17-notch scale (see Table B.3). Numbers are based on the sample of 1,097 rating announcements (635 upgrades, 462 downgrades) made by Standard & Poor's (S&P), Moody's, and Fitch between 1994 and 2011.

Appendix C

Appendix to Chapter 3

Table C.1: **Borrower countries in the estimation sample**

Country	Number of deals	Country	Number of deals
China	688	Kuwait	17
Indonesia	557	Ghana	16
Brazil	491	Oman	16
Thailand	455	Morocco	15
India	421	Côte d'Ivoire	14
Mexico	375	Angola	12
Malaysia	263	Guatemala	12
Russia	251	Bahamas	11
Philippines	213	Cyprus	10
Chile	211	Estonia	9
Argentina	199	Jordan	9
Turkey	138	Bulgaria	8
Venezuela	101	Papua New Guinea	8
Saudi Arabia	93	Uruguay	8
Colombia	81	Zimbabwe	8
Poland	78	El Salvador	7
Hungary	77	Zambia	7
United Arab Emirates	72	Iran	6
Pakistan	71	Sri Lanka	6
Czech Republic	65	Trinidad and Tobago	6
South Africa	62	Dominican Republic	5
Nigeria	51	Ecuador	5
Slovak Republic	44	Mali	5
Peru	43	Lithuania	4
Egypt	39	Mauritius	4
Vietnam	37	Kenya	3
Croatia	31	Bangladesh	2
Ukraine	27	Cameroon	2
Bahrain	22	Costa Rica	2
Qatar	21	Lao PDR	2
Tunisia	19	Bolivia	1
Algeria	18	Guinea	1
Kazakhstan	18	Latvia	1
Panama	18	Lebanon	1

Notes — This table shows the 68 emerging and developing countries in the estimation sample used for both the aggregate and micro-level analysis, including the total number of deals considered for each country. The numbers refer to deals that directly enter the regressions. They are therefore net of the first five deals in each country that determine early or late-participant status.

Table C.2: **Variable definitions**

Variable	Definition	Source
Participation (*Partic*)	Dummy variable taking on a value of one if a parent bank participates in a given syndicated loan deal; zero otherwise.	Dealogic Loan Analytics
Participation share (*Share*)	Share of participation in the syndicate by the stated group of parent banks, measured in per cent. The variable is defined in terms of the number of parent banks that signed up for participation. Let n_A the number of parent banks on the deal that belong to some group A, and n_T the total number of parent banks, then the variable takes on the value $n_A/n_T \cdot 100$, irrespective of the loan volumes provided.	Dealogic Loan Analytics
Early participant (*Early*)	Dummy variable taking on a value of one if a foreign parent bank has participated in at least one of the early syndicated loan deals in a given country; zero otherwise. It is generally defined on the basis of the first five recorded deals, unless stated otherwise.	Dealogic Loan Analytics
GDP growth (ΔGDP)	Change in real GDP over the previous year in the borrowing firm's country of incorporation, measured in per cent. Analogously, the measure refers to the foreign parent bank's country of incorporation where stated.	World Bank
Deal value	Total volume of the loan deal, supplied by all foreign and domestic banks on the syndicate, measured in logs of US$ mn.	Dealogic Loan Analytics
Deal maturity	Maturity of the loan deal, measured in years. In case of deals with multiple tranches, it takes the value of the maturity averaged across tranches, weighted by the different tranches' volumes.	Dealogic Loan Analytics
Deal spread	Spread of the loan interest rate over the agreed reference rate (eg, LIBOR), measured in basis points.	Dealogic Loan Analytics
Reserve currency	Dummy variable taking on a value of one if the deal has been signed in a major reserve currency (US Dollar, Euro/Deutschmark, Pound Sterling, Japanese Yen, Swiss Franc); zero otherwise. In case of deals with multiple tranches, it takes on a value of one if at least one tranche has been agreed in a major reserve currency.	Dealogic Loan Analytics
Private borrower	Dummy variable taking on a value of one if the borrower in the deal is from the private sector; zero otherwise.	Dealogic Loan Analytics

GDP per capita	GDP per capita in the borrowing firm's country of incorporation, measured in logs of constant 2005 US$.	World Bank
Domestic credit	Domestic credit in the borrowing firm's country of incorporation provided to various sectors, excluding the central government, by monetary authorities and deposit money banks, measured in per cent of GDP.	World Bank
Sudden stop	Dummy variable taking on a value of one if the deal was signed while the borrowing firm's country of incorporation was subject to a systemic sudden stop episode; zero otherwise.	Calvo et al. (2008)
Systemic banking crisis	Dummy variable taking on a value of one if the deal was signed while the banking system in the borrowing firm's country of incorporation was in a systemic crisis; zero otherwise.	Laeven and Valencia (2012)
Prior lending to country	Dummy variable taking on a value of one if a foreign parent bank has participated in a syndicated loan deal in the borrowing firm's country of incorporation prior to the loan deal in question; zero otherwise.	Dealogic Loan Analytics
Prior local lending in country	Dummy variable taking on a value of one if a foreign parent bank has participated in a syndicated loan deal in the borrowing firm's country of incorporation prior to the loan deal in question, and has done so through a local affiliate; zero otherwise.	Dealogic Loan Analytics
Prior lending to borrower	Dummy variable taking on a value of one if a foreign parent bank has participated in a syndicated loan deal with the borrowing firm prior to the loan deal in question; zero otherwise.	Dealogic Loan Analytics
Prior lending to borrower parent	Dummy variable taking on a value of one if a foreign parent bank has participated in a syndicated loan deal with the borrowing firm's parent company prior to the loan deal in question; zero otherwise.	Dealogic Loan Analytics
Distance	Great-circle distance between the most important cities or agglomerations of the countries of incorporation of the foreign parent bank and the borrowing firm, respectively, measured in kilometres.	CEPII Gravity Dataset (Mayer and Zignano, 2011)
Common language	Dummy variable taking on a value of one if the countries of incorporation of the foreign parent bank and the borrowing firm share a common official language; zero otherwise.	CEPII Gravity Dataset
Coloniser	Dummy variable taking on a value of one if the foreign parent bank's country of incorporation used to be a coloniser of the borrowing firm's country of incorporation; zero otherwise.	CEPII Gravity Dataset

Table C.3: **Sensitivity of deal-variable distributions to the business cycle**

Variable	Mean	10^{th} pct	25^{th} pct	50^{th} pct	75^{th} pct	90^{th} pct
Deal value		-4.3521	-4.2800	-3.5685	-0.0864	1.9282
		(0.1901)	(0.1887)	(0.2966)	(0.9857)	(0.7366)
Deal maturity		0.0162	0.0081	0.0422	0.0441	0.0547
		(0.7213)	(0.8562)	(0.3160)	(0.3373)	(0.1992)
Deal spread		0.2197	-0.4631	-1.7058	-3.0034	-5.5295
		(0.8510)	(0.6888)	(0.2379)	(0.1064)	(0.1336)
Deal in reserve currency	-0.0017					
	(0.1499)					

Notes — This table shows the coefficients on ΔGDP in regressions with the stated mean (for the binary reserve-currency variable) or percentiles (for the continuous variables deal value, deal maturity, and deal spread) as dependent variables. The mean and percentiles of the respective variables obtain by collapsing and summarising the 5,593 deals from the estimation sample at the country-year level. To capture the sensitivity of deal-variable distributions to the business cycle *within countries*, I then use the fixed-effects estimator on the resulting unbalanced panel of 793 country-year observations, including year dummies to account for global factors that affect deal-variable distributions across all countries equally. P-values based on robust standard errors in parentheses. ***, **, and * denote significance at the 1, 5, and 10 per cent levels, respectively.

Table C.4: **Linear probability model regressions, different sets of banks**

	All	All ex JPN	Dev	Dev ex JPN
Early	0.8862***	1.0240***	0.9319***	1.1297***
	(0.2234)	(0.2451)	(0.2533)	(0.2656)
ΔGDP	0.0142	-0.0151	0.0088	-0.0321
	(0.0297)	(0.0317)	(0.0366)	(0.0373)
$\Delta GDP \times Early$	-0.0327	-0.1050***	-0.0162	-0.1034***
	(0.0324)	(0.0342)	(0.0375)	(0.0385)
Prior lending to country	0.1379	-0.0342	0.1918	-0.0540
	(0.1751)	(0.1788)	(0.2037)	(0.2074)
Prior local lending in country	7.0119***	7.1794***	7.3523***	7.5276***
	(1.1109)	(1.1745)	(1.2184)	(1.2889)
Prior lending to borrower	9.4428***	9.4755***	9.5955***	9.7028***
	(0.5245)	(0.5538)	(0.5441)	(0.5680)
Prior lending to borrower parent	5.8232***	6.1826***	6.1770***	6.6361***
	(0.5343)	(0.5314)	(0.5477)	(0.5460)
Distance	-0.0003***	-0.0004***	-0.0003***	-0.0004*
	(0.0000)	(0.0001)	(0.0000)	(0.0002)
Common language	1.3469***	1.3301***	0.8604**	1.1179***
	(0.2479)	(0.2634)	(0.3777)	(0.4010)
Coloniser	2.1399***	2.2483***	2.6320***	2.5678***
	(0.4785)	(0.4673)	(0.4433)	(0.4397)
GDP growth in parent bank country	0.0449***	0.0075	0.1123***	0.0204
	(0.0122)	(0.0123)	(0.0286)	(0.0275)
$\Delta GDP \times$ Prior lending to country	0.0155	0.0284	0.0275	0.0471*
	(0.0229)	(0.0231)	(0.0266)	(0.0262)
$\Delta GDP \times$ Prior local lending in country	-0.3211**	-0.3534**	-0.3669**	-0.4054***
	(0.1328)	(0.1384)	(0.1458)	(0.1505)

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Linear probability model regressions, different sets of banks (continued)

$\Delta GDP \times$ Distance	-0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
$\Delta GDP \times$ Coloniser	-0.0249	-0.0284	-0.0927	-0.0829
	(0.0695)	(0.0672)	(0.0635)	(0.0592)
$\Delta GDP \times$ Common language	-0.0081	0.0091	0.0639	0.0684
	(0.0292)	(0.0294)	(0.0425)	(0.0434)
Deal value	1.1818***	1.1764***	1.3641***	1.3999***
	(0.0651)	(0.0661)	(0.0753)	(0.0741)
Deal maturity	-0.0483***	-0.0649***	-0.0270	-0.0425**
	(0.0185)	(0.0191)	(0.0220)	(0.0215)
Deal spread	-0.0001	0.0003*	-0.0004	0.0002
	(0.0003)	(0.0002)	(0.0003)	(0.0002)
Deal in reserve currency	0.9030***	0.8672***	1.0281***	1.0146***
	(0.1409)	(0.1438)	(0.1595)	(0.1652)
Private-sector borrower	0.5458**	1.0478***	0.6798**	1.3933***
	(0.2637)	(0.2934)	(0.3031)	(0.3473)
GDP per capita	-0.6289**	-0.4507	-0.6965**	-0.4967*
	(0.2647)	(0.2984)	(0.3231)	(0.3008)
Domestic credit	0.0010	-0.0009	0.0022	-0.0003
	(0.0030)	(0.0032)	(0.0037)	(0.0038)
Sudden stop	-0.2705	-0.2314	-0.2420	-0.1812
	(0.2118)	(0.2221)	(0.2523)	(0.2738)
Systemic banking crisis	-0.4126***	-0.4182***	-0.5340***	-0.5739***
	(0.1469)	(0.1530)	(0.1805)	(0.1836)
N	1,112,847	940,537	898,121	725,811
R^2	0.1315	0.1291	0.1395	0.1375

Notes — This table shows linear probability model regressions explaining the participation of a foreign parent bank in a syndicated loan deal based on specification (5) from Table 3.4 for different sets of foreign parent banks. "All" replicates the results from column (5) in Table 3.4, where all 1,174 foreign parent banks have been considered. "All ex JPN" drops Japanese parent banks, leaving a total of 1,060 banks. "Dev" reports results for the set of 823 foreign banks that come from developed economies, and "Dev ex JPN" focuses on the subset of 707 non-Japanese banks from developed economies.

Table C.5: **Robustness to clustering schemes**

	All banks			All banks excluding Japan		
	CY & BY	CB & BY	CB & CY	CY & BY	CB & BY	CB & CY
Early	0.8862***	0.8862**	0.8862**	1.0240***	1.0240***	1.0240***
	(0.2234)	(0.3496)	(0.3759)	(0.2451)	(0.3617)	(0.3808)
ΔGDP	0.0142	0.0142	0.0142	-0.0151	-0.0151	-0.0151
	(0.0297)	(0.0191)	(0.0357)	(0.0317)	(0.0198)	(0.0312)
$\Delta GDP \times Early$	-0.0327	-0.0327	-0.0327	-0.1050***	-0.1050**	-0.1050**
	(0.0324)	(0.0428)	(0.0474)	(0.0342)	(0.0418)	(0.0448)
Prior lending to country	0.1379	0.1379	0.1379	-0.0342	-0.0342	-0.0342
	(0.1751)	(0.1395)	(0.1992)	(0.1788)	(0.1466)	(0.1871)
Prior local lending in country	7.0119***	7.0119***	7.0119***	7.1794***	7.1794***	7.1794***
	(1.1109)	(0.8488)	(1.2701)	(1.1745)	(0.9062)	(1.3332)
Prior lending to borrower	9.4428***	9.4428***	9.4428***	9.4755***	9.4755***	9.4755***
	(0.5245)	(0.3114)	(0.5569)	(0.5538)	(0.3304)	(0.5779)
Prior lending to borrower parent	5.8232***	5.8232***	5.8232***	6.1826***	6.1826***	6.1826***
	(0.5343)	(0.3881)	(0.5677)	(0.5314)	(0.4105)	(0.5706)
Distance	-0.0003***	-0.0003***	-0.0003***	-0.0004***	-0.0004***	-0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Common language	1.3469***	1.3469***	1.3469***	1.3301***	1.3301***	1.3301***
	(0.2479)	(0.3074)	(0.3613)	(0.2634)	(0.3076)	(0.3460)
Coloniser	2.1399***	2.1399***	2.1399***	2.2483***	2.2483***	2.2483***
	(0.4785)	(0.5675)	(0.6678)	(0.4673)	(0.5659)	(0.6326)
GDP growth in parent bank country	0.0449***	0.0449***	0.0449***	0.0075	0.0075	0.0075
	(0.0122)	(0.0102)	(0.0139)	(0.0123)	(0.0096)	(0.0110)
$\Delta GDP \times$ Prior lending to country	0.0155	0.0155	0.0155	0.0284	0.0284*	0.0284
	(0.0229)	(0.0152)	(0.0271)	(0.0231)	(0.0160)	(0.0236)
$\Delta GDP \times$ Prior local lending in country	-0.3211**	-0.3211***	-0.3211**	-0.3534**	-0.3534***	-0.3534**
	(0.1328)	(0.0917)	(0.1474)	(0.1384)	(0.0972)	(0.1497)

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Robustness to clustering schemes (continued)

$\Delta GDP \times$ Distance	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0002)
$\Delta GDP \times$ Coloniser	-0.0249	-0.0249	-0.0249	-0.0284	-0.0284	-0.0284
	(0.0695)	(0.0617)	(0.0874)	(0.0672)	(0.0614)	(0.0740)
$\Delta GDP \times$ Common language	-0.0081	-0.0081	-0.0081	0.0091	0.0091	0.0091
	(0.0292)	(0.0314)	(0.0401)	(0.0294)	(0.0315)	(0.0366)
Deal value	1.1818***	1.1818***	1.1818***	1.1764***	1.1764***	1.1764***
	(0.0651)	(0.0498)	(0.0722)	(0.0661)	(0.0541)	(0.0657)
Deal maturity	-0.0483***	-0.0483***	-0.0483**	-0.0649***	-0.0649***	-0.0649***
	(0.0185)	(0.0096)	(0.0211)	(0.0191)	(0.0104)	(0.0184)
Deal spread	-0.0001	-0.0001	-0.0001	0.0003*	0.0003	0.0003
	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0004)
Deal in reserve currency	0.9030***	0.9030***	0.9030***	0.8672***	0.8672***	0.8672***
	(0.1409)	(0.0918)	(0.1655)	(0.1438)	(0.0965)	(0.1476)
Private-sector borrower	0.5458**	0.5458***	0.5458**	1.0478***	1.0478***	1.0478***
	(0.2637)	(0.1603)	(0.2770)	(0.2934)	(0.1704)	(0.3066)
GDP per capita	-0.6289**	-0.6289***	-0.6289**	-0.4507	-0.4507**	-0.4507
	(0.2647)	(0.2072)	(0.2969)	(0.2984)	(0.2122)	(0.2929)
Domestic credit	0.0010	0.0010	0.0010	-0.0009	-0.0009	-0.0009
	(0.0030)	(0.0022)	(0.0034)	(0.0032)	(0.0024)	(0.0034)
Sudden stop	-0.2705	-0.2705**	-0.2705	-0.2314	-0.2314*	-0.2314
	(0.2118)	(0.1074)	(0.2267)	(0.2221)	(0.1221)	(0.2227)
Systemic banking crisis	-0.4126***	-0.4126***	-0.4126***	-0.4182***	-0.4182***	-0.4182***
	(0.1469)	(0.1078)	(0.1488)	(0.1530)	(0.1174)	(0.1373)
N	1,112,847	1,112,847	1,112,847	940,537	940,537	940,537
R^2	0.1315	0.1315	0.1315	0.1291	0.1291	0.1291

Notes — This table shows linear probability models explaining the participation of a foreign parent bank in a syndicated loan deal based on specification (5) from Table 3.4 under alternative clustering schemes. For the set of all parent banks and that excluding Japanese banks, the first columns repeat the baseline results of two-way clustering at the country-year ("CY") and bank-year ("BY") levels for comparison. The second columns refer to two-way clustering at the country-bank ("CB") and bank-year levels, while the third columns show results when clustering at the country-bank and country-year levels.

Table C.6: **Robustness to early-participation measures, all banks**

	Number of first deals			Deals per country	
	Five	Three	10	At least 30	At least 50
Early	0.8862***	1.0180***	1.4215***	0.9425***	0.8602***
	(0.2234)	(0.2920)	(0.2038)	(0.2249)	(0.2240)
ΔGDP	0.0142	0.0217	0.0140	0.0161	0.0141
	(0.0297)	(0.0301)	(0.0305)	(0.0277)	(0.0277)
$\Delta GDP \times Early$	-0.0327	0.0193	-0.0524*	-0.0476	-0.0447
	(0.0324)	(0.0404)	(0.0301)	(0.0328)	(0.0328)
Prior lending to country	0.1379	0.1680	0.0035	0.2818	0.3170*
	(0.1751)	(0.1790)	(0.1679)	(0.1733)	(0.1738)
Prior local lending in country	7.0119***	7.0202***	6.8438***	6.8639***	6.7000***
	(1.1109)	(1.1077)	(1.0994)	(1.1035)	(1.1025)
Prior lending to borrower	9.4428***	9.4866***	9.4063***	9.2502***	9.2232***
	(0.5245)	(0.5166)	(0.5273)	(0.5298)	(0.5373)
Prior lending to borrower parent	5.8232***	5.7989***	5.8074***	5.7589***	5.7149***
	(0.5343)	(0.5751)	(0.5117)	(0.5065)	(0.5068)
Distance	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Common language	1.3469***	1.4361***	1.3402***	1.0663***	1.0777***
	(0.2479)	(0.2440)	(0.2579)	(0.2421)	(0.2438)
Coloniser	2.1399***	2.1759***	2.1556***	2.4352***	2.2983***
	(0.4785)	(0.4819)	(0.4626)	(0.4732)	(0.4762)
GDP growth in parent bank country	0.0449***	0.0432***	0.0489***	0.0445***	0.0432***
	(0.0122)	(0.0162)	(0.0122)	(0.0118)	(0.0118)
$\Delta GDP \times$ Prior lending to country	0.0155	0.0045	0.0270	0.0238	0.0225
	(0.0229)	(0.0238)	(0.0214)	(0.0225)	(0.0224)
$\Delta GDP \times$ Prior local lending in country	-0.3211**	-0.3292**	-0.3110**	-0.3075**	-0.3059**
	(0.1328)	(0.1312)	(0.1302)	(0.1306)	(0.1300)

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Robustness to early-participation measures, all banks (continued)

$\Delta GDP \times$ Distance	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\Delta GDP \times$ Coloniser	-0.0249	-0.0222	-0.0196	-0.1041	-0.1047
	(0.0695)	(0.0682)	(0.0643)	(0.0637)	(0.0640)
$\Delta GDP \times$ Common language	-0.0081	-0.0133	-0.0165	0.0125	0.0148
	(0.0292)	(0.0282)	(0.0303)	(0.0269)	(0.0269)
Deal value	1.1818***	1.2024***	1.1518***	1.0960***	1.0764***
	(0.0651)	(0.0753)	(0.0640)	(0.0597)	(0.0593)
Deal maturity	-0.0483***	-0.0521***	-0.0444**	-0.0526***	-0.0536***
	(0.0185)	(0.0186)	(0.0183)	(0.0172)	(0.0171)
Deal spread	-0.0001	-0.0001	-0.0001	-0.0001	0.0000
	(0.0003)	(0.0003)	(0.0002)	(0.0002)	(0.0002)
Deal in reserve currency	0.9030***	0.8930***	0.9294***	0.9485***	0.9419***
	(0.1409)	(0.1590)	(0.1389)	(0.1370)	(0.1364)
Private-sector borrower	0.5458**	0.4977*	0.4657*	0.4829*	0.4992*
	(0.2637)	(0.2633)	(0.2492)	(0.2653)	(0.2660)
GDP per capita	-0.6289**	-0.6411**	-0.6288**	-0.7225***	-0.6778***
	(0.2647)	(0.2682)	(0.2987)	(0.2519)	(0.2470)
Domestic credit	0.0010	0.0020	0.0008	0.0019	0.0015
	(0.0030)	(0.0034)	(0.0031)	(0.0029)	(0.0029)
Sudden stop	-0.2705	-0.3050	-0.2596	-0.2855	-0.3384
	(0.2118)	(0.2093)	(0.2029)	(0.2089)	(0.2063)
Systemic banking crisis	-0.4126***	-0.4434***	-0.3535**	-0.3864***	-0.3392**
	(0.1469)	(0.1509)	(0.1385)	(0.1421)	(0.1345)
N	1,112,847	1,120,910	1,091,342	1,087,587	1,071,726
R^2	0.1315	0.1323	0.1324	0.1287	0.1291

Notes — This table shows linear probability models explaining the participation of a foreign parent bank in a syndicated loan deal based on specification (5) from Table 3.4 for alternative early-participation measures and subsamples of countries. Estimations are based on the full set of foreign parent banks. The first column reports the baseline results for comparison, whereas the second and third columns show estimates using early participation status defined on the basis of the three and 10 first ever deals, respectively. The fourth and fifth columns use the default five-deals measure, but only consider countries with a minimum of 30 and 50 deals in total (see Table C.1).

Table C.7: **Robustness to early-participation measures, excluding Japanese banks**

	Number of first deals			Deals per country	
	Five	Three	10	At least 30	At least 50
Early	1.0240***	1.0286***	1.6631***	1.0807***	1.0003***
	(0.2451)	(0.2554)	(0.2059)	(0.2360)	(0.2370)
ΔGDP	-0.0151	-0.0065	-0.0127	-0.0133	-0.0137
	(0.0317)	(0.0295)	(0.0309)	(0.0279)	(0.0280)
$\Delta GDP \times Early$	-0.1050***	-0.0533	-0.1281***	-0.1199***	-0.1173***
	(0.0342)	(0.0396)	(0.0311)	(0.0327)	(0.0329)
Prior lending to country	-0.0342	0.0176	-0.2393	0.1326	0.1700
	(0.1788)	(0.1797)	(0.1690)	(0.1735)	(0.1739)
Prior local lending in country	7.1794***	7.2255***	6.9712***	7.0161***	6.8424***
	(1.1745)	(1.1686)	(1.1666)	(1.1725)	(1.1727)
Prior lending to borrower	9.4755***	9.5336***	9.4561***	9.2968***	9.2578***
	(0.5538)	(0.5465)	(0.5515)	(0.5635)	(0.5709)
Prior lending to borrower parent	6.1826***	6.1516***	6.1780***	6.1186***	6.0730***
	(0.5314)	(0.5172)	(0.5163)	(0.5180)	(0.5177)
Distance	-0.0004***	-0.0004*	-0.0004***	-0.0004**	-0.0003***
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Common language	1.3301***	1.3950***	1.3078***	1.0687***	1.0773***
	(0.2634)	(0.2529)	(0.2644)	(0.2523)	(0.2539)
Coloniser	2.2483***	2.2724***	2.2601***	2.5637***	2.4326***
	(0.4673)	(0.4574)	(0.4473)	(0.4538)	(0.4578)
GDP growth in parent bank country	0.0075	0.0064	0.0092	0.0073	0.0065
	(0.0123)	(0.0119)	(0.0122)	(0.0117)	(0.0117)
$\Delta GDP \times$ Prior lending to country	0.0284	0.0134	0.0513**	0.0358	0.0339
	(0.0231)	(0.0236)	(0.0217)	(0.0221)	(0.0220)
$\Delta GDP \times$ Prior local lending in country	-0.3534**	-0.3665***	-0.3392**	-0.3391**	-0.3375**
	(0.1384)	(0.1361)	(0.1352)	(0.1357)	(0.1353)

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Robustness to early-participation measures, excluding Japanese banks (continued)

$\Delta GDP \times$ Distance	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0001)	(0.0002)	(0.0000)	(0.0001)	(0.0000)
$\Delta GDP \times$ Coloniser	-0.0284	-0.0270	-0.0233	-0.1095*	-0.1094*
	(0.0672)	(0.0636)	(0.0596)	(0.0579)	(0.0583)
$\Delta GDP \times$ Common language	0.0091	0.0022	0.0036	0.0256	0.0281
	(0.0294)	(0.0280)	(0.0304)	(0.0272)	(0.0271)
Deal value	1.1764***	1.2008***	1.1426***	1.0863***	1.0675***
	(0.0661)	(0.0625)	(0.0609)	(0.0577)	(0.0574)
Deal maturity	-0.0649***	-0.0699***	-0.0591***	-0.0677***	-0.0688***
	(0.0191)	(0.0175)	(0.0176)	(0.0166)	(0.0165)
Deal spread	0.0003*	0.0003	0.0004	0.0004***	0.0004*
	(0.0002)	(0.0004)	(0.0003)	(0.0001)	(0.0002)
Deal in reserve currency	0.8672***	0.8562***	0.9002***	0.9137***	0.9038***
	(0.1438)	(0.1419)	(0.1430)	(0.1376)	(0.1375)
Private-sector borrower	1.0478***	0.9896***	0.9689***	0.9853***	1.0013***
	(0.2934)	(0.2902)	(0.2738)	(0.2942)	(0.2961)
GDP per capita	-0.4507	-0.4742*	-0.4792*	-0.5313**	-0.4795*
	(0.2984)	(0.2589)	(0.2675)	(0.2525)	(0.2488)
Domestic credit	-0.0009	0.0002	-0.0006	-0.0001	-0.0001
	(0.0032)	(0.0031)	(0.0031)	(0.0029)	(0.0030)
Sudden stop	-0.2314	-0.2669	-0.2268	-0.2578	-0.3144
	(0.2221)	(0.2181)	(0.2238)	(0.2219)	(0.2198)
Systemic banking crisis	-0.4182***	-0.4551***	-0.3550**	-0.3826***	-0.3553**
	(0.1530)	(0.1506)	(0.1481)	(0.1461)	(0.1410)
N	940,537	947,638	921,677	917,329	902,935
R^2	0.1291	0.1299	0.1300	0.1261	0.1264

Notes — This table shows linear probability models explaining the participation of a foreign parent bank in a syndicated loan deal based on specification (5) from Table 3.4 for alternative early-participation measures and subsamples of countries. Estimations are based on the set of foreign parent banks excluding Japanese banks. The first column reports the baseline results for comparison, whereas the second and third columns show estimates using early participation status defined on the basis of the three and 10 first ever deals, respectively. The fourth and fifth columns use the default five-deals measure, but only consider countries with a minimum of 30 and 50 deals in total (see Table C.1).

Table C.8: **Linear probability model regressions, role of early lead arrangers**

	All banks		All banks excluding Japan	
	Baseline	Early lead?	Baseline	Early lead?
Early	0.8862***	0.8211***	1.0240***	0.9466***
	(0.2234)	(0.2222)	(0.2451)	(0.2444)
EarlyLead		1.6933		1.8735*
		(1.1522)		(1.0423)
ΔGDP	0.0142	0.0134	-0.0151	-0.0161
	(0.0297)	(0.0297)	(0.0317)	(0.0316)
$\Delta GDP \times Early$	-0.0327	-0.0353	-0.1050***	-0.1072***
	(0.0324)	(0.0319)	(0.0342)	(0.0342)
$\Delta GDP \times EarlyLead$		0.0911		0.0846
		(0.1865)		(0.1713)
Prior lending to country	0.1379	0.1380	-0.0342	-0.0340
	(0.1751)	(0.1754)	(0.1788)	(0.1789)
Prior local lending in country	7.0119***	7.0195***	7.1794***	7.1871***
	(1.1109)	(1.1064)	(1.1745)	(1.1693)
Prior lending to borrower	9.4428***	9.4342***	9.4755***	9.4640***
	(0.5245)	(0.5246)	(0.5538)	(0.5532)
Prior lending to borrower parent	5.8232***	5.8315***	6.1826***	6.1950***
	(0.5343)	(0.5332)	(0.5314)	(0.5311)
Distance	-0.0003***	-0.0003***	-0.0004***	-0.0004
	(0.0000)	(0.0000)	(0.0001)	(0.0004)
Common language	1.3469***	1.3426***	1.3301***	1.3278***
	(0.2479)	(0.2495)	(0.2634)	(0.2639)
Coloniser	2.1399***	2.1595***	2.2483***	2.2687***
	(0.4785)	(0.4804)	(0.4673)	(0.4661)
GDP growth in parent bank country	0.0449***	0.0451***	0.0075	0.0077
	(0.0122)	(0.0122)	(0.0123)	(0.0122)
$\Delta GDP \times$ Prior lending to country	0.0155	0.0157	0.0284	0.0286
	(0.0229)	(0.0230)	(0.0231)	(0.0231)
$\Delta GDP \times$ Prior local lending in country	-0.3211**	-0.3197**	-0.3534**	-0.3521**
	(0.1328)	(0.1324)	(0.1384)	(0.1379)

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Linear probability model regressions, role of early lead arrangers (continued)

$\Delta GDP \times$ Distance	-0.0000	-0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
$\Delta GDP \times$ Coloniser	-0.0249	-0.0258	-0.0284	-0.0294
	(0.0695)	(0.0704)	(0.0672)	(0.0674)
$\Delta GDP \times$ Common language	-0.0081	-0.0082	0.0091	0.0091
	(0.0292)	(0.0296)	(0.0294)	(0.0295)
Deal value	1.1818***	1.1818***	1.1764***	1.1764***
	(0.0651)	(0.0654)	(0.0661)	(0.0664)
Deal maturity	-0.0483***	-0.0484***	-0.0649***	-0.0649***
	(0.0185)	(0.0185)	(0.0191)	(0.0190)
Deal spread	-0.0001	-0.0001	0.0003*	0.0003
	(0.0003)	(0.0003)	(0.0002)	(0.0004)
Deal in reserve currency	0.9030***	0.9036***	0.8672***	0.8677***
	(0.1409)	(0.1409)	(0.1438)	(0.1440)
Private-sector borrower	0.5458**	0.5457**	1.0478***	1.0473***
	(0.2637)	(0.2637)	(0.2934)	(0.2936)
GDP per capita	-0.6289**	-0.6297**	-0.4507	-0.4517
	(0.2647)	(0.2652)	(0.2984)	(0.2980)
Domestic credit	0.0010	0.0009	-0.0009	-0.0009
	(0.0030)	(0.0030)	(0.0032)	(0.0032)
Sudden stop	-0.2705	-0.2707	-0.2314	-0.2316
	(0.2118)	(0.2120)	(0.2221)	(0.2223)
Systemic banking crisis	-0.4126***	-0.4126***	-0.4182***	-0.4184***
	(0.1469)	(0.1467)	(0.1530)	(0.1525)
N	1,112,847	1,112,847	940,537	940,537
R^2	0.1315	0.1316	0.1291	0.1291

Notes — This table shows linear probability models explaining the participation of a foreign parent bank in a syndicated loan deal based on specification (5) from Table 3.4. For the set of all parent banks and that excluding Japanese banks, the first columns repeat the baseline results for comparison. The second columns then add *EarlyLead* and its interaction with ΔGDP, where *EarlyLead* is a dummy variable that takes on a value of one if a bank was a lead arranger in at least one of the first ever deals in a given emerging market, and zero otherwise.

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