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Competition for internal funds within multinational banks: foreign affiliate lending in the crisis

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Abstract

We investigate how the lending activities of a multinational bank's affiliates located abroad are affected by funding difficulties in view of the financial crisis. For this, we consider transaction-induced changes in long-term lending to the private sector of 40 countries by the affiliates of the 68 largest German banks. We find that affiliates' local deposits and profitability have been stabilizing loan supply. By contrast, relying on short-term wholesale funding has increasingly proven to be a disadvantage in the crisis, as inter-bank and capital markets froze. Besides, the more an affiliate abroad takes recourse to intra-bank funding in the crisis, the more it becomes dependent on a stable deposit and long-term wholesale funding position of its parent bank. We furthermore detect competition for intra-bank funding across the affiliates abroad as well as an increasing focus on the parent bank's home market activities.

Keywords: Funding structure, multinational banks, internal capital market, intra-bank lending, wholesale funding, financial crisis.

JEL Classification: G21, F23, F34, E44

Non-technical summary

This paper evaluates how the funding structure of a multinational bank has affected affiliates' lending to the foreign private sector since the collapse of Lehman Brothers (in comparison to the situation prior to this event). Beyond the scope of previous studies in this area of research, we not only investigate the relevance of the funding behavior of a local affiliate in a host country and of its parent bank located in the home country, but we also assess the role of other foreign affiliates of the same bank. First, we analyze the influence of the funding of other foreign affiliates which potentially supply loans to borrowers in the country in question on a cross-border basis, partly even instead of a local affiliate. Second, we examine further affiliates of the same bank which are located in different countries and whose lending is focused on their respective local market. These may be competitors for internal funds provided by the parent bank, thereby influencing loan supply to the country in question. To complete the picture, we analyze whether the parent bank's lending to the home market has become an additional limiting factor for lending abroad.

The analysis is based on detailed bank-level data for the 68 largest German banks and their foreign affiliates' lending to the private sector in 40 different countries. For German banks, this is the first study to explicitly investigate the role of intra-bank funding for foreign affiliates in times of crisis. In this context, we detect an increase in competition for intra-bank funds among a bank's affiliates. By developing a reliable approximation of intra-bank flows between branches located abroad and their German parent banks, we are able to include this funding source in the analysis not only for the foreign subsidiaries (for which the data is directly available), but also for the branches.

The ongoing discussion about the cross-border deleveraging of multinational banks has drawn more attention to the lending behavior of their affiliates located in foreign markets. While for many smaller economies they are indispensable loan providers, they are also part of the global fund management and the overall strategy of the bank. For

German banks, the financial linkage between foreign affiliates and their parent banks should be of particular importance, since German banks' affiliates use intra-bank funding more than affiliates of other European or US multinational banks.

This study using fixed-effects regressions shows that, after the default of Lehman Brothers, lending by foreign affiliates of German banks has been stabilized by their ability to collect deposits locally and by their profitability. We are the first to demonstrate that this is not only true for local affiliates, but also for other affiliates of the same bank which lend across borders to the respective country. Regarding a specific destination country, these two types of affiliates do not act as competitors for intra-bank funds provided by the parent bank. However, there is competition on the bank's internal capital market between an affiliate and other affiliates of the same bank without cross-border lending activity. In contrast to deposit funding, short-term wholesale funding has increasingly proven to be a disadvantage to the foreign affiliates. Besides, the more the affiliates located abroad take recourse to intra-bank funding during the crisis, the more they become dependent on their parent banks having a stable deposit and long-term wholesale funding position.

The linkage between the foreign affiliates and their parent banks via the bank's internal fund management again becomes apparent in the relationship between the parent bank's lending to the home market and lending to foreign markets by the affiliates. While the expansion at home and abroad used to tend to occur in parallel, the two types of lending decoupled in the course of the financial crisis. The larger the share of intra-bank funding within the funding portfolio of the foreign affiliates, the more the parent banks' activities on the home market have become a limiting factor for lending by affiliates abroad.

We conclude that deleveraging abroad by multinational banks has been highly bank-specific. If a bank attaches strategic importance to a foreign market, this may result in rather stable loan provision to the respective foreign economy even during periods of distress.

Nichttechnische Zusammenfassung

Die vorliegende Studie untersucht, welche Rolle die Finanzierungsstruktur eines multinationalen Bankkonzerns für das Kreditvergabeverhalten von dessen Auslandsniederlassungen nach dem Zusammenbruch von Lehman Brothers spielt (im Vergleich zur Situation davor). Anders als frühere Arbeiten auf diesem Gebiet untersuchen wir nicht nur die Bedeutung der Finanzierung einer lokalen Auslandsniederlassung vor Ort und die des Mutterinstituts im Heimatland, sondern wir gehen auch auf die Rolle anderer Auslandsniederlassungen des gleichen Bankkonzerns ein. Insbesondere betrachten wir den Einfluss der Finanzierung anderer Auslandsniederlassungen, die eventuell grenzüberschreitend Kredite in das in Rede stehende Gastland gewähren, teils sogar anstelle einer lokalen Niederlassung. Zudem betrachten wir die Rolle weiterer lokaler Auslandsniederlassungen in anderen Ländern, die möglicherweise um die Refinanzierungsmittel konkurrieren, die im Gesamtkonzern zur Verfügung stehen und die deshalb auch die Kreditvergabe im fraglichen Gastland beeinflussen können. Die Analyse der Relevanz bankinterner Finanzierung wird dadurch komplettiert, dass wir der Auslandskreditvergabe durch Niederlassungen die Kreditvergabe der Muttergesellschaft im Heimatmarkt gegenüberstellen und auf mögliche Verdrängungseffekte im Krisenzeitraum prüfen.

Die Analyse erfolgt auf der Basis detaillierter Daten für die größten 68 Bankkonzerne in Deutschland und die Kreditgewährung durch deren Auslandsniederlassungen an den Privatsektor in 40 Gastländern. Erstmals für deutsche Banken wird in dieser Studie explizit auf die Bedeutung der bankinternen Finanzierung für Auslandsniederlassungen in Krisenzeiten und die daraus möglicherweise entstehende Konkurrenz um bankinterne Mittel zwischen den Niederlassungen eingegangen. Durch eine Approximation der bankinternen Mittelströme zwischen Auslandsfilialen und deren Mutterinstituten gelingt es uns, diese wichtige Finanzierungsquelle nicht nur für Auslandstöchter (für die entsprechende Daten direkt verfügbar sind), sondern auch für Auslandsfilialen mit einzubeziehen.

Im Zuge der Diskussion um ein mögliches Deleveraging multinationaler Banken außerhalb ihres Heimatmarktes rückt das Verhalten von deren Auslandsniederlassungen zunehmend in den Blick. In vielen kleineren Volkswirtschaften sind sie wichtige Kreditgeber der Realwirtschaft, zugleich aber auch Teil des globalen Finanzierungsmanagements der jeweiligen Bank. Die Auswirkungen der finanziellen Verbundenheit zwischen Auslandsniederlassungen und Mutterinstitut könnten bei deutschen Banken eine besonders große Rolle spielen, da die im Ausland tätigen Teile der Konzerne sich im Vergleich zum Gros der US-amerikanischen oder der anderen europäischen Bankkonzerne stärker über den internen Kapitalmarkt finanzieren.

Die in der vorliegenden Studie verwendeten Regressionsanalysen mit fixen Effekten zeigen, dass die Kreditvergabe durch Auslandsniederlassungen deutscher Banken nach der Lehman-Pleite besonders stabil gehalten werden konnte, wenn Niederlassungen vor Ort Einlagen generierten und eine hohe Profitabilität aufwiesen. Es kann über die bestehende Literatur hinaus gezeigt werden, dass dies nicht nur für lokale Auslandsniederlassungen, sondern auch für Niederlassungen derselben Bank gilt, die grenzüberschreitend die Kreditvergabe in das betreffende Land unterstützen. Bei Betrachtung eines bestimmten Ziellandes wird zudem deutlich, dass diese beiden Typen von Auslandsniederlassungen nicht in Konkurrenz um bankinterne Finanzierung stehen. Jedoch ist zunehmender Wettstreit um interne Mittel zwischen lokalen Niederlassungen und weiteren Niederlassungen der Bank festzustellen, die nicht grenzüberschreitend agieren, sondern in anderen Märkten vorwiegend lokal aktiv sind. Je mehr die Auslandsniederlassungen auf bankinterne Finanzierung zurückgreifen, desto abhängiger werden sie außerdem von einer stabilen Einlagenfinanzierung und langfristiger Kapitalmarktfinanzierung (Schuldverschreibungen und Interbankkredite) durch ihre Muttergesellschaft.

Die enge finanzielle Verflechtung zwischen Auslandsniederlassungen und Muttergesellschaft lässt sich darüber hinaus im Verhältnis zwischen der Kreditvergabe an den ausländischen Privatsektor durch die Niederlassungen und dem Geschäft der Mutter-

gesellschaft auf dem heimischen Kreditmarkt erkennen. Die vor der Finanzkrise vorherrschende parallele Entwicklung verschwand im Lauf der Krise. Je größer dabei der Anteil der bankinternen Mittel am Finanzierungsportfolio einer Auslandsniederlassung war, desto eher stellte die Ausweitung der Kreditvergabe auf dem Heimatmarkt durch die Muttergesellschaft einen limitierenden Faktor für das Geschäft der Auslandsniederlassung dar. Daneben entwickelte es sich zum Nachteil für Auslandsniederlassungen, wenn sie in großem Umfang auf kurzfristige Kapitalmarktfinanzierung (durch Geldmarktpapiere und vor allem Interbankkredite) vertrauten.

Aus der vorliegenden Studie lässt sich schlussfolgern, dass das Deleveraging multinationaler Banken im Ausland sehr konzern- und land-spezifisch verläuft. Im Falle der besonderen strategischen Bedeutung eines Auslandsmarktes für eine Bank ist mit einer stabilen Versorgung der betreffenden Volkswirtschaft mit Krediten durch diese Bank zu rechnen.

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Competition for internal funds within multinational banks: Foreign affiliate lending in the crisis*

1 Introduction

The ongoing financial crisis with its abruptly arising funding difficulties, banks' increasing risk aversion and stricter capital requirements has led to a growing discussion about deleveraging by banks. In this context, the uncertainty about the behavior of banks' foreign affiliates seems to be particularly high, as their decisions not only depend on the country-specific loan demand and their own resources, but also on the strategy of the banking group as a whole. Foreign affiliates' lending was found to differ from lending by domestic banks, in particular during the recent financial crisis (see eg DE HAAS AND VAN LELYFELD (2011)). A key structural difference arises in their financial options for funding lending activities. Domestic banks rely to a great extent on local funding, whereas an affiliate of a multinational bank can exploit both local funding possibilities and the funding capacity of its parent bank, all of which are embedded in the fund management of the banking conglomerate. Thus, in this paper we try to shed more light on the importance of a multinational bank's funding structure for foreign affiliate lending in the crisis.

In our study, we use micro data on lending and further balance sheet characteristics not only for the respective affiliates and their parent banks but also for the affiliated other

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subsidiaries and branches in non-financial and financial centers. Among the affiliates which are not located in financial centers, we furthermore distinguish between purely locally active affiliates and affiliates which engage in cross-border lending. Compared to previous studies, we are able to assess lending decisions much more precisely by considering the complex structure of a multinational bank and by relying on transaction-induced changes in the bank's loan portfolio, which excludes changes in loan stocks caused by exchange rate fluctuations and other valuation effects. Furthermore, this setting allows us to address the issue of competition among affiliates for banks' internally available funds during the crisis under consideration of the affiliates' respective funding structure and business model. Besides, we are able to analyze whether banks prioritize parent bank lending to the domestic private sector over foreign affiliate lending. Hence, against the background of scarce financial resources in the crisis, we investigate the redirection of funds within multinational banks.

The arising funding difficulties in combination with an increasing risk aversion throughout the crisis led to multinational banks' foreign positions being cut back (for the relevance of risk aversion and other bank-specific factors in the case of German banks, see DÜWEL, FREY AND LIPPONER (2011)). While during the recent financial crisis a complete withdrawal of foreign affiliates from a local market was rather uncommon, adjustments in the amount of credit supplied were more widespread (evidence for US banks in emerging economies provided by CETORELLI AND GOLDBERG (2011A)). German banks' cross-border lending declined after the failure of Lehman Brothers.¹ On the contrary, lending on the bank's home market remained rather stable (see Figure 2 in the appendix), which is in line with the focus on the home market found for UK banks during the financial crisis (ROSE AND WIELADEK (2011)).² Funding difficulties turned out to be the main drivers for the reduced banking business in some areas. CE-

1 Government rescue measures and liquidity support, especially that of the US Federal Reserve, had some stabilizing impact on foreign activities of German banks and dampened the deleveraging of foreign assets (BUCH, KOCH AND KÖTTER (2011)).

2 In addition, in a study on international syndicated loans, GIANNETTI AND LAEVEN (2012) find that the home bias of lenders' loan origination increased in the early stage of the crisis.

TORELLI AND GOLDBERG (2011B) recently provided direct evidence that the collapse of the asset-backed commercial paper market in combination with the subsequent breakdown of external funding markets probably played a large role with regard to changes in the lending activities of US banks at home as well as abroad.³

According to MCCAULEY ET AL. (2010), who use BIS data, German banks generally fund a substantial part of their lending activity by accessing the internal capital market. Moreover, they finance less of their local lending through locally generated funds than the affiliates of most other European or US banks. The global fund management of German banks in the crisis should therefore be of crucial importance to the lending activities of their affiliates abroad. In contrast to foreign affiliates of US banks (see CETORELLI AND GOLDBERG (2011B)), affiliates of German banks on aggregate continued to be net borrowers from their parent banks during the crisis, too (see Figure 3), though heterogeneity across the affiliates increased. On aggregate, intra-bank net borrowing by foreign affiliates of German banks peaked after the collapse of Lehman Brothers towards the end of 2008 and then slightly declined.

In general, lending by affiliates located abroad depends on the stability and resources of the affiliate itself, but also on characteristics of the parent bank. Evidence for the latter is provided for German banks by BUCH, KOCH AND KÖTTER (2009), for European banks' activities in eastern Europe by DE HAAS AND VAN LELYFELD (2006) and (2010) as well as by POPOV AND UDELL (2010) regarding the early crisis period, and for US banks eg by ASHCRAFT (2008). Focusing on liquidity and capital endowment, for US banks HOUSTON, JAMES AND MARCUS (1997) find an influence of both subsidiary and parent bank characteristics on subsidiary loan growth without measuring intra-bank flows directly. Shocks to parent bank health or parent bank liquidity can be transmitted to the affiliates through the financial linkages given by the bank's internal capital market. PEEK AND ROSENGREN (1997), for example, find that Japanese bank branches in the

³ Furthermore, CETORELLI AND GOLDBERG (2011A) find that the larger the pre-crisis dollar-vulnerability of a country's aggregate banking system, the lower was its post-crisis lending growth to emerging economies by parent banks and by affiliates.

US reduced their credit supply after their parent banks were hit by a sharp drop in stock prices in 1990 in combination with stricter capital requirements. Besides, the literature on the bank lending channel demonstrates the influence of parent banks' liquidity on the activities of their affiliates (see for the US eg HOUSTON AND JAMES (1998) and KASHYAP AND STEIN (2000) as well as CAMPELLO (2002) and CETORELLI AND GOLDBERG (2008)). NAVARETTI ET AL. (2010) conclude that in financially integrated areas like the EU, banks' internal capital markets are particularly active and complement external sources of funding.

Our results show that since the bankruptcy of Lehman Brothers, the adjustments in lending activities by German affiliates located abroad have been strongly influenced by funding structures in all parts of the banking organization. Locally active affiliates as well as affiliates engaged in cross-border lending which can rely on their own net income and on strong local deposit funding in the period of distress have been able to stabilize their loan supply. Being tied to a global bank's fund management, changes in lending activities abroad increasingly depend on parent bank characteristics the more the affiliates rely on funding via the internal capital market. Parent banks which could maintain their deposit funding and long-term wholesale funding turned out to be of particular advantage to the activities of their affiliates located abroad. With overall internally distributable funds becoming scarce in the crisis, we find evidence for growing competition for these funds among affiliates. Besides, we detect a concentration of bank resources on parent banks' lending to the home market, which becomes apparent as the expansion in parallel of credit abroad and on the home market seen before the crisis disappears.

The remainder of the paper is organized as follows. Section 2 introduces the analysis's empirical framework as well as estimation equations and variables. Section 3 provides detailed information on the data sources and the construction of variables. In Section 4 we present our estimation results and discuss implications. Section 5 concludes.

2 Empirical model

2.1 Funding structures of multinational banks

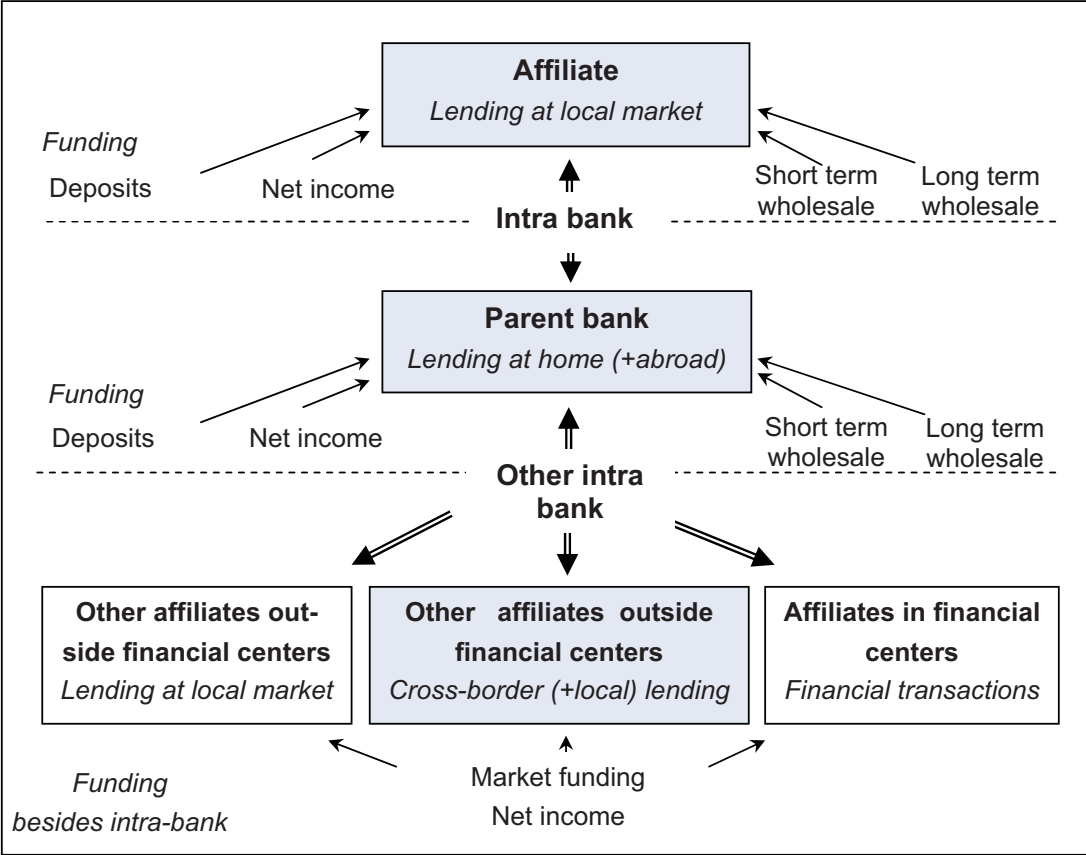
Our model is a strong simplification of the complex world of a bank. It tries to capture parts of a bank's business model and the funding structure. We start out from a multinational bank and focus on the behavior of its affiliates. We reduce the business model of the bank to long-term lending to non-financial firms since we consider this business to be strategic and thus continuous as market entry and exit is costly. The affiliate has different ways to fund its lending activity and usually relies on a mixture of these (see Figure 1). It can rely on market funding, its own generated funds and *intra*-bank funding. Market funding comprises local deposits and wholesale funds, which comprehend the issuance of bonds and notes (debt securities) and interbank borrowing as the most prominent components (see section 3 for the relevance of funding sources over time). Besides, if the affiliate borrows on the bank's internal capital market, it can be expected that parent bank funding characteristics will also become more important for affiliate lending. Below, we limit the bank's internal capital market to the intra-connections of the affiliates with the parent bank and neglect the much less relevant relationships among the affiliates themselves.⁴

While the affiliates can be active on the capital market and collect deposits locally, intra-bank funding constitutes an important addition to their funding portfolio. Particularly during a crisis period, the external finance premium which market funding requires in order to compensate for informational asymmetries can become so high that it cuts banks off from certain funding sources. In this case, intra-bank resources provide a vital funding alternative for affiliates. However, the resources of the bank are distributed across the parent bank itself and all affiliates, including those located in financial centers, according to their relevance and needs. Internal capital markets provide the opportunity to allocate resources within business conglomerates wherever they are most

⁴ In addition, data limitations do not allow an exact identification of the inter-affiliate relationships.

efficient (GERTNER, SCHARFSTEIN AND STEIN (1994), STEIN (1997)).⁵ From the point of view of a specific affiliate, intra-bank funding is therefore in most cases limited (see also the discussion by HOUSTON, JAMES AND MARCUS (1997)). This is particularly the case in a crisis period, when overall funds of the bank become scarce, as eg in case of severe funding troubles on the capital and inter-bank market. Then, the internal fund management of the bank even gains importance.

Figure 1: Model of the lending and funding behavior of a multinational bank



Our approach not only includes loan provision abroad to a certain country by local affiliates but also by affiliates of the same parent bank that are located in other countries, e.g. neighboring countries, and are engaged in cross-border lending to the foreign private sector (see Figure 1 above).⁶ For this reason, we classify the affiliates in the other

5 However, efficiency gains might not be fully reached due to misaligned incentives which cause principal-agent problems (RAJAN, SERVAES AND ZINGALES (2000), SCHARFSTEIN AND STEIN (2000)).

6 Furthermore, the parent bank may also provide cross-border loans, an aspect that is not treated in this paper (but e.g. in DÜWEL, FREY AND LIPPONER (2011))

countries into two groups, the cross-border affiliates and the non-cross-border affiliates. Affiliates located in countries with large financial centers are treated as a separate group, since their business model differs (see section 3). Characteristics of the group of cross-border affiliates become relevant in countries where affiliate lending occurs, however local affiliates conduct only a small fraction of the lending or are missing completely. By contrast, the lending of the remaining non-cross-border affiliates is limited to their respective local markets and hence these affiliates are competitors for the bank's internal funds.

2.2 Estimation

The identification strategy of our empirical approach relies on the assumption that the bankruptcy of Lehman Brothers in September 2008 and its direct effects came as a surprise to banks (we thereby follow CORNETT ET AL. (2011)). This choice is motivated by the observation that this event ushered in a new funding situation in which market and inter-bank funding were strongly limited since investors perceived much higher risks in banks and a loss of confidence on the interbank market arose. In line with this, we find strong support for this choice in the data on cross-border loans, where the turning point from expansion to deleveraging is 2008Q3 (see Figure 2). We therefore interact the funding variables and all other explanatory variables with a crisis dummy and interpret the estimated coefficients on these interacted terms only.⁷ In doing so, we can assess how the funding difficulties in turn affected the lending behavior of banks and their foreign affiliates. In this context, it is important to recognize that in most cases the funding structure does not abruptly change. Deposit and long-term wholesale funding evolution, in particular, is characterized by a high degree of inertia (for our sample, see Figure 5 in the appendix). Furthermore, we lag the funding variables.

First, we test how, for the affiliates' lending abroad, the relevance of the affiliate's own

⁷ In a robustness check (see section 4.4), we use a continuous risk indicator for the phase of distress instead of the dummy variable. Our key results remain qualitatively unchanged.

and the bank's funding structure changes after the collapse of Lehman Brothers. Second, we evaluate whether competition for internal funds has increased within the banking conglomerate in view of the crisis. Third, we investigate whether the parent bank prioritized lending on the home market, making lending decisions by foreign affiliates more restrictive during the crisis.

Thus, we start with the following fixed-effects regression using our panel of 68 German banks and their foreign affiliates' lending to the private sector of 40 countries (for detailed information on the data, see section 3). We test how the reliance on a specific funding structure affected lending of affiliates located abroad in the aftermath of the collapse of Lehman Brothers:

$$\begin{aligned}
\Delta l_{ikt} = & \mathbf{d_crisis} * [\alpha_1 \mathbf{Local_AffiliateFund}_{ikt-1} + \alpha_2 \mathbf{ParentFund}_{it-1} \\
& + \alpha_3 \mathbf{CB_AffiliatesFund}_{ikt-1} + \alpha_4 \mathbf{BankControls}_{ikt-1}] \\
& + \beta_1 \mathbf{Local_AffiliateFund}_{ikt-1} + \beta_2 \mathbf{ParentFund}_{it-1} \\
& + \beta_3 \mathbf{CB_AffiliatesFund}_{ikt-1} + \beta_4 \mathbf{BankControls}_{ikt-1} \\
& + \delta + \eta_i + \gamma_{kt} + \varepsilon_{ikt}
\end{aligned} \tag{1}$$

where $i = 1, \dots, N$, N is the number of banks in the sample, $k = 1, \dots, K$, K the number of foreign countries, and $t = 1, \dots, T$ the time period covered (2002Q4-2010Q4). The crisis dummy ($\mathbf{d_crisis}$) equals 1 from 2008Q3 onwards. We include a constant (δ) and fixed effects for banks (η_i). To capture changes in local factors, especially the country-specific demand for credit, we also include country-time fixed effects (γ_{kt}). ε_{ikt} represents an idiosyncratic error.

The dependent variable Δl_{ikt} is the real volume of transaction-induced changes in long-term lending TO the private sector of country k by ALL affiliates located abroad of bank i at time t (see also section 3 for information on the structure of the data).

The coefficient vectors $\alpha_1 - \alpha_3$ represent changes in the relevance of funding sources

for affiliate lending after the collapse of Lehman Brothers. First and foremost, the loans to country k are provided by the local affiliate of bank i , whose funding sources are combined in the vector $\text{Local_AffiliateFund}_{ikt-1}$. Besides, lending to country k may be carried out by the group of cross-border affiliates located outside country k , whose aggregate funding structure is incorporated in the vector $\text{CB_AffiliatesFund}_{ikt-1}$. Furthermore, the corresponding parent bank's characteristics are included in the vector ParentFund_{it-1} .

In more detail, the main funding sources in the different parts of the bank are *Deposit funding*, *Short-term wholesale funding* and *Long-term wholesale funding*. Besides, the individual *Net income (relative to equity capital)* is included in the vector of funding variables, since it describes the ability to generate additional funds internally. In the following, we refer to net income as being in first line a measure of profitability which includes the aspect that profitable entities may be of higher strategical relevance for a bank (See Table 1 in the appendix for the definitions of the variables, as well as their expected impact on affiliate lending. Table 2 provides corresponding summary statistics.)

The vector *BankControls* consists of the general characteristics of the banks. We include *Capitalization* and *Size* for all three parts of the banking group. Besides, we control for the importance of the affiliates' lending business for the banking group as a whole (*Affiliate lending share*), and this for both the local affiliate and for cross-border affiliates. The role of one or the other type of affiliate varies substantially across banks and countries. To take this aspect into account, we attach relative weights to the balance sheet characteristics of both the local affiliate and the group of cross-border affiliates (for the construction of these weights and of the variables included in the vector *BankControls*, see again Table 1 in the appendix).

Second, we ask if competition for internal funds within the banking conglomerate increased due to the external funding contraction in the aftermath of the Lehman bankruptcy. For this, we additionally include the share of intra-bank financing in our

set of regressors from equation (1):

$$\begin{aligned}
\Delta l_{ikt} = & (\dots) + d_crisis * [\alpha_5 \text{Local_AffiliateIntra}_{ikt-1} + \alpha_6 \text{CB_AffiliatesIntra}_{ikt-1} \\
& + \alpha_7 \text{ParentFund}_{it-1} * \text{Local_AffiliateIntra}_{ikt-1} \\
& + \alpha_8 \text{NonCB_AffiliatesIntra}_{ikt-1} + \alpha_9 \text{Fin_AffiliatesIntra}_{ikt-1}] \\
& + \beta_5 \text{Local_AffiliateIntra}_{ikt-1} + \beta_6 \text{CB_AffiliatesIntra}_{ikt-1} \\
& + \beta_7 \text{ParentFund}_{it-1} * \text{Local_AffiliateIntra}_{ikt-1} \\
& + \beta_8 \text{NonCB_AffiliatesIntra}_{ikt-1} + \beta_9 \text{Fin_AffiliatesIntra}_{ikt-1} \tag{2}
\end{aligned}$$

where (...) stands for the inclusion of all explanatory variables of equation (1).

Intra-bank funding is in principle accessible to all affiliates belonging to a banking conglomerate. In the second regression specification, we therefore not only include *Intra-bank funding* as a special type of funding source for the local affiliate and for cross-border affiliates (vectors $\text{Local_AffiliateIntra}_{ikt-1}$ and $\text{CB_AffiliatesIntra}_{ikt-1}$), but also account for possible competition for these funds stemming from the other non-cross-border affiliates and from affiliates located in financial centers (vectors $\text{NonCB_AffiliatesIntra}_{ikt-1}$ and $\text{Fin_AffiliatesIntra}_{ikt-1}$). Furthermore, as we expect that the recourse of the affiliate to *intra-bank* funds causes additional dependence of the affiliate's lending activity on the funding of the parent bank, we interact parent bank funding characteristics with the affiliate's share of intra-bank funding in total assets. Besides, we account for the relative importance of the non-cross-border affiliates for the banking group by including their *Affiliate lending share*, and we measure the role of financial center affiliates in the banking group by their size relative to that of the banking group.

Third, we investigate whether a potential stabilisation of lending activities on the home market on the part of the parent bank was conducted at the expense of foreign affiliate lending during the crisis. In doing so, we take recourse to equation (2) and add the

parent bank's lending on the home market (*ParentHomeLend*). Again, we interact home lending with the share of the affiliate's intra-bank funding, as affiliate lending is likely to be more in competition with parent bank home lending, the more the affiliate relies on intra-bank funding:

$$\begin{aligned}
\Delta l_{ikt} = (\dots) &+ \mathbf{d_crisis} * [\alpha_{10} \mathbf{ParentHomeLend}_{it-1} \\
&+ \alpha_{11} \mathbf{ParentHomeLend}_{it-1} * \mathbf{Local_AffiliateIntra}_{ikt-1}] \\
&+ \beta_{10} \mathit{ParentHomeLend}_{it-1} \\
&+ \beta_{11} \mathit{ParentHomeLend}_{it-1} * \mathit{Local_AffiliateIntra}_{ikt-1} \quad (3)
\end{aligned}$$

3 Data

3.1 Sample

Concerning the business activity of German banks' affiliates abroad, we concentrate on long-term lending to the private sector.⁸ Long-term loans, ie loans with an original maturity of more than one year, already account for more than 85% of German banks' total cross-border lending activities. An additional reason for dropping short-term loans is that they also include trade financing, a more erratic business which follows other motives and determinants than those treated in this study. As lending to the private sector in a country which hosts an important financial center is strongly influenced by financial deals with special purpose entities as well as by banks' proprietary trading in portfolio instruments, we focus on lending to countries which do not host important financial centers.

Affiliate lending abroad marks an important share of the overall international activities of German banks.⁹ Figure 2 in the appendix illustrates that activities by affiliates located

⁸ These figures comprise both lending by subsidiaries as well as by branches. Subsidiaries are reported whenever a parent bank acts as majority shareholder, and they have an own legal status whereas branches do not. For both types of affiliates, there are no reporting thresholds.

⁹ There are many more branches than subsidiaries of German banks - a fact that is reflected in the

abroad account on aggregate for 60-70% of total foreign private sector lending of German banks over time. Foreign private sector lending of affiliates continuously expanded between 2004 and 2007, before it stagnated and started to decline after the collapse of Lehman Brothers. For our regression, we take recourse to real transaction-induced changes in lending. These exclude changes in loan stock due to exchange rate fluctuations or other valuation effects and thus reflect more precisely the bank's strategical decisions. In the aggregate figures, a shift in the lending behavior after the failure of Lehman Brothers is reflected in the transaction-induced variations, although the drop does not prove to be as drastic as that for changes in the stock data (see Figure 3).

As international activities are first and foremost a strategical field of large banks, we selected the 100 German parent banks with the largest balance sheet size, which also account for most of the cross-border lending. However, on the one hand, excluding promotional banks and foreign-owned banks drives the number of banks down to 68. On the other hand, owing to bank mergers in the period under review, which we handle by backward integration, we consider 140 parent banks overall. For these banks, we collect information on all of their foreign affiliates.

We further focus on the 51 countries with the largest amounts of German cross-border loans outstanding in order to keep the amount of data on foreign affiliates feasible. In doing so, our sample still covers roughly 80% of German banks' total lending to the non-bank private sector abroad. For the reasons mentioned above, we concentrate on the lending activities of foreign affiliates of German banks with respect to countries without financial centers. For the classification of offshore financial centers we make use of the definition of the Financial Stability Forum, the predecessor of today's Financial Stability Board, published in 2000 and in addition we exclude the UK and the US from our sample¹⁰ since they represent large financial hubs for German banks. We thus shrink our sample of destination countries from 51 to 40 (see Table 3 in the appendix).

aggregate volumes, where branches are found to be more significant.

10 This is in line with the IMF, which also sees the UK and the US as hosting financial centers.

Nevertheless, we account for the relevance of affiliates in countries with important financial centers by including aggregate information on these affiliates for every bank (see section 2.1). The period covered by our analysis runs from 2002Q4 to 2010Q4.

3.2 Bank data, bank aggregates and grouping of banks

The micro data is collected by the Deutsche Bundesbank. Parent banks report balance sheet statistics of affiliates abroad separately for branches and subsidiaries. While each subsidiary files its own report, activities of branches are aggregated by foreign country. In order to gain a clear picture of the relevance of different foreign economies to the banks, we aggregate balance sheet data from branches and subsidiaries by parent bank and country to produce one affiliate per bank-country pair.

The statistics on external positions of German banks allow for a separation of lending activities by destination country.¹¹ We use quarterly series which have been calculated from the original monthly series. For all foreign countries to which German banks supply loans, we observe lending to the private sector on the parent level, on the affiliate level (subsidiaries and branches), and on the level of the consolidated group, which is cleaned from intra-bank lending positions. For our analysis, we collapse the subsidiaries' and branches' funding variables into a funding structure for one hypothetical »affiliate« per bank and country. Besides, our consolidated lending data consists of the volume of loans distributed to a country aggregated over all affiliates of one bank, whether they are located in the respective country or in other (likely neighboring) foreign countries. This view on the data has the advantage that it accounts for affiliates acting as »hubs« which are located in other foreign countries. The relevance of the affiliates which lend across borders is captured by the inclusion of their aggregate funding structure in the regressions. To take into account the relative importance of local lending vis-à-vis lending from outside, weights are attached to the respective funding structures (see section 2.1).

¹¹ For a detailed description, see FIORENTINO, KOCH AND RUDEK (2010).

In our study, we especially address the role of affiliates' intra-bank funding, which requires the net borrowing position vis-à-vis their parent banks to be identified. While subsidiaries report this exposure, we have to proxy for the assets and liabilities of branches vis-à-vis their parent bank. For this, we rely on their positions vis-à-vis the German banking sector (excluding positions vis-à-vis the central bank) which relies on the assumption that the main business partner for branches on the home market is their parent bank. As a robustness check for this assumption, in Figure 4 in the appendix we compare this approximation with the actual data series which are available as of June 2010 and find very similar dynamics as well as comparable volumes.

To conclude the data section, we take a look at the development of the funding structure of the affiliates of our sample located in countries without important financial centers on the aggregate level (in Figure 5 in the appendix). Wholesale funding accounts on average for 40%-50% of total assets and represents the major funding source of these affiliates. In this context, short-term wholesale funding dominates but has been declining since mid-2007 by approximately 10% to roughly 33% of total assets at the end of 2010. Long-term wholesale funding demonstrates on average more stability, especially during the crisis, but accounts for only around 7% of total assets. For the average affiliate in our sample, deposits as a share of total assets declined between 2005 and 2009 from roughly 27% to 17%, before this share started to increase again to slightly above 20% at the end of 2010. By contrast, intra-bank funding has become relatively more important since 2005. It rose on average to over 30% in 2009Q1 and has since been fluctuating at around 28% of the total assets of affiliates. This relatively large relevance of intra-bank funding mirrors mainly the dependence of branches on parent banks.¹² In turn, subsidiaries more strongly rely on deposit financing. The dynamics, especially during the crisis period, are however with respect to all funding types almost the same for both subsidiaries and branches (outside financial centers), which supports the approach of aggregating over branches and subsidiaries per bank and country below.

¹² Branches of German banks already account for roughly two-thirds of total affiliate lending to the foreign private sector.

4 Results

Table 4 depicts two columns of results per regression, of which the first column reports estimated coefficients of the explanatory variables interacted with the crisis dummy. We aim at interpreting only these coefficients, as they show the crisis driven changes in affiliate lending abroad in dependence on the underlying funding sources. The second column of each regression outcome reports controls for these variables (the estimated coefficients for the variables that are not interacted with the crisis dummy).

4.1 Stable affiliate funding important for loan supply in the crisis

The outcome of regression (1) in the first two columns of Table 4 demonstrates that local affiliates were more likely to extend credit to a certain country during the crisis if they relied on stable *Deposit funding* and on large *Net income* (panel (I) of regression outcome (1)). We find the very same effects for the funding variables of the bank's cross-border affiliates, which may complement the lending activities of the local affiliate or may be the sole lender to a certain country (panel (III)). This is in line with IVASHINA AND SCHARFSTEIN (2010) who provide evidence that during the financial crisis, banks which had better access to deposit financing - as the traditional source of loan funding - cut back less of their syndicated lending with mainly large corporations. In addition, CORNETT ET AL. (2011) stress the importance of core deposits as a stable source of funding during the crisis. Beyond this focus of the previous literature, we demonstrate that affiliates which remain successful in generating income reduce their lending activities to a lesser extent, as they are more profitable and thus try to keep their activities at least stable in the crisis.

By contrast, local affiliates which had relied more on *Short-term wholesale funding* found it increasingly difficult to provide a stable loan supply (the interaction term with the crisis dummy is negative significant in panel I of the results table). For cross-border affiliates (panel III), this effect is not significant. The cross-border affiliates in turn

dampen affiliate lending during the crisis the larger their risk aversion is, measured by their *Capitalization*.

4.2 Intra-bank funding and competition on the internal capital market

The regression output (2) in Table 4 includes *intra-bank* funding as a special source of affiliate funding. It is treated separately, since it brings two further aspects into the analysis. First, a higher share of intra-bank funding increases the dependence of affiliate lending on balance sheet characteristics of the parent bank (as the most important supplier of internal funding). Second, it allows for the consideration of competition for internal funds across the bank's affiliates.

While parent bank characteristics have no impact *per se* on affiliate lending abroad (as we conclude from the results of regression (1)), their relevance emerges with affiliates taking recourse to intra-bank funding (see interaction terms of parent bank characteristics with intra-bank funding in panel (II) of regression outcome (2)). The more affiliates rely on internal funds, the more we find that relatively stable *Deposit funding* by the parent bank contributes positively to lending by affiliates abroad in the crisis. Besides, strong and stable banks which were largely granted long-term refinancing on the capital market (*Long-term wholesale funding*) are also in a position to support their foreign affiliates' lending activities.

By itself, the local affiliate's intra-bank net borrowing is found to be a rather limiting factor for the loan supply abroad in the crisis (*Intra-bank funding* in the crisis is significantly negative, see panel (I) of regression outcome (2)). This could indicate that internal funds are increasingly used to support the parent banks' home market activities (see also the results in section 4.3) and strategically important affiliates, as the available overall bank resources become scarce. Thus, affiliates that relied strongly on intra-bank funding already before the crisis experienced growing competition for these internal

funds and had to cut back on their lending in order to adjust their business model in the context of the bank's overall strategy.

With the results of regression (2), we can provide another important insight into the multinational bank's internal fund management. Alongside intra-bank funding which is provided to local affiliates and cross-border affiliates, we include the reliance of non-cross-border affiliates located in other countries and financial center affiliates on this type of funding, as these financing shares reflect the competition for these funds across the affiliates (reported in panel (IV) of regression outcome (2)). As expected, in the light of increasingly scarce funding resources during the financial crisis, the estimated coefficient on intra-bank funding provided to non-cross-border affiliates turns out to be negative and significant (see panel (IV) of regression (2)). From the point of view of the affiliates which are involved in lending to a certain country, the group of other non-cross-border affiliates is a direct competitor for intra-bank funds. In line with this, we find no significant impact on affiliate loan supply from intra-bank funding of the group of financial center affiliates or of the cross-border affiliates.

4.3 Parent bank home lending as an additional limiting factor

In our final specification, we show that during the crisis the banks' scarcity of funding sources stops the formerly parallel expansion of parent banks' home lending and affiliates' lending abroad. The delinkage of home and foreign activities is stronger the more the affiliate abroad relies on intra-bank funding.

In regression outcome (3) reported in Table 4, we introduce *Home lending* by the parent bank, which in analogy to our dependent variable, affiliate lending, refers to the variation in long-term loans provided to corporations. It is lagged one period to reduce simultaneity issues (see also Table 1 for the definition of variables). We find a highly significant relationship between *Home lending* of the parent bank and transaction-induced

changes in affiliate lending abroad before the financial crisis.¹³ In a previous study (DÜWEL, FREY AND LIPPONER (2011)), we have already shown that this kind of relationship generally exists between the lending of the whole banking conglomerate to foreign markets and the activities of their German parent banks on the home market. However, we have now found evidence that during the financial crisis banks concentrated their lending on corporations on the home market, although no trade-off between activities at home and abroad could be detected.

The results of regression (3) demonstrate that the more affiliates abroad borrow from their parent, the more their lending is expanded in parallel to the activities of the parent bank on the home market (see the interaction term between *Home lending* of the parent bank and *Intra-bank funding* by affiliates). However, this parallel movement is lost during the financial crisis (the interaction of the term with the crisis dummy is significantly negative and the total effect in the crisis is insignificant). The dampening of this positive correlation during the crisis is larger, the more affiliates rely on intra-bank funding, which reflects the competition for internal funds between the parent bank and its affiliates.

4.4 Robustness of the distress indicator

Our key results hold when we employ a continuous indicator for the generally perceived risk on funding markets for German banks instead of a crisis dummy variable. For this, we replace the crisis dummy marking the period from 2008Q3 onwards with the spread between the three-month European interbank offered rate (EURIBOR) and the three-month German government bond rate.¹⁴ This spread peaked in 2008Q4 at about 240 basis points. Until the end of our sample in 2010Q4, the spread has been fluctuating at around 50 basis points, which is still well above the pre-crisis level of less than 10

¹³ As domestic parent bank lending is like the dependent variable, affiliate lending abroad, a flow variable, an economic interpretation of the coefficient for the pre-crisis period is possible.

¹⁴ We thereby follow CORNETT ET AL. (2011) who use the difference between the three-month London interbank offered rate (LIBOR) and the three-month Treasury rate for the US.

basis points. With this alternative measure, we can confirm our outcome above of an increasing relevance of the net income of the local and the cross-border affiliates for stable loan supply in the crisis. Deposit funding of the cross-border affiliates¹⁵ and of the parent banks support affiliate lending abroad. As before, growing competition among the affiliates for internal funds can be detected during the crisis, and home lending by the parent bank is given priority over affiliate lending abroad during the time of distress.

5 Conclusions

With the unexpected bankruptcy of Lehman Brothers in September 2008, the funding of banks became more difficult due to the loss of confidence both on the capital and the interbank market. Against this background, we have investigated the impact of the multinational banks' funding structures on the lending of their affiliates located abroad and provided some evidence for increasing competition for internal funds within the banking conglomerates. Our unique data set allows us to rely on lending and funding balance sheet data of both the affiliates and the parent banks on the micro level and thus to distinguish between market funding, internal funding (net income) and intra-bank funding. Concerning the latter, we are the first to identify the financial intra-bank relationship between German parent banks and their branches abroad. Thus, we can provide new insight into the competition for internal funds among the different parts of the banking group, including locally active affiliates as well as affiliates lending across borders or being hosted in countries with large financial centers. Besides, we assure an accurate assessment of lending strategies by using transaction-induced changes in the banks' loan portfolios in real terms, which excludes changes in loan stocks caused by exchange rate fluctuations and other valuation effects.

First and foremost, we expect the foreign affiliates' own funding structure to be relevant for its lending decisions. In fact, we find that their local deposit funding as well as their

¹⁵ The estimated coefficient on deposit funding of the local affiliate remains positive but turns out to be insignificant.

potential to generate own funds internally prove to be key in stabilizing loan supply after the bankruptcy of Lehman Brothers. As the net income can be also interpreted as a measure of profitability, we find that the success of the affiliates' lending business protects them from sizeable deleveraging within the banking group in the crisis. With respect to the loan provision to a specific country, these results hold independently of the channel of loan distribution, which is either lending through a local affiliate or lending on a cross-border basis through affiliates located in other, probably neighboring countries. In contrast, we see short-term wholesale funding of local affiliates as a destabilising element in the crisis. This is all the more concerning as this funding instrument, which is dominated by interbank loans, was by far the most relevant funding source of the affiliates up to the financial crisis (above 40 % of total assets), while it has faced a strong decline during the crisis.

The emerging funding gap, which was additionally increased by a temporary reduction in deposits, was partly offset by the financial support of the parent banks to their affiliates. The share of intra-bank funding in total assets rose to slightly above 30 % in the crisis. Our results show that with a reliance on intra-bank funding, the funding characteristics of parent banks become relevant for the affiliates' lending behavior during the crisis. Affiliate lending abroad receives additional support from parent banks which are more successful in collecting deposits and which have a stronger position in the long-term wholesale funding market. The latter represents an important funding tool at the parent bank level and has a strong focus on the bonds and notes issued by the bank.

As banks' overall funds become scarce in the course of the crisis, we detect growing competition for funds within the banking organization. Affiliates with local lending activity increasingly compete with each other for internal funds. In addition, the parent banks' lending on its home market is found to be a further limiting factor for the affiliates' business abroad, as home lending is a core business of German banks and hence given priority in the crisis. While lending by affiliates to the private sector in foreign countries used to expand rather in parallel with lending to the home market, this relationship is

lost from late 2008 onwards. Especially affiliates relying on intra-bank funding suffer from the shift in funding priorities towards the home market business.

We conclude that in times of crisis a bank adjusts its strategy, focussing on its most relevant business fields. Deleveraging as a reaction to the financial crisis is found to differ strongly across the various activities of the banks. It is therefore not easy to give a general prediction regarding the development of loan supply by foreign affiliates during the crisis in certain regions of the world, as it is primarily bank-country specific. Western European banks' foreign affiliate lending, for example, plays a crucial role for loan supply to several CEE countries, therefore considerable withdrawal would probably have a noticeable effect on real activity. However, the BIS (2011) assesses a deleveraging of western European banks in this region as rather unlikely, since most of them operate through their in-country presence, and their claims are to a large extent long-term and are tradable only at relatively high cost. This corresponds with our outcome, which suggests that the strategic importance of the market in combination with established banking infrastructure in the form of local affiliates with independent funding represent significant exit costs. This may result in rather stable loan provision in such regions, even during periods of distress.

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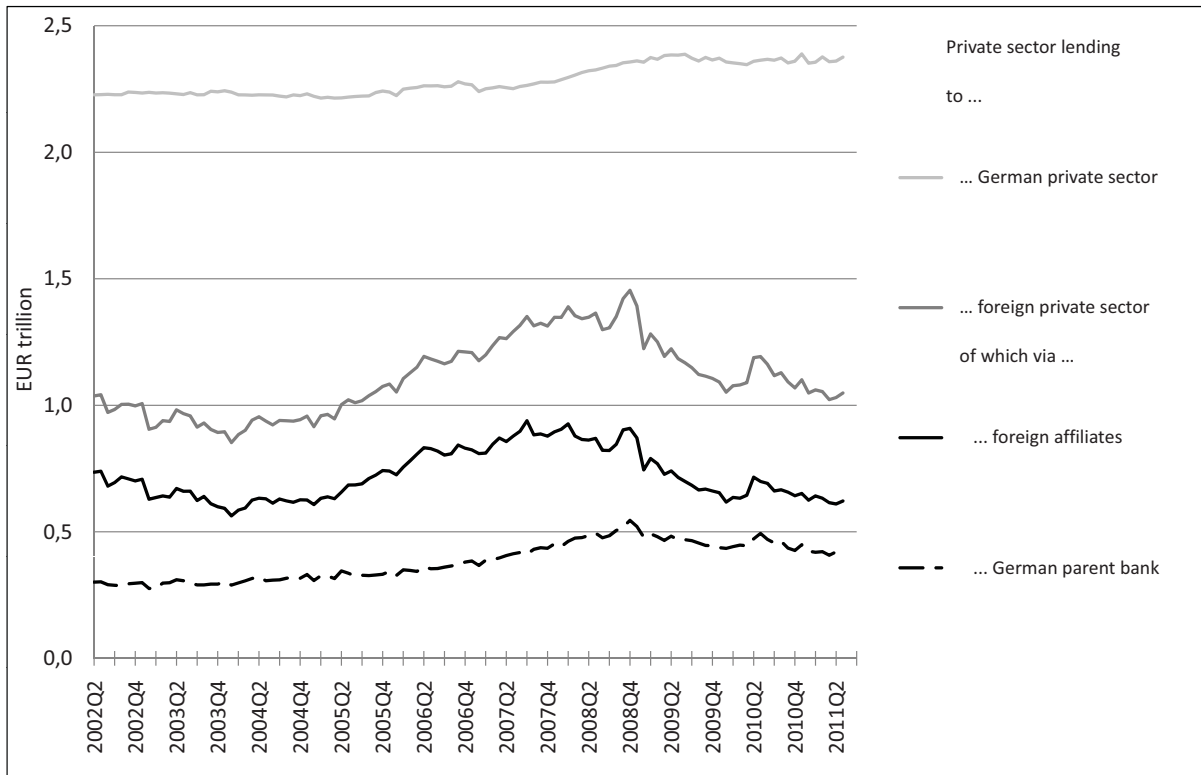
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Appendix

A Figures

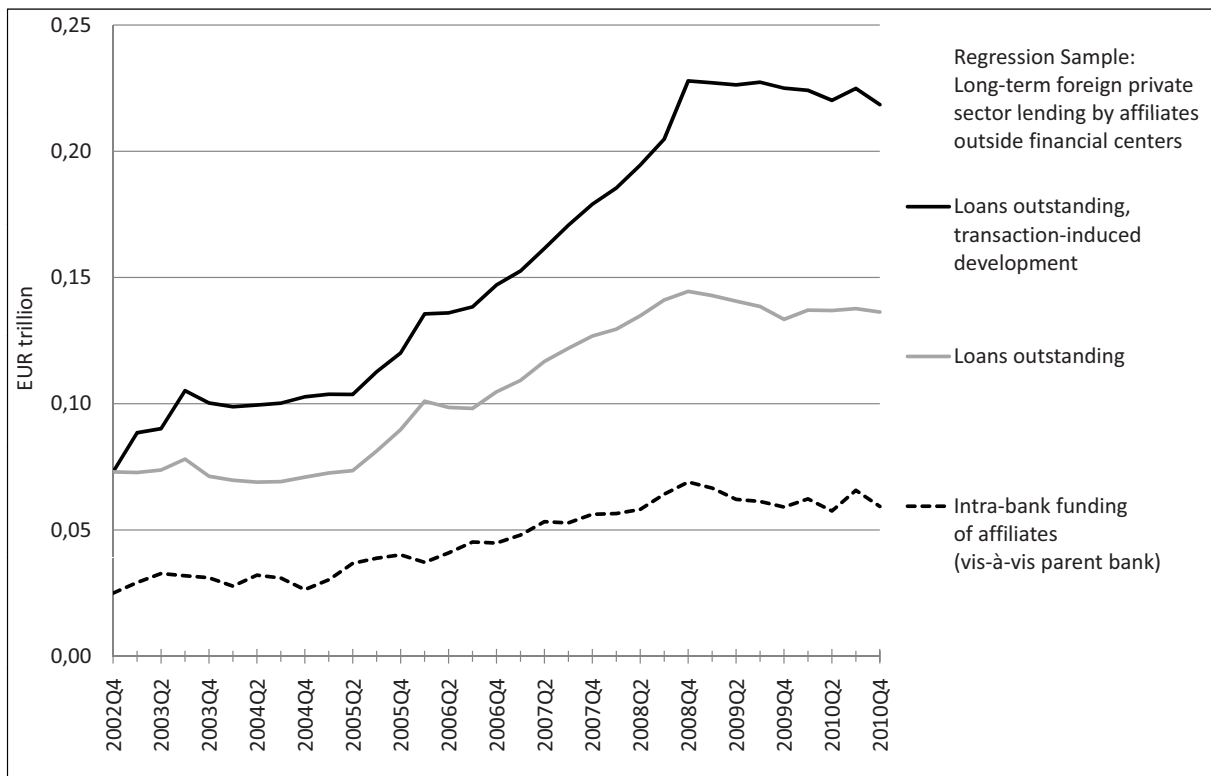
Figure 2: Overall private sector lending by German banks



Source: Deutsche Bundesbank.

This graph depicts overall private sector lending to the German economy and to all foreign economies by the German banking system. The series are based on monthly observations reported to the Deutsche Bundesbank by the German banks and their affiliates (subsidiaries and branches) located abroad.

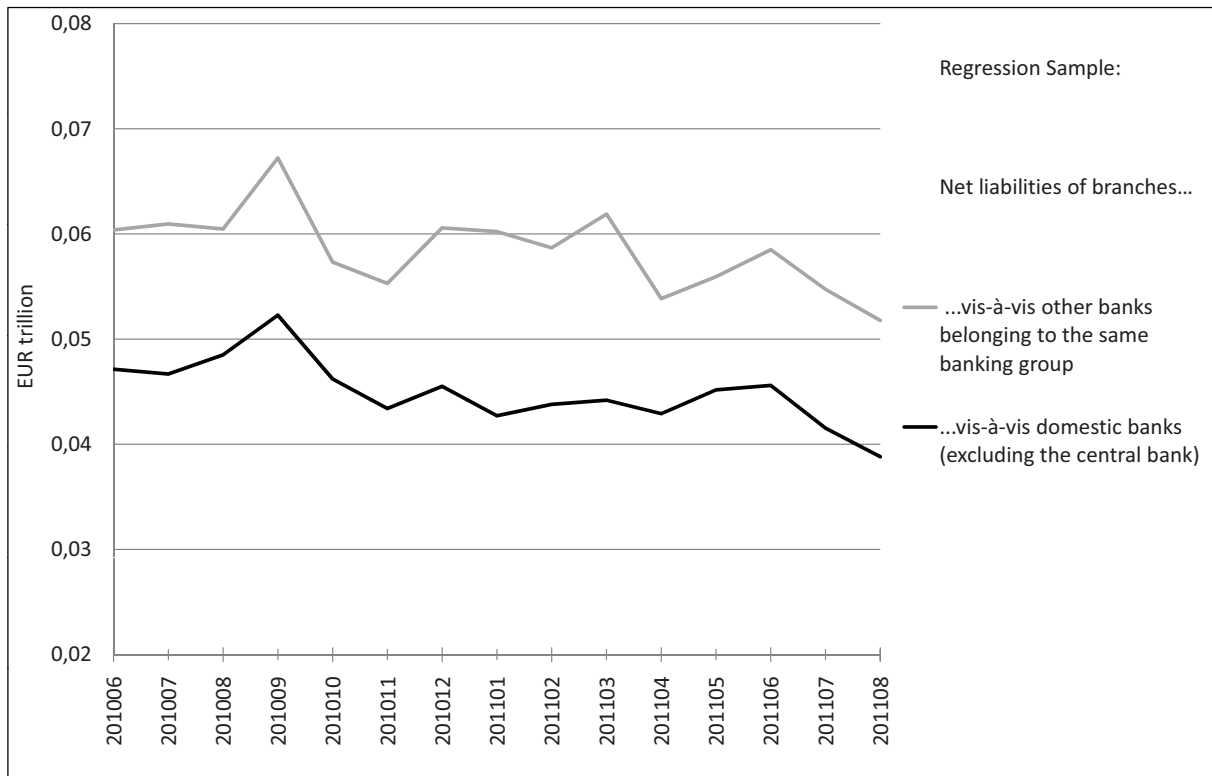
Figure 3: Lending and intra-bank funding by affiliates of German banks



Source: Deutsche Bundesbank / own calculations.

This graph depicts the aggregate development of transaction-induced long-term foreign private sector lending and intra-bank funding of affiliates located abroad which comprise the largest 68 German banking organizations. These banking organizations account for approximately 84% of total foreign private sector lending by the German banking system (for details of the selection of banks and destination countries, see section 3). The underlying monthly series have been transformed into quarterly series. Transaction-induced changes are variations in loan stock which are not caused by exchange rate fluctuations or other valuation effects. The transaction-induced development in loans outstanding is calculated by adding transaction-induced changes in loans to the stock of loans outstanding in 2002Q4. Intra-bank funding corresponds to net liabilities of foreign affiliates vis-à-vis the German parent banks.

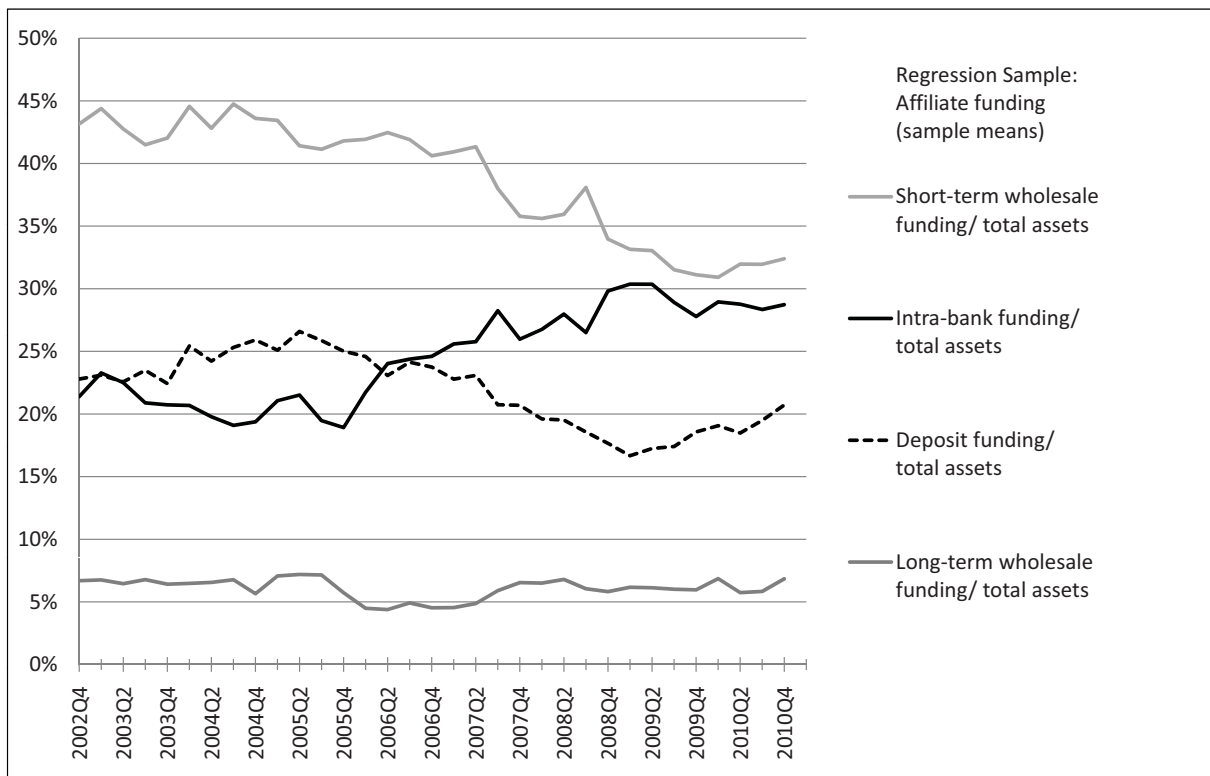
Figure 4: Approximation of intra-bank flows for branches



Source: Deutsche Bundesbank / own calculations.

This graph supports our decision to use net liabilities vis-à-vis banks in Germany as an approximation for net intra-bank borrowing of branches. This becomes necessary for our analysis since it requires data from before and after the bankruptcy of Lehman Brothers, but the more accurate information on net liabilities of branches vis-à-vis banks belonging to the same banking group has only been available since June 2010. The dynamics between the two series follow a very similar pattern. The difference in volume might arise from the fact that the new series on net liabilities of branches vis-à-vis other banks of the same banking group comprise not only borrowing from the parent bank but also from other affiliates located abroad. Regarding the position vis-à-vis domestic banks, small inaccuracies may occur if branches abroad borrow from domestic banks other than their parent bank. However, we consider this to be rather unlikely and suggest that the main business partner of a branch in the home banking sector is the parent bank.

Figure 5: Funding structure of affiliates located abroad



Source: Own calculations.

Based on balance sheet statistics collected by the Deutsche Bundesbank on subsidiaries and branches (together: affiliates) of German banks located abroad, we calculated quarterly mean shares of funding sources relative to total assets of affiliates over time. The graph is based on affiliates which appear in the regression sample.

Intra-bank funding corresponds to net borrowing of affiliates abroad vis-à-vis the German parent bank. Wholesale funding comprehends both liabilities of affiliates vis-à-vis foreign banks and the issuance of bonds and notes.

B Tables

Table 1: Definition of variables and their expected impact on foreign affiliate lending in the crisis

Variable	Definition	Notes on definition	Expected impact on foreign affiliate lending in the crisis	Short intuition
Transaction-induced changes in long-term lending by affiliates abroad	Change in loan stock outstanding, adjusted for exchange rate fluctuations and cleaned from other valuation effects such as right-downs.	Measured in real terms using the German consumer price index to deflate initial series.	-	- Dependent variable -
Deposit funding	Liabilities vis-à-vis non-banks / total assets		+	Banks that successfully raise deposits locally can rely on a stable source of funding as it is independent from the functioning of interbank and liquidity markets, even in times of crisis.
Short-term wholesale funding	(Short-term liabilities vis-à-vis banks + short-term debt securities issued) / total assets	For affiliates located abroad, only liabilities vis-à-vis foreign banks (international interbank market) are used. For parent banks, the position vis-à-vis other German banks (without the central bank) is used.	-	Short-term funding makes banks more dependent on market conditions and confidence within the wholesale funding market, which both worsened during the crisis.
Long-term wholesale funding	(Long-term liabilities vis-à-vis banks + long-term debt securities issued) / total assets		+	Banks with long-term refinancing on the wholesale market rely on a stable funding source during the crisis.
Intra-bank funding	Net liabilities of affiliate vis-à-vis parent bank / total assets	net liabilities of affiliate = net liabilities of subsidiary vis-à-vis parent bank + net liabilities of branch vis-à-vis German banking sector (the latter proxies for series not registered)	+/-	The affiliate's recourse to intra-bank funding provided by the parent bank could stabilize lending by compensating for other lost funding sources (+). Due to bank-wide competition on the bank's internal capital market a cut-back may arise especially in the crisis (-).
Net income	Net income / equity capital	Both series are averaged over the past two quarters in order to eliminate high fluctuations from the series.	+	Banks which are successful in generating net income are more independent from external finance or intra-bank funding and can stabilize their lending. It is also a signal of profitability and thus it reflects strategic importance of the affiliates.
Affiliate lending shares	Long-term loans outstanding vis-à-vis the foreign private sector / total amount held by the whole banking organization	Calculated for local affiliate, cross-border affiliates and non-cross-border affiliates.	+	The larger the share of local and cross-border affiliates in lending activities of the whole banking group, the more they are likely to extend credit.
Relevance of financial center affiliates	Overall balance sheet size of affiliates located in countries with important financial centers / total assets of banking organization		+/-	The larger the affiliates located in countries with important financial centers, the higher is their relevance within the bank (+), or the more they compete with affiliates engaged in lending to corporations for internal funds (-).

Table 1: *continued*

Home lending of the parent bank	First difference of parent bank's loans outstanding vis-à-vis corporations located in the home market	Measured in real terms using the German consumer price index to deflate initial series.	-	In times of declining intra-bank funds, affiliate lending abroad compends with home lending by the parent bank for internal funds.
Capitalization	Equity capital / loans outstanding		-	High capitalization hints to higher risk aversion of the bank, which may limit the expansion of credit.
Size	Total assets		+	Size controls for lower informational asymmetries due to eg better screening instruments.
Weight on balance sheet characteristics of the <i>local</i> affiliate	Local affiliate's long-term loans to firms outstanding / total loan supply to firms in the specific country provided by all affiliates of the common parent bank	The share is averaged over the past six months in order to avoid misjudgement due to single events. For the extreme values: Set to 0 if denominator=0 (there is no loan supply by affiliates). Set to 1 if the calculated share exceeds 1.		This weight measures to which extent the local affiliate is able to satisfy local loan demand. Balance sheet characteristics of the local affiliate should be the more important compared to those of cross-border affiliates, the more it is responsible for the whole banking group's loan supply to the local market.
Weight on balance sheet characteristics of the group of <i>other</i> affiliates which supply loans <i>cross-border</i>	1- (Local affiliate's long-term loans to firms outstanding / total loan supply to firms in the specific country provided by all affiliates of the common parent bank)	The share is averaged over the past six months in order to avoid misjudgement due to single events. For the extreme values: Set to 0 if denominator=0 (there is no loan supply by affiliates). Also set to 0 if the weight on the local affiliate=1 (see definition right above).		This weight measures to which extent other affiliates outside the destination country support a potential local affiliate in satisfying local loan demand. Balance sheet characteristics of the affiliates which lend cross-border should be the more important compared to local affiliates, the less these local dependencies cover the local demand for loans.

Table 2: Descriptive statistics

This table reports summary statistics for the panel of the largest 68 German banking conglomerates between 2002Q2 and 2010Q4. The data stem from statistics collected by the Deutsche Bundesbank on a monthly base. Transaction-induced changes in long-term lending by affiliates abroad correspond to the variation in these affiliates' long-term loan stock outstanding, adjusted for exchange rate fluctuations and other valuation effects. Affiliates comprehend both subsidiaries and branches; the data are constructed such that one affiliate exists per parent bank and destination country. Balance sheet data are grouped by bank entity: *Local affiliate*=local affiliate in destination country. *Cross-border affiliates*=affiliates of the same parent bank outside the destination country, which are active in cross-border lending, hence may also supply loans to this country. *Non-cross-border affiliates*=affiliates of the same parent bank outside the destination country whose lending is focused on their local market. *Financial center affiliates*=affiliates which are located in countries with important financial centers (see section 3). Minima and maxima of bank-specific variables are not reported due to confidentiality. Maximum number of observations: 95,200 = 35 quarters x 40 countries x 68 parent banks.

Variable	Obs	Mean	Std. Dev.
<i>Dependent variable</i>			
Transaction-induced changes in long-term lending by affiliates abroad (in EUR bn)	95,164	0.002	0.060
<i>Non-zero observations</i>	51,088	0.003	0.082
<i>Local affiliate*</i>			
Deposits / total assets	3,321	0.219	0.248
Short-term wholesale funding / total assets	3,321	0.389	0.323
Long-term wholesale funding / total assets	3,321	0.061	0.137
Net income / equity capital	3,321	6.160	63.239
Intra-bank funding / total assets	3,321	0.245	0.448
Capitalization (equity capital / loans outstanding)	3,321	0.471	10.322
Affiliate lending share (within banking group)	3,321	0.042	0.111
Total assets (in EUR bn)	3,321	2.791	4.770
<i>Parent bank</i>			
Deposits / total assets	95,200	0.483	0.222
Short-term wholesale funding / total assets	95,200	0.056	0.061
Long-term wholesale funding / total assets	95,200	0.290	0.177
Net income / equity capital	95,120	0.176	0.176
Capitalization (equity capital / loans outstanding)	95,200	0.060	0.037
Home Lending: changes (in EUR bn)	95,160	-0.016	0.451
Total assets (in EUR bn)	95,200	59.229	99.721
<i>Cross-border affiliate*</i>			
Deposits / total assets	939	0.168	0.212
Short-term wholesale funding / total assets	939	0.376	0.321
Long-term wholesale funding / total assets	939	0.077	0.150
Net income / equity capital	939	1.391	6.300
Intra-bank funding / total assets	939	0.383	0.410
Capitalization (equity capital / loans outstanding)	939	0.050	0.061
Affiliate lending share (within banking group)	939	0.062	0.078
Total assets (in EUR bn)	939	3.409	4.041
<i>Other affiliate of the same banking group*</i>			
Non-cross-border affiliate: Lending share (within banking group)	2,382	0.035	0.120
Non-cross-border affiliate: Intra-bank funding / total assets	2,382	0.191	0.451
Financial center affiliate: Relevance (size rel. to banking group)	2,700	0.051	0.061
Financial center affiliate: Intra-bank funding / total assets	2,700	0.117	0.330
<i>Weights [0, 1]</i>			
...on balance sheet characteristics of the local affiliate	92,480	0.023	0.141
... if local affiliate exists	3,229	0.640	0.407
...on balance sheet characteristics of cross-border affiliates	92,480	0.111	0.306
... if cross-border affiliates exists	15,640	0.474	0.477
Crisis dummy (1: t ≥ 2008Q3; 0: otherwise)	35	0.286	0.458

* Balance sheet data of local affiliates and/or of other affiliates is set to zero in the regressions if no affiliate of this type exists. Statistics reported refer to non-zero observations.

Table 3: List of countries

Numbers refer to the regression sample and provide a snapshot of aggregate lending activities by affiliates located abroad of the largest 68 German banking organizations as of 12/2009. Affiliates may be located in or outside the destination country. Lending volumes and number of active affiliates may include both local affiliates as well as affiliates situated in other foreign countries. The data stem from monthly reports to the Deutsche Bundesbank.

Country	Volume of affiliate long-term lending to private sector (in Euro Million)	Number of German banks with active affiliates	Affiliate share in total long-term lending by German banks
1 Italy (IT)	26,091.250	12	0.95
2 Spain (ES)	22,820.940	18	0.73
3 Poland (PL)	13,164.440	12	0.68
4 France (FR)	12,359.650	19	0.41
5 Netherlands (NL)	8,220.244	20	0.30
6 Hungary (HU)	5,991.111	9	0.74
7 Australia (AU)	4,943.627	12	0.84
8 Portugal (PT)	4,410.414	11	0.76
9 Japan (JP)	3,314.444	8	0.56
10 Russian Federation (RU)	3,235.044	8	0.40
11 Sweden (SE)	2,900.897	11	0.31
12 Denmark (DK)	2,627.659	13	0.39
13 Norway (NO)	2,198.446	8	0.39
14 Belgium (BE)	2,109.908	14	0.39
15 United Arab Emirates (AE)	1,910.929	10	0.66
16 India (IN)	1,901.942	9	0.80
17 Canada (CA)	1,766.109	12	0.51
18 Czech Republic (CZ)	1,647.326	10	0.41
19 Mexico (MX)	1,295.724	10	0.51
20 Finland (FI)	1,080.531	9	0.36
21 Chile (CL)	920.475	7	0.69
22 Saudi Arabia (SA)	900.928	5	0.79
23 Brazil (BR)	880.329	8	0.68
24 Turkey (TR)	847.644	9	0.16
25 Ukraine (UA)	834.890	4	0.78
26 South Africa (ZA)	783.251	5	0.85
27 Greece (GR)	623.486	10	0.14
28 Qatar (QA)	570.247	5	0.51
29 Iceland (IS)	523.858	10	0.72
30 China (CN)	505.746	9	0.62
31 Austria (AT)	418.298	11	0.11
32 Romania (RO)	413.421	5	0.28
33 Republic of Korea (KR)	278.359	7	0.69
34 Indonesia (ID)	268.412	7	0.77
35 Slovak Republic (SK)	252.944	6	0.31
36 New Zealand (NZ)	150.493	6	0.79
37 Iran (IR)	103.856	5	0.15
38 Israel (IL)	61.155	6	0.09
39 Slovenia (SI)	39.833	3	0.04
40 Croatia (HR)	36.838	4	0.11
Total	133,405.098		
Financial centers*	135,474.400		

* Countries hosting important financial centers were not considered for the analysis. Alongside the US and the UK, all offshore financial centers as defined by the IMF (2000) were excluded as destination countries for lending. These are: Luxembourg, Ireland, Switzerland, Singapore, Hong Kong, Malta, Cyprus, Bahrain, Macao, Mauritius, Liechtenstein, Antigua and Barbuda, Anguilla, Netherlands Antilles, Barbados, Bermuda, Guernsey, Gibraltar, Isle of Man, Jersey, Cayman Islands, Liberia, Marshall Islands, Panama, Philippines, Saint Vincent and the Grenadines, Virgin Islands (British), Virgin Islands (U.S.).

Table 4: Regression results

This table reports fixed-effects regressions of quarterly transaction-induced changes in long-term lending by affiliates abroad for a panel of the largest 68 German banking conglomerates, 2002Q4 to 2010Q4. Transaction-induced changes correspond to the affiliates' variations in long-term loan stock outstanding, adjusted for exchange rate fluctuations and other valuation effects. Intra-bank funding corresponds to net liabilities of an affiliate abroad vis-à-vis its German parent bank (the affiliate variables are own calculations based on data collected by the Deutsche Bundesbank such that one affiliate exists per parent bank and country). *Local affiliate*=local affiliate in destination country. *Cross-border affiliates*=affiliates of the same parent bank outside the destination country, which are active in cross-border lending, hence may also supply loans to this country. *Non-cross-border affiliates*=affiliates of the same parent bank outside the destination country whose lending is focused on their local market. *Financial center affiliates*=affiliates which are, in contrast to all other affiliates, located in countries with important financial centers (see section 3). Fixed effects for banks, country-time fixed effects and seasonal dummies are included but not reported. All explanatory variables are lagged one period. *Crisis dummy*=1 if $t \geq 2008Q3$. Standard errors, clustered by bank-country pairs, in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).

<i>Dependent variable</i>	(1) Role of affiliates' funding structures		(2) Intra-bank competition for funds		(3) Including parent bank home lending	
	<i>Change due to crisis</i>	<i>control for pre-crisis</i>	<i>Change due to crisis</i>	<i>control for pre-crisis</i>	<i>Change due to crisis</i>	<i>control for pre-crisis</i>
I. Local affiliate:						
Deposit funding	0.146** (0.068)	0.028 (0.048)	0.126* (0.069)	0.050 (0.047)	0.125* (0.068)	0.043 (0.048)
Short-term wholesale funding	-0.081** (0.039)	-0.010 (0.023)	-0.085** (0.038)	-0.009 (0.022)	-0.082** (0.038)	-0.009 (0.023)
Long-term wholesale funding	0.064 (0.047)	-0.039 (0.043)	0.081 (0.059)	-0.050 (0.053)	0.063 (0.051)	-0.032 (0.044)
Net income	0.005*** (0.001)	-0.000*** (0.000)	0.005*** (0.001)	-0.001 (0.000)	0.004*** (0.001)	-0.000 (0.000)
Capitalization	-0.052 (0.042)	0.030 (0.032)	-0.060 (0.047)	0.027 (0.033)	-0.051 (0.045)	0.020 (0.031)
Affiliate lending share	-0.116 (0.078)	0.046 (0.039)	-0.073 (0.088)	-0.050 (0.058)	-0.080 (0.084)	-0.025 (0.049)
Size (total assets)	-0.005 (0.003)	0.007* (0.004)	-0.004 (0.003)	0.006* (0.004)	-0.005 (0.003)	0.007* (0.004)
Intra-bank funding			-0.111* (0.059)	0.087* (0.046)	-0.079 (0.050)	0.056 (0.037)
II. Parent bank:						
Deposit funding	0.007 (0.022)	0.013 (0.013)	0.010 (0.014)	0.010 (0.009)	0.008 (0.014)	0.013 (0.009)
Short-term wholesale funding	-0.032 (0.030)	-0.013 (0.016)	-0.016 (0.022)	-0.009 (0.012)	-0.026 (0.023)	-0.001 (0.013)
Long-term wholesale funding	0.010 (0.022)	0.013 (0.012)	0.015 (0.014)	0.011 (0.009)	0.013 (0.014)	0.011 (0.008)
Net income	-0.002 (0.003)	0.002 (0.003)	0.001 (0.003)	-0.001 (0.003)	0.001 (0.003)	-0.001 (0.003)
Capitalization	-0.005 (0.017)	0.009 (0.008)	0.005 (0.017)	0.002 (0.007)	-0.000 (0.017)	0.003 (0.007)
Size (total assets)	-2.67e-06 (0.000)	1.19e-04** (0.000)	2.98e-05*** (0.000)	9.77e-05** (0.000)	1.68e-05 (0.000)	8.66e-05* (0.000)
Deposit funding * Intra-bank funding of affiliate			0.211** (0.088)	-0.185*** (0.070)	0.142* (0.075)	-0.123** (0.057)
Short-term wholesale funding * Intra-bank funding of affiliate			-0.324 (0.364)	-0.296 (0.227)	-0.884** (0.376)	0.282 (0.272)
Long-term wholesale funding * Intra-bank funding of affiliate			0.203* (0.118)	-0.047 (0.098)	0.230* (0.118)	-0.052 (0.078)
Net income * Intra-bank funding of affiliate			-0.262 (0.296)	0.466** (0.200)	-0.089 (0.245)	0.304** (0.136)
III. Cross-border affiliates:						
Deposit funding	0.079*** (0.020)	-0.035*** (0.013)	0.056** (0.023)	-0.021 (0.014)	0.060*** (0.023)	-0.031** (0.015)
Short-term wholesale funding	-0.017 (0.012)	0.013 (0.011)	-0.011 (0.013)	0.006 (0.010)	-0.011 (0.013)	0.010 (0.011)
Long-term wholesale funding	0.001 (0.012)	0.015 (0.012)	-0.005 (0.012)	0.019 (0.012)	-0.006 (0.012)	0.018 (0.012)
Net income	4.01e-04** (0.000)	-6.27e-04*** (0.000)	4.49e-04* (0.000)	-4.87e-04** (0.000)	3.57e-04 (0.000)	-4.58e-04* (0.000)
Capitalization	-0.270*** (0.078)	0.112 (0.081)	-0.245** (0.100)	0.096 (0.100)	-0.251** (0.100)	0.104 (0.100)
Affiliate lending share	-0.005 (0.010)	-0.015 (0.009)	-0.005 (0.012)	-0.039** (0.016)	-0.014 (0.013)	-0.002 (0.010)
Intra-bank funding			-0.012 (0.010)	0.007 (0.010)	-0.009 (0.010)	0.006 (0.009)
IV. Further affiliates of the same parent bank:						
Non-cross-border affiliates: Lending share			0.024* (0.012)	-0.034 (0.023)	0.017 (0.012)	-0.015 (0.019)
Non-cross-border affiliates: Intra-bank funding			-0.012** (0.005)	0.003 (0.004)	-0.008* (0.004)	0.000 (0.003)
Financial center affiliates: Relevance			-0.012 (0.017)	0.015 (0.015)	0.000 (0.016)	0.027* (0.015)
Financial center affiliates: Intra-bank funding			0.004 (0.002)	0.002 (0.003)	0.004* (0.002)	0.000 (0.003)
V. Parent bank: lending on home market						
Home lending					-0.002 (0.002)	0.004*** (0.001)
Home lending * Intra-bank funding of affiliate					-0.088* (0.050)	0.125*** (0.033)
Constant	-0.034 (0.021)		-0.029 (0.026)		-0.039 (0.025)	
Observations	89684		89684		89684	
Number of bank-country pairs (clusters)	2720		2720		2720	
adj. R-squared	0.0233		0.0362		0.0735	

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