Crises, rescues, and policy transmission through international banks

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Abstract

The World Financial Crisis has shaken the fundamentals of international banking and triggered a downward spiral of asset prices. To prevent a further meltdown of markets, governments have intervened massively through rescues measures aimed at recapitalizing banks and through liquidity support. We use a detailed, bank-level dataset for German banks to analyze how the lending and borrowing of their foreign affiliates has responded to domestic (German) and to US crisis support schemes. We analyze how these policy interventions have spilled over into foreign markets. We identify loan supply shocks by exploiting that not all banks have received policy support and that the timing of receiving support measures has differed across banks. We find that banks covered by rescue measures of the German government have increased their foreign activities after these policy interventions, but they have not expanded relative to banks not receiving support. Banks claiming liquidity support under the Term Auction Facility (TAF) program have withdrawn from foreign markets outside the US, but they have expanded relative to affiliates of other German banks.

JEL codes: G01, F34, G21

Keywords: Cross-border banking, financial crisis, government support, Term Auction Facility

Non-technical summary

We analyze the responses of German banks' foreign affiliates to domestic and foreign government support measures in terms of international lending and borrowing. The objective of the paper is to shed light on the existence of cross-border policy transmission.

Detailed data on foreign exposures of German banks between 2002 and 2010 is combined with support measures by domestic and US authorities. Specifically, we use support measures of the German government, which have largely been administered by the so-called SoFFin (*Sonderfonds Finanzmarktstabilisierung*, Special Fund Financial Market Stabilization), and the Term Auction Facility (TAF) of the Federal Reserve System.

Identification of rescue measures and crisis effects proceeds in two ways. First, we investigate the determinants of foreign assets of those German affiliates abroad, which are associated with a bank holding company (BHC) that has received government support (guarantees or capital injections). Second, we investigate foreign lending (borrowing) of *non-US* affiliates associated with a particular German BHC that also operates a US affiliate that, in turn, has tapped the TAF facility. Both approaches ensure that the effects of rescue measures are exogenous to the analyzed foreign affiliates.

The first result is based on a difference-in-difference approach identifying the effect of rescues and crises on affiliates of BHCs with an exposure to either kind of rescue measure. We find that German support measures increased foreign lending and borrowing significantly after the crisis of 2008, but not before. TAF measures, in turn, lead to a contraction of both foreign assets and liabilities on the books of German affiliates operating outside the US. This result provides evidence for the existence and the different nature of international spillovers of domestic support policies.

Our second main result contrasts the international activities of German banks' affiliates with the activities of those affiliates whose German parent (or US-sibling, respectively) has drawn on support measures. German rescue measures are correlated with a contraction of foreign activity of the average foreign affiliate after the crisis. Put differently, while support measures were successful in mitigating contractionary tendencies among those banks considered in need for governmental support, interventions were not able to completely nullify the reduction in foreign assets and liabilities due to the financial crisis for the banking industry as a whole. In contrast, TAF measures led to an expansion of both foreign assets and liabilities among German affiliates operating outside the US.

Nicht-technische Zusammenfassung

In diesem Papier untersuchen wir, wie sich Forderungen und Verbindlichkeiten der Auslandsniederlassungen deutscher Banken als Reaktion auf nationale oder ausländische Rettungsmaßnahmen anpassen. Unsere Daten umfassen detaillierte Auslandspositionen der deutschen Banken im Meldezeitraum 2002 bis 2010, sowie deutsche und US-amerikanische Unterstützungsmaßnahmen. Konkret benutzen wir Maßnahmen aus dem Rettungspaket der deutschen Bundesregierung, die unter anderem vom Sonderfonds Finanzmarktstabilisierung (SoFFin) verwaltet werden und die *Term Auction* Facility (TAF) der US-Notenbank.

Zwei alternative Ansätze gewähren die statistische Identifikation von Rettungsmaßnahmen und deren Folgewirkungen im Zuge der Krise: Einerseits untersuchen wir die Bestimmungsfaktoren der Forderungen jener Auslandsniederlassungen deutscher Banken, deren Mutterinstitute das Rettungspaket (in Gestalt von staatlichen Garantien oder Kapitalhilfen) in Anspruch genommen haben. Andererseits betrachten wir die internationalen Positionen der Schwester-Niederlassungen im nicht-amerikanischen Ausland, gegeben dass eine dem Gesamtinstitut zugehörige US-Niederlassung von der Liquiditätszufuhr des TAF-Programms profitiert hat. Beide Ansätze garantieren, dass die Effekte der Rettungsmaßnahmen für die jeweiligen Auslandsniederlassungen deutscher Banken als exogen erachtet werden können.

Unser erstes Resultat basiert auf der Difference-in-Difference Methode, um den Effekt sowohl des deutschen Rettungspakets als auch des TAF-Programms zu analysieren. Wir zeigen, dass deutsche Rettungsmaßnahmen *nach* dem Höhepunkt der Bankenkrise im Jahr 2008 zu einer Zunahme von Auslandsforderungen und –verbindlichkeiten geführt haben, *vor* diesem Zeitpunkt jedoch nicht. Demgegenüber reduzierten die Auslandsniederlassungen außerhalb der USA sowohl Auslandsforderungen als auch –verbindlichkeiten nach Implementierung des TAF-Programms. Dieses Ergebnis bezeugt nicht nur die Existenz sondern auch den unterschiedlichen Charakter der internationalen Folgewirkungen auf nationale Stützungsprogramme.

Unser zweites Resultat stellt die internationalen Aktivitäten von betroffenen und nicht betroffenen Auslandsniederlassungen gegenüber. Die deutschen Rettungsmaßnahmen gehen mit einer allgemeinen Reduktion der Auslandsaktivität von Niederlassungen einher. Zwar übten damit die Rettungsmaßnahmen einen mäßigenden Einfluss auf die Reduktionstendenzen innerhalb der betroffenen Banken aus, jedoch konnten sie das Zurückfahren des Auslandsengagements im gesamten deutschen Bankensektor nicht verhindern. Im Gegensatz dazu gab das TAF-Programm sowohl den internationalen Forderungen als auch den Verbindlichkeiten einen Wachstumsanstoß unter den nicht in den USA ansässigen Auslandsniederlassungen.

Contents

1 Motivation

During the World Financial Crises, banks have adjusted their international positions, and cross-border bank lending has contracted (IMF 2010, BIS 2010). To prevent a further meltdown of markets, governments have intervened massively into banking systems by means of concerted actions or standby measures. In this paper, we analyze whether international activities of German banks' foreign affiliates have been a channel of policy transmission across countries by analyzing the lending of foreign affiliates.

We distinguish two sets of policy measures. First, 11 German banks have received government guarantees or capital injections of the government between August 2007 and September 2008. German banks were thus among the first to be supported by governmental schemes.[1] The decision by the German government to support a particular parent bank has not been affected by the bank's exposure to a specific foreign country. Hence, the variation of receiving rescue measures across banks and over time helps identifying supply-side effects.

Second, US-located affiliates of German banks have been eligible for liquidity support under the Term Auction Facility (TAF) of the Federal Reserve Bank. In contrast to the German measures, the TAF program was targeted at illiquid but otherwise solvent banks. The program is seen as one channel through which US monetary policy transmits to other countries through foreign banks' affiliates hosted in the US (Shin 2011). German banks account for one fourth of the largest banks claiming loans under the TAF program. We analyze whether foreign affiliates hosted in countries different from the US but belonging to the same German parent bank change their activities after the US affiliate draws on support measures.

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[1] See, e.g., the Time Line on the crisis regularly updated by the New York Fed. http://www.newyorkfed.org/research/global_economy/policyresponses.html

Our main finding is that activities of banks' foreign affiliates are a channel for the propagation of policy interventions across countries. The effects of the German rescues and the TAF programs differ. Banks covered by rescue measures of the German government have increased their foreign activities following these policy interventions, but they have not expanded relative to banks not receiving support measures. Banks receiving liquidity support under the TAF program have withdrawn from foreign markets outside the US while expanding relative to other German banks. We also analyze whether banks have lowered their foreign relative to total activities, and we find that the withdrawal from foreign markets has been fostered by the policy support.

Our data come from a novel bank-level dataset that gives detailed information on the internationalization of German banks. The "External Position Report" provided by the *Deutsche Bundesbank* contains information about the international assets of German banks and their foreign affiliates, month-by-month, and country-by-country. We have information on tradable and non-tradable assets and on exposures vis-à-vis different sectors. Our sample covers the pre- and the post-crisis episode and ends in April 2010.

Our analysis complements a small set of papers which look at the impact of the crisis on international banking from an aggregate perspective. Cetorelli and Goldberg (2010) find a negative impact of the crisis on aggregate emerging market lending. They exploit the fact that banks in different countries have been hit differently by the drying up of the market for dollar funding due to the crisis, but they do not explicitly tie access and use of government support schemes to foreign lending of banks' foreign affiliates.

Recent papers study the impact of the crisis on international banking using micro-level data. Work perhaps closest to ours is by Rose and Wieladek (2010). They use information on local lending by foreign banks residing in the UK to analyze how support measures targeted at these banks have affected lending in the UK. They find that, after nationalization, foreign banks reduced the share of their loans going to the UK, and they interpret this as evidence for financial protectionism. Giannetti and Laeven (2010) analyze the geographic structure of syndicated loan issuances and find a "flight home" effect in response to the crisis. The strength of this effect is not affected by government interventions. De Haas et al. (2010) use individual loan data from syndicated loan issuances for the world's largest banks. They find that foreign banks remain more committed to countries hosting an affiliated subsidiary, that are geographically close, and that have build up relationships with local banks. Puri et al. (2010) study the impact of the crisis on lending at home. They find that savings banks which are linked to *Landesbanken* affected by the crisis reject substantially more loan applications than non-affected banks.

We complement these studies by identifying the impact of the crisis and subsequent rescue measures on the longer-run lending and borrowing patterns of German banks' foreign affiliates, by studying the response of individual banks, and by studying different balance-sheet positions. So far, most studies on the integration of banking markets have looked at the degree of integration of asset markets (see, e.g., Kalemli-Ozcan et al. 2010). However, the crisis has shown that a significant part of shock transmission across countries is related to the funding structure of banks. Many of the banks that were severely affected by the crisis had strongly relied on short-term wholesale funding from (international) markets. We thus analyze how the crisis has impacted not only on the foreign assets but also the foreign liabilities of German banks, and we study whether banks that rely to a large extent on domestic wholesale funding behaved differently.[2]

In a complementary project, Düwel, Frey and Lipponer (2011) analyze short-run adjustment in cross-border lending of German banks. They find that rising risk aversion of a German parent bank has a negative impact on cross-border lending activities of the corporate banking group, even more so during the financial crisis. Macroeconomic and risk factors in destination countries come into play if loans are distributed via affiliates located abroad. We depart from their study in several respects. Düwel et al. (2011) focus on cross-border lending of the entire bank holding company (German parent plus affiliates) while we analyze domestic banks and their affiliates separately. We look at the impact of government support measures on the stocks of banks foreign assets and liabilities while Düwel at al. analyze the relevance of banks' risk positions and of macroeconomic determinants.

Our identification scheme helps analyzing the impact of policy measures affecting the domestic parent on lending by its affiliates. In this sense, our work is related to literature studying the impact of foreign banks on the stability of credit supply in emerging markets. De Haas and Van Lelyveld (2006) analyse the impact of foreign banks on credit stability in Central and Eastern European countries. They find that, during crisis periods, domestic banks reduce lending while Greenfield investments of foreign banks have a stabilizing impact. Also, lending by Greenfield foreign banks depends on the strength of the capital base of the domestic parent. Evidence for Latin American countries suggests that foreign banks have contributed to greater financial stability because of superior risk management strategies compared to local banks (Crystal, Dages and Goldberg 2001). So far, this literature has mostly looked at the response of domestic versus foreign banks to crises that have hit the *host* countries. One finding of this literature is that foreign banks have a stabilizing impact since they can draw on the parents' capital buffer. However, the current crisis has affected

[2] See, for instance, Huang and Ratnovski (2010) on the lower resilience of banks to shocks that rely heavily on wholesale funding.

developed countries more than developing countries. In contrast to this literature, we focus on a situation in which the *source* country has been hit by a shock.[3]

In Section two, we describe our data and provide descriptive statistics. Section three shows the empirical model and the regression results. We conclude in Section four.

2 The Data

2.1 External Positions of German Banks

To analyze how activities of German banks' foreign affiliates have responded to the crisis and rescue measures, we use information on foreign positions of German banks provided in the External Position Report of the *Deutsche Bundesbank* (see Fiorentino, Koch, and Rudek 2010 for details). The *Bundesbank* collects mandatory information on external positions by banks located in Germany as well as by their foreign affiliates, including assets and liabilities vis-à-vis foreign counterparties. These data serve, inter alia, as inputs to the bilateral banking statistics provided by the Bank for International Settlements. Data are available on a monthly basis, and reporting thresholds have been abandoned since January 2002. Hence, concerns about truncation or censoring do not arise. The data cover all German banks and their foreign-based subsidiaries and branches. The data can be used for research purposes only on the premises of the *Deutsche Bundesbank*.

From the External Position Report, we retrieve information on foreign assets and liabilities of German banks' affiliates (branches plus subsidiaries) located abroad in more than 40 destination countries.[4] These countries account for about 85% of all German banks' international activities and close to 100% of those by foreign affiliates. The data are broken down by counterparty (banks, non-bank private sector, governments). We focus on adjustment along the intensive margin, i.e. we do not model the entry and exit of particular banks into specific markets.

Graph 1 shows that, initially, withdrawal of international banks from foreign markets has been relatively uniform: in the second half of 2008, cross-border assets of European banks vis-à-vis all countries worldwide contracted by about 18%. The adjustment of German banks' positions was slightly stronger (-21%). By September 2010, the picture becomes more differentiated. Compared to the situation before the fall of Lehman Brothers (the second

[3] Recent research using firm-level data suggests that adverse shocks to parents of multinational banks can have adverse effects on local lending conditions. Popov and Udell (2010) study the probability that firms in Eastern Europe report being credit constrained. They find that financial distress of the parent bank is transmitted to local financing for SMEs in Central and Eastern European countries.

[4] A list of countries is provided in the Data Appendix.

quarter of 2008), all foreign assets had contracted by -23% (-29% for German banks). Overall, lending to developing countries had recovered (-6%) while assets of German banks were still about one fifth lower than before the crisis (-19%). Hence, German banks have not only been affected more by the crisis; their withdrawal from foreign markets has also exhibited different cross-country patterns.

Graph 2 presents similar data but is based on German banks' micro data and allows distinguishing foreign assets and liabilities. These data show that the decline in foreign assets has been mirrored by a decline in foreign liabilities (Graph 2a). The withdrawal from foreign markets has been uneven across banks. In the immediate aftermath of the crisis, some banks have expanded their foreign activities in order to support their foreign affiliates. At the end of our sample period (April 2010), foreign assets were still about twice as high compared to the beginning of the sample period (January 2002).[5] To some extent, this decline has been driven by valuation effects, but results in Düwel et al. (2011) show similar trends when accounting for valuation changes.

Table 2 shows the structure of the data for the years 2002-2010 (April). In relative terms, German banks' total foreign assets have declined from 60% to 40% of their balance sheet total; foreign liabilities have declined from 46% to 27%. This trend of a slow de-globalization of the German banking system – albeit from a high level – had started already before the crisis. After the crisis, the decline in German banks' assets and liabilities reflects the attempt of banks to downsize their (foreign) activities in order to meet capital requirements and to lower their exposure to foreign shocks.

Prior to August 2007, short-term liabilities dominated the banks' funding structure with a share of 87% of the balance sheet total. In response to the crisis, this share has declined to 80%. Overall, liabilities vis-à-vis banks dominate (60%), with a relatively stable structure throughout the crisis. Banks' foreign assets, in contrast, are dominated by longer-term maturities. In 2010, short-term assets (36%) and assets held vis-à-vis banks (32%) account for one third of the balance sheet total. The share of securitized assets stood at 27% in April 2010. This number includes bonds issued by foreign governments; the share of non-securitized assets vis-à-vis foreign governments is small (less than 2.2% at the end of our sample in April 2010).

2.2 Parent-Level Information

We use control variables which capture banks' exposure to risks during the crisis and the probability that banks qualify for rescue measures. Data on domestic banks come from the

[5] Note that the decline in foreign liabilities is somewhat overstated because liabilities in the form of, for instance, money market paper are not included.

balance sheets statistics of German banks (*Monatliche Bilanzstatistik* or "*Bista")*. From this database, we retrieve monthly information on the parent banks' total assets, their capital base, and their funding structure. We distinguish banks by their degree of dependence on wholesale funding and the share of short-term funding. Both variables are based on purely domestic variables and should be largely exogenous for an individual foreign affiliate.

The reasoning behind including these variables is the following: (i) banks' capital-to-asset ratio affects the need for recapitalization in response to changes in asset valuations; (ii) a strong reliance on wholesale funding and short-term funding increases the need for liquidity assistance in response to a negative shock in interbank markets; (iii) bank size controls for the fact that large banks are more internationally active than smaller banks.

Unobserved characteristics, which might shape the banks' international activities, are accounted for by including a full set of parent-, affiliate- and country-level fixed effects. These fixed effects absorb all unobservable features that might otherwise be attributed to the rescue measures.

Descriptive statistics reported in Table 3 show that support measures have been received by larger banks, banks with a lower degree of capitalization, and a higher share of wholesale funding. These patterns are consistent with too-big-to-fail and too-connected-to-fail considerations.

2.3 German Rescue Measures

Governments around the world have launched a host of rescue measures to support their financial systems.[6] The Bank for International Settlements (BIS) broadly divides these measures into four phases (BIS 2009). Phase One (August 2007 – September 2008) has been characterized by standalone support for large institutions, including some German banks. We use this information to analyze whether measures targeted at specific German banks have affected their foreign affiliates. In Phase Two (October 2008), support packages, including bank guarantees, have been implemented by a large set of countries. Due to the broad country coverage and the simultaneity of these measures, we cannot use this information to isolate reactions to a specific support programs. Rather, we will analyze whether the response before and after the bankruptcy of Lehman Brothers in September 2008 differs. In Phase Three (November – December 2008), fewer programs and more standalone actions have been implemented. Phase Four (since January 2009) features additional packages with emphasis on the asset side and on the recapitalization of banks.

[6] See BIS (2009), Fed (2010), Petrovic and Tutsch (2009), or Stolz and Wedow (2010) for surveys.

More specifically, as a result of their exposure to the US subprime market, several German banks, including IKB and *Landesbanken* like WestLB, BayernLB, and SachsenLB, have received capital injections, credit lines, and guarantees by the German government (federal and state-level) between August 2007 and August 2008. With the United Kingdom, which provided liquidity and guarantees to Northern Rock between September 2007 and February 2008, and the United States, which provided emergency lending to Bear Stearns in March 2008, Germany has been among the first industrialized countries to provide support to distressed banks.

In October 2008, the German government has taken several bold steps by announcing a blank guarantee for bank deposits, by setting up a € 400 billion bank guarantee fund and a € 70 billion recapitalization facility, and by setting up a special institution to administer these funds, the so-called SoFFin (*Sonderfonds Finanzmarktstabilisierung*, Special Fund Financial Market Stabilization). As of August 2010, a total of € 153.6 billion in guarantees by the SoFFin has been taken up by eight German banks in addition to € 29.3 billion in equity stakes in four German banks (Aareal Bank, Commerzbank, Hypo Real Estate, WestLB) (Table 1).[7] Additionally, capital support has been provided by the federal states to their *Landesbanken* (BayernLB, HSH Nordbank).

In April 2009, the German Ministry of Finance has additionally passed legislation allowing the setup of Bad Bank facilities to which German banks could shift non-performing assets. In early October 2010, Hypo Real Estate has moved a significant part of its portfolio to the *Abwicklungsanstalt FMS Wertmanagement*, following a similar move by WestLB which has created the *Erste Abwicklungsanstalt (EAA)* in December 2009.

In our empirical model, we will use information on the timing of capital injections and the issuance of government-guaranteed bonds. The timelines have kindly been provided by Stephanie Stolz and Michael Wedow (see Stolz and Wedow 2010). We expect the following effects of these measures: if the domestic parent receives capital injections by the government, funding costs should ceteris paribus decline, and lending at home and abroad might increase. Debt guarantees lower funding costs and should similarly increase lending at home and abroad.[8] Asset purchases reduce banks' risk-weighted assets by replacing assets with high risk weights with lower risk assets. This would, ceteris paribus, enable the banks to

[7] This and the following information have been obtained from the webpage of *SoFFin* as of August 11, 2010. See the data appendix for details.

[8] Previous studies (see, e.g., BIS 2009) show that the effects of guarantees depend on the credit rating of the sovereign body involved. One might thus expect to see different reactions to guarantees of the federal government and German state governments. However, because differences across German states in terms of ratings are small, we do not distinguish between guarantees issued by the federal and state governments.

increase lending. Overall, all three measures targeted at the domestic parents should thus have the effect of increasing the lending and borrowing capacity of the parent at home and abroad.

We therefore use a combined indicator which assumes the value of one from the time the German parent has received *any* support measure. An alternative interpretation of this indicator could be that the announcement of a support measure sends a negative signal to foreign market participants concerning bank solvency. This negative announcement and the associated deleveraging effect could counterbalance or even over-compensate the positive impact on funding costs. An additional reason for using a combined indicator rather than treating capital injections and guarantees separately is that most banks have received different rescue measures. While the timing of these measures has differed to some extent, there is insufficient variation on the data to clearly identify the effects of capital injections or guarantees.

There is an additional feature of our data which might bias results towards finding a negative effect. The German government support measures have been linked to the requirement to close or scale down the activities of specific foreign branches or subsidiaries. However, the relevant official documentation of these requirements imposed by the EU Commission is incomplete, and we have thus not used this information in the estimation. Instead, affiliate-level fixed effects are included to capture the effects of these requirements. To check the robustness of our results, we also drop affiliates located in Ireland, the UK, and the US.

2.4 Term Auction Facility

The second support measure that we analyze is the liquidity support German (and other) banks have received under the Fed's Term Auction Facility (TAF). Borrowing under the TAF program allowed eligible banks to receive liquidity support without potential negative signalling effects of borrowing at the Fed's discount window (Shin 2011). We have publicly-available, detailed information on the loan date, the maturity, the loan volume, the interest rate, and the borrower. We code this information into a 0/1-dummy that indicates whether a US-based affiliate, which is majority-owned by a German bank holding company, has claimed liquidity support in the US. Overall, 13 German banks have received liquidity support under this program between December 2007 and March 2010. In our empirical analysis, we drop these US-based affiliates as observational units to avoid endogeneity concerns.

When estimating the effects of the TAF program, we look at the impact of tapping TAF funds by US-based affiliates of German banks on the activities of foreign affiliates in *other* countries worldwide. We do so because the use of US support by a German affiliate is independent of the financial position of affiliates located elsewhere outside the US, thus

representing an exogenous friction that is useful to assess the impact on aggregate international lending (and borrowing) outside the US by German affiliates. We exclude direct linkages between non-US and US affiliates of the same parent as well as between the non-US affiliates and the German parent. Hence, we exclude the direct effects of intra-bank lending under the roof of the same parent.

The expected effect of TAF support is ambiguous. First, for a given liquidity need within the bank holding company, funding from non-US markets might go down if additional liquidity is available in the US. As we focus on funding that banks obtain from non-US foreign markets, the expected effect would be negative. Second, non-US affiliates might also use the US-based affiliates of the same parent as a gateway to the US funding market. In this case, the provision of liquidity under TAF might capture the liquidity shortage on the US market, and the expected effect might be positive if the non-US affiliates successfully raise other sources of funding worldwide. Third, enhanced access to liquidity on the US market may lower risk spreads for the bank affected and thus encourage borrowing from third markets as well.

2.5 Country-Level Data

Country fixed effects are included and capture other structural features of the countries under study such as banking-market characteristics. In addition, we use domestic stock market indices, being fully aware of the fact that the recent crisis has not originated from stock markets. We use this variable because stock markets have also been affected by the crisis and because they represent a forward-looking measure of business prospects.

3 Empirical Model

3.1 Testing Equation

Our main interest in this paper is in the longer-run integration patterns of German banks' foreign affiliates. We thus model the stock of foreign bank affiliates' assets (*FA*; or liabilities *FL*) as a function of parent bank characteristics, country-level characteristics, and rescue measures targeted at specific banks:

$$FA_{ijkt} = \alpha_0 + u_i + u_j + u_k + T_t + \alpha_1 Policy_{jt} + \alpha_2 X_{ij} + \alpha_3 Y_{kt} + \varepsilon_{ijkt} \quad (1)$$

where u are fixed effects for the parent (j = 1, …97), the affiliate (i = 1, … 533), and the destination country (k = 1, …, 47). T_t are time fixed effects where t = 1, …, 94 is the number of months (April 2002 – March 2010). The fixed effects capture unobserved features of the affected banks and thus help isolating the effects of the policy measures. X_{jt} is a vector of parent-level characteristics. We include the share of domestic retail funding, the share of

domestic short-term funding, log domestic assets (bank size), and the capital-asset-ratio of the parent. $Policy_{jt}$ captures support measures targeted at specific parent banks in Germany such as the provision of capital or the use of guarantees or the effects of TAF liquidity assistance to a bank's US affiliates. Y_{kt} is the stock market index in the destination country. Any other time-invariant, country-specific features are included in the fixed effects.

Rather than estimating the above model on a panel dataset which features the full time series information, we collapse the dataset on time averages before and after the fall of Lehman Brothers (September 2008), i.e. $T = 2$. There are two reasons for this modelling choice:

First, Bertrand et al. (2004) show that serial correlation in the residuals might bias the estimation results. They suggest obtaining difference-in-difference estimates by averaging observations before and after policy changes. In our case, we are interested in the impact of the crisis and of the rescue measures on banks' foreign activities, and our results allow assessing whether banks with and without support measures have behaved differently before and after the crisis.

Second, estimating the model on a full time-country panel dataset requires taking into consideration that foreign assets and liabilities of banks are highly persistent. We have run such regressions, and the lagged endogenous variable is highly significant, thus requiring the use of dynamic panel models. These models, however, are known to be sensitive to the choice of instruments and the specific modelling choice (Roodman 2009). Since our main interest is on shifts in the longer-run patterns of bank internationalization (rather than the monthly variation in the data), we refrain from implementing these potentially instable estimators.

To identify the effects of rescue measures, we distinguish banks with and without government support by using a dummy variable indicating whether a German parent has received capital injections from *SoFFin* or issued bonds guaranteed by the government. Alternatively, we account for the fact whether German banks' US affiliates have participated in the TAF programs. In these specifications, we exclude foreign affiliates in the US themselves, i.e. we analyze the impact of access to the TAF program for *other* foreign affiliates of German banks worldwide. In both specifications, we focus on activities of foreign affiliates abroad.

There are two possible selection concerns in our dataset. The first is related to the selection of banks into a specific foreign market and the endogeneity of the rescues. If banks receive rescue measures in response to entering or leaving a specific market, this may affect the interpretation of our results. Yet, from previous work with our dataset, we know that variation along the extensive margin of internationalization is not very frequent (Buch, Koch, Kötter 2009). Also, banks have not withdrawn from (or entered into) foreign markets on a large scale along the extensive margin during the crisis. Additionally, foreign activity is closely correlated with bank size, and we thus control for banks' volume of activities.

The second selection issue is related to the selection into a specific policy measure. Again, our results would be biased if banks receive policy measure because of their presence in a specific foreign market. This issue is addressed by exploiting the fact that policy measures are targeted at a specific parent bank (or a specific US affiliate in the case of the TAF program) and by studying the effects on activities of *other* affiliates worldwide. Additionally, we exclude specific destination countries which host affiliates which in turn are particularly affected by the crisis (Ireland, the UK, the US). It could be argued that rescue measures have been received because banks are present in these markets. Yet, this does not seem to bias our results, and results excluding these countries are qualitatively unchanged.

3.2 Results

Our results on the effects of policy measures on German banks' foreign activities are presented in two steps. In a first step, we report conditional regression results in the sense that we include information only on banks that have received policy measures. We also condition the dependent variable on observable bank-, country-, and time effects. These findings, which are reported in Table 4, focus on the within-variation of the data for the banks receiving policy support, i.e. difference in the timing of rescue measures. In a second step, we report unconditional regression results which provide further information on how the policy measures have affected different types of banks. These results are reported in Table 5 and illustrate the between-variation of the data by comparing banks with and without support.

3.2.1 Effects of Policy Measures: Conditional Regression Results

We follow Bertrand et al. (2004) and focus on the response of affiliates that have received support measures only, conditional on the vector of bank-level and country-level control variables. A full set of dummies is included, which inter alia control for time effects. We begin by running a pooled regression of banks' foreign assets and liabilities on all control variables. We keep the residuals only of those affiliates that have received support measures at some point in time. These residuals are then averaged over time and summed across destination countries, and we use the log of the aggregated residuals in a regression using a "rescue" (or "TAF") dummy as the only regressor.[9] The advantage of this method is that we analyze only the within-sample variation of the banks affected by rescue measures *conditional* on the controls. The disadvantage is that, by construction, we cannot draw inference on

[9] We multiply the log of the absolute value of the summed residuals with the sign of the original variable to take logs of negative values. Note that the residuals for each affiliate do not sum to zero because the regression generating the residuals is a pooled regression on all affiliates and because we keep only those that have received policy support measures.

control variables. This method ensures that we account for the fact that different banks or US affiliates have received the support measures at different points in time.

Results which retain the crisis information by forming four sub-groups (before / after the rescue, before / after the Lehman crisis) are reported in Table 4. Because fewer banks have received support from the German government than under the TAF program, the sample size differs between 358 affiliate-time observations for the German rescues and 667 observations for the TAF program. Before the crisis, there have been very few affiliate-level observations (8% of all observations) which have received rescue measures, and these affiliates belong to a few parents only. In the post-crisis period, the observations are divided more equally with 25% of the observations without and 33% with rescue measures.[10] For the TAF measures, there is an almost equal share of observations (about 32% each) with and without TAF support before the crisis; after the crisis, almost no bank (1.9%) has received no TAF support.[11]

The explanatory power of the model in terms of the R^2 ranges between 5 and 15% of the total variance, but this includes the effects of the parent fixed effects. Still, it is interesting to note that the explanatory power increases when moving from the pooled estimates to the samples before / after the Lehman crisis, which indicates a regime shift. In addition to the coefficient estimates, the Table reports standardized beta coefficients in brackets. The beta coefficients give the expected change in the dependent variable for an increase in the explanatory variable by one standard deviation.

The effect of the German rescues (Table 4a) is insignificant for total assets and weakly positive (at the 10% level) for total liabilities. The insignificant impact of the rescues on total assets clouds different responses before and after the crisis though. The positive and significant effects of the rescues on assets and liabilities *after* the crisis are interesting: those German banks that have benefited from support by the German government have expanded their foreign assets (and liabilities) after the support has been granted. Hence, any potential negative impact of closure requirements for particular affiliates abroad has been outweighed by the positive effect of better capitalization and, indirectly, better funding conditions.

The effects of the TAF measures differ (Table 4b). Here, the effects of the pre-crisis period are more interesting since, after the crisis, almost all banks in the sample have benefited from the TAF program. Overall, we find a negative and significant effect for the full sample, both for assets and liabilities, and this effect is entirely driven by the pre-crisis period. For the post-Lehman period, the point estimate is positive but insignificant. These findings measure the

[10] The remaining 32% are banks *without* rescues *before* the crisis.

[11] About 34% of all observations are affiliates linked to US affiliates *with* TAF support *after* the crisis.

effects of liquidity support under TAF on activities of German banks' foreign affiliates *outside* the US and *outside* Germany. Hence, the negative effect on foreign liabilities is consistent with funding from other foreign markets being substituted by funding from the US. The negative effect on foreign assets abroad could be indicative of a shift of foreign assets to the US.

In sum, these results can be interpreted as evidence that the German policy measures have helped the banks after the fall of Lehman in September 2008 to stabilize or even expand their foreign activities. Banks receiving TAF support, in contrast, have lowered their foreign assets and liabilities. It is important to bear in mind that the effects measured in Table 4 are the within variations only for those banks that have received the support measures.[12]

3.2.2 Effects of Policy Measures: Unconditional Regression Results

Results reported so far provide information on the effects of policy measures conditional on other determinants of banks' foreign activities and conditional on being affected by the policy measures. They do not inform us about the effects of the support measures on the recipients of these measures relative to the other German banks' foreign affiliates. Table 5 provides this information for all banks. The dependent variable is the log of total foreign assets and total foreign liabilities of German banks' foreign affiliates in a specific destination country. Here, effects of the support measures might also capture unobserved differences between the two groups of banks. To remedy this concern, a full set of parent-level and affiliate-level fixed effects is included. As before, data are averaged over time before / after September 2008. Overall, our model explains about 50% of the variation in assets and liabilities across banks and countries. When excluding parent-, affiliate-, and country-fixed effects, the R^2 falls to 8%.

For the full sample, the German rescue measures have no significant impact on German banks' foreign assets or liabilities (Columns 1 and 5 of Table 5a). The effect of the crisis dummy is negative and significant throughout. Allowing the effects of the rescues to differ for the pre- and the post-crisis period by splitting the sample accordingly or by introducing an interaction term between the rescue and the crisis dummy changes this picture. Now, the effects of the rescues are positive for the pre-crisis period: affiliates of banks that have received rescue measures before the crisis have increased their foreign assets relative to all German banks' affiliates. The interpretation should take into account that most rescue measures became effective after September 2008. The specifications with interaction terms (Columns 4 and 8) show that, overall, banks with rescues and after the crisis had lower foreign assets (sum of coefficients = -0.234) and foreign liabilities (-0.378) *relative* to other

[12] The qualitative results are identical if we do not collapse the data across foreign countries but retain the country dimension

German banks. Hence, the support measures of the German government have induced weak banks to increase their foreign assets and liabilities (Table 4a) but compared to affiliates of other healthy German banks worldwide, weak banks have down-sized their foreign activities (Table 5a). These joint effects are also economically significant. Standardized coefficients imply for the semi-log specification shown in Table 5 that a one-standard deviation increase in the total effect of crisis and rescues reduces total foreign assets by 2.4% and total foreign liabilities by 3.7%. Given average shares of foreign assets in total assets of around 50% (see Table 2), such a contraction due to shocks in the average bank's international activities is sizeable. Direct crisis and rescue coefficients and the interaction term are jointly significant at the 1% level.

Table 5 also provides information on the bank-level determinants of foreign assets. The most important result is that banks with a strong reliance on wholesale funding have higher foreign assets and liabilities. This effect is very consistent across the specifications and changes little when splitting the sample into the pre- and the post-crisis period. A high share of short-term funding has a negative impact on foreign liabilities. Size and the degree of capitalization have no significant impact on banks' foreign assets. Note that we obtain these results in a model that includes parent-level fixed effects; in (unreported) regressions excluding the parent-level fixed effects, size (positive) and capitalization (negative) are significant. This confirms the finding of previous studies that the volume of activities in foreign markets is positively related to the size of the parent. It also shows that, *ceteris paribus*, less well capitalized banks have higher foreign assets.

Our proxy for the exposure of German banks to developments on financial markets is the stock market index but this variable has no significant impact on foreign activities. This result should not be read as if macroeconomic factors do not matter for two reasons: first, all regressions include a full set of country fixed effects, which absorb largely time-invariant foreign market characteristics. Second, stock market valuations are only an imperfect proxy for financial market developments during the recent (banking) crises.

To what extent are the results reported above specific to the German rescue measures? To capture the effects of liquidity provision under the Term Auction Facility, we have run the same set of regressions, but we now replace the policy measure (Table 5b). The two sets of measures are not fully comparable because the timing and the recipients differ. The TAF program has been geared more towards the provision of short-term liquidity to otherwise solvent banks, while the German rescue measures have affected banks with difficulties in their longer-run business models and need for recapitalization. Hence, we expect a negative signalling effect to be stronger for the German support measures than for participation in TAF.

Consistent with this expectation, we find a positive and significant impact of TAF on foreign assets and foreign liabilities. Liquidity provision through the TAF program, which affected banks' affiliates in the United States, had a positive effect on other affiliates worldwide. The net effects of rescues and the crisis is positive for assets (0.923 -0.52 = 0.41) and for liabilities (0.752-0.501 = 0.25). These coefficients are also jointly significant, and standardized coefficients indicate that also TAF measures exerted an economically significant role, increasing foreign assets of German bank affiliates outside the US by 5.9% (3.8% for foreign liabilities) in response to an increased unconditional probability of receiving TAF support during the financial crisis by one standard deviation. Potentially, this result reflects internal capital markets of bank holding companies taking advantage of favourable refinancing conditions in the US, subsequently re-allocating resources.[13] Alternatively, crumbling financial health of US banks might have left a void in non-US credit markets that was subsequently filled by, among others, German competitors.

3.3 Robustness Tests

We check the robustness of our results in a number of ways.[14] The first issue we address is the question whether the activities of certain foreign affiliates have affected the probability to receive rescue measures. Banks with affiliates in the US, for instance, might have endured higher losses due their exposure to subprime risks than banks with affiliates elsewhere, and some banks have used their affiliates in Dublin or London to channel funds into structured financial products. To account for this possibility that the rescues are not exogenous for these affiliates, we estimate the baseline model excluding Ireland, the UK, and the US as destination countries successively. The main qualitative results are not affected.

We also investigate whether our results are driven by specific regions. We distinguish the Euro Area, financial centers, high- and low-income countries, and Eastern Europe, and we drop Ireland, the UK, and the US successively. The dummy for the post-crisis period shows that withdrawal of German banks from foreign markets has been relatively uniform across different regions with the exception of low-income countries where the crisis had no significant impact on either foreign assets or foreign liabilities. This confirms the conventional wisdom that the World Financial Crisis has been a crisis of developed economies. We again find no significant impact of the German rescues. The impact of the TAF measures is, as before, positive and significant except for the liabilities in the Euro Area and in low income countries.

[13] We cannot test this hypothesis more formally due to lacking information on internal capital movements and leave this issue for future research.

[14] These results are unreported but are available upon request.

As regards the adjustment across asset classes, the withdrawal from foreign markets after the fall of Lehman has impinged upon interbank activities but not lending and borrowing from the private sector or holdings of securities (including government bonds). The finding that the German rescue measures had no significant effect for the full sample is confirmed as well. As regards the TAF program, the positive effect found when aggregating across all assets and liabilities is confirmed by results for interbank and private-sector assets as well as private sector liabilities. Interestingly, the effect is insignificant for borrowing from banks.

We have also winsorized all bank-level data at the 1%- and 99%-level. The main results, in particular the positive TAF effect on liabilities remin valid.

Finally, it could be argued that the time windows that we have chosen for the pre- and the post-crisis period are somewhat arbitrary and guided by data availability. We have thus checked the robustness of our results by constructing a symmetric time window around September 2008. In the conditional regressions (Table 4), the effects of the German rescue measures remain significant (both, for assets and liabilities), but the negative effect of the TAF programme becomes insignificant. In the unconditional regressions (Table 5), the effects of the rescue measures and of the TAF program on total assets remain unaffected.

4 Summary

We have analyzed how German banks' foreign affiliates have reacted to the financial crisis, to policy measures by the German government targeted at the German parent, and to liquidity injection into US affiliates under the TAF program. Our analysis has three main findings:

First, German banks strongly increased their foreign assets in the period from 2002-2008, but this process has partly been reversed after the crisis. The reversal of banks' foreign liabilities has been even stronger than that of assets.

Second, the most important bank-level determinant of banks' cross-border expansions has been the share of wholesale funding. Banks with a strong reliance on wholesale funding have expanded both, their foreign affiliates' assets and liabilities.

Third, rescue measures by the German government and access to the Fed's Term Auction Facility have triggered spillover effects on other affiliates worldwide. Banks covered by rescue measures of the German government have increased their foreign activities following these policy interventions, but they have not expanded relative to other banks' foreign affiliates. Foreign assets of banks receiving liquidity support under the TAF program have expanded relative to those of other German banks. This supports previous evidence (see, e.g. Shin 2011) which indicates that borrowing through foreign affiliates in the US constitutes a channel for the global transmission of US monetary policy.

What do these results tell us about the "success" of the rescue measures and the liquidity support? Defining success in terms of a stabilizing impact on banks and of putting the deleveraging of banks' foreign assets to a halt, the measures have been successful. This finding is remarkable because we do not analyze the immediate impact of the measures on the parents or affiliates directly affected. Instead, we focus on foreign affiliates operating under the auspices of the same parent bank. Yet, we cannot identify whether the policies have been "successful" in the sense that foreign activities have become more or less risky. It may well be that changes in international activities have increased banks' exposure to foreign or domestic shocks. Whether this has been the case is an issue we leave for future research.

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6 Data Appendix

External Position Report

Data on the international assets of German banks are taken from the External Position report (*Auslandsstatus*) of the *Deutsche Bundesbank*. They are confidential and can be used on the premises of the *Bundesbank* only.

International assets: Loans and advances to banks, companies, governments, bonds and notes, foreign shares and other equity, participation abroad, denominated or converted into Euro. Irrevocable credit commitments are included but other off-balance sheet items are not. For a more detailed description of this data base see (Fiorentino et al. 2010).

Branches and subsidiaries: Foreign affiliates of German parent banks. Branches do not have an independent legal status and are fully-owned by the German parent; subsidiaries have an independent legal status and are majority owned (50% plus one share) by the German parent. We attribute assets held by affiliates to the destination country, independently from the country in which foreign affiliates are located. Hence, the host country of the affiliates and the destination country of their foreign assets and liabilities might differ.

Time: Monthly data from May 2002 – March 2010 ($t = 94$)

Countries: Austria, Australia, Belgium, Bulgaria, Brazil, Canada, Switzerland, Chile, China, Cyprus, Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hong Kong, Hungary, Ireland, Israel, India, Iceland, Italy, Japan, Korea, Cayman Islands, Liechtenstein Lithuania, Luxembourg, Latvia, Malta, Mexico, Netherlands, Norway, New Zealand, Poland, Portugal, Romania, Russian Federation, Sweden, Singapore, Slovenia, Slovak Republic, Turkey, United Kingdom, United States

Country groups:

- Euro Area: Austria, Belgium, Cyprus, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia, Slovakia
- Eastern Europe: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Russia
- Financial centres: Switzerland, Luxembourg, Hong Kong, Singapore, Cayman Islands, United Kingdom, Ireland, Liechtenstein
- High income: Austria, Belgium Finland, France, Ireland, Italy, Spain, Luxembourg, Malta, Netherlands, Switzerland, Hong Kong, Singapore, Cayman Islands, United Kingdom, Liechtenstein, Japan, Canada, Australia, Israel, Denmark, Iceland, Norway, New Zealand, Sweden
- Low income: Bulgaria, Romania, Russia, India, Brasil, China, Mexico

Asset classes: Securitized and non-securitized assets and liabilities are distinguished. Within the group of non-securitized assets, different types of borrowers (banks, private sector, governments) are distinguished. The same classification applies to liabilities. Within the group of securitized assets, shares, money market paper (banks as well as non-banks) , treasuries, and bonds (issued by banks, the private sector, or the government) are distinguished.

Table 1: German Banks with German Government Support and TAF Funding

(1) German banks with government support	
Guarantees in € billions (Total: €152.6 bn)	
Aareal Bank	4.0
BayernLB	5.0
Commerzbank	5.0
Corealcredit Bank	0.5
Deutsche Pfandbriefbank (HRE)	102.0
Düsseldorfer Hypothekenbank	2.4
HSH Nordbank	17.0
IKB Deutsche Industriebank	10.0
Sicherungseinrichtungsgesellschaft deutscher Banken mbH	6.7
Capital injections in € billions (Total: €29.3 bn)	
Aareal Bank	0.4
Commerzbank	18.2
Hypo Real Estate Holding	7.7
WestLB	3.0

(2) Banks with TAF support

Bayerische Landesbank, Commerzbank, Depfa, Deutsche Bank, DG Bank, Dresdner Bank, Euro Hypo, Helaba, HSH Nordbank, LBBW, Nord LB, UniCredit, West LB

Source: http://www.soffin.de/de/soffin/leistungen/massnahmen-aktuell/ (as of 11.8.2010)

Table 2: Structure of German Banks' Total Foreign Assets and Liabilities

Private sector = firms and private households. Data for the years 2002-2009 are as of May; data for 2010 are for April. This Table shows positions including foreign assets and liabilities of affiliates and cross-border activities of the parents.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Foreign Assets/Total Assets	0.60	0.55	0.54	0.51	0.54	0.52	0.52	0.49	0.40
Non-securitized assets									
By maturity (in % of total foreign assets)									
Short-term foreign assets	0.42	0.47	0.46	0.47	0.49	0.53	0.52	0.46	0.36
Long-term foreign assets	0.26	0.22	0.22	0.23	0.23	0.19	0.21	0.24	0.23
By sector (in % of total foreign assets)									
Foreign assets vis-à-vis banks	0.38	0.39	0.37	0.39	0.39	0.38	0.40	0.40	0.32
Foreign assets vis-à-vis the private sector	0.28	0.28	0.29	0.30	0.32	0.32	0.31	0.29	0.24
Foreign assets vis-à-vis foreign governments	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Foreign securitized assets / total foreign assets	0.24	0.22	0.23	0.25	0.26	0.25	0.24	0.22	0.27
Total foreign liabilities / total liabilities	0.46	0.42	0.42	0.40	0.42	0.41	0.40	0.38	0.27
By maturity (in % of total foreign liabilities)									
Short-term foreign liabilities	0.85	0.81	0.83	0.84	0.87	0.88	0.87	0.77	0.80
Long-term foreign liabilities	0.14	0.12	0.14	0.14	0.12	0.12	0.12	0.13	0.14
By maturity (in % of total foreign liabilities)									
Foreign liabilities vis-à-vis banks	0.65	0.61	0.60	0.61	0.62	0.61	0.60	0.57	0.64
Foreign liabilities vis-à-vis the private sector	0.32	0.31	0.35	0.36	0.35	0.37	0.37	0.31	0.29
Foreign liabilities vis-à-vis foreign governments	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.02
Total (short-term + long-term + securitized)	0.92	0.91	0.90	0.95	0.98	0.97	0.97	0.92	0.86
Total (banks + private + government + securitized)	0.92	0.91	0.90	0.95	0.98	0.97	0.97	0.92	0.86

Table 3: Descriptive Statistics Banks With and Without Government Support

	Affiliates of banks that received no German rescues (Rescue = 0)	Affiliates of banks that received German rescues (Rescue = 1)	Affiliates of banks not linked to TAF recipients (TAF = 0)	Affiliates linked to TAF recipients (TAF = 1)
Foreign assets (in € millions)	222.93	237.17	99.2	350.23
Foreign liabilities (in € millions)	180.71	163.83	74.47	270.01
Capital (%)	4.92	4.16	5.02	4.48
Wholesale (%)	41.67	56.37	42.12	47.42
Short-term funding (%)	66.34	56.24	62.5	66.43
Size (in € millions)	79,576	108,803	68,909	104,026
Observations	2,079	8,300	5,496	4,883

Table 4: Results Using Residual Approach

The dependent variable in the following Tables is the log of the sum across German bank affiliates' residual assets and liabilities in a particular host country abroad. The residuals are obtained by regressing the level of affiliate assets and liabilities on parent-level characteristics, parent- and affiliate fixed effects, time fixed effects, and crisis dummies. Only affiliates that have been affected by the policy measures are included. For a description of this residual-approach see Bertrand et al. (2004). "Rescue" is a bank-specific dummy variable which equals one from the time of announcement of any rescue measure (capital injections, guarantees, or asset purchases). A constant term is included but not reported. Standardized beta coefficients are reported in brackets. ***, **, * = significant at the 1%, 5%, 10%-level.

(a) German Rescue Measures

	Total assets			Total liabilities		
	Full sample	before crisis	after crisis	Full sample	before crisis	after crisis
Rescue (0/1)	1.087	-3.401**	2.953***	1.549*	-2.103	3.631***
	(0.091)	*(-0.252)*	*(0.236)*	*(0.126)*	*(-0.144)*	*(0.290)*
September 2008 (0/1)	-1.261			-0.725		
	(-0.105)			*(-0.059)*		
Observations	358	148	210	324	140	184
R^2	0.047	0.151	0.159	0.041	0.091	0.126

(b) Term Auction Facility (TAF)

	Total assets			Total liabilities		
	Full sample	before crisis	after crisis	Full sample	before crisis	after crisis
Term Auction Facility (0/1)	-1.215**	-1.481**	2.858	-1.848***	-2.076***	2.977
	(-0.093)	*(-0.121)*	*(0.102)*	*(-0.144)*	*(-0.171)*	*(0.090)*
September 2008 (0/1)	0.465			0.158		
	(0.036)			*(0.012)*		
Observations	667	427	240	638	415	223
R^2	0.083	0.073	0.144	0.060	0.065	0.075

Table 5: Regression Results for Foreign Assets and Liabilities

The dependent variable in the following tables is the log of German bank affiliates' assets and liabilities in a particular destination country abroad. The data are averaged over the period before and after September 2008. "Rescue" is a bank-specific dummy variable which equals one from the time of announcement of any rescue measure (capital injections, guarantees, or asset purchases). "capitalization" is the ratio of capital over total assets, "wholesale" is the share of domestic wholesale in total domestic funding. The log stock market index is measured at the level of the destination country. A full set of dummies to capture bank holding company, affiliate, and country- fixed effects is included in all regressions. Standardized beta coefficients are reported in brackets. ***, **, * = significant at the 1%, 5%, 10%-level.

a) Effects of German Rescue Measures

	Total assets				Total liabilities			
	Full sample	Before crisis	After crisis	Full sample	Full sample	Before crisis	After crisis	Full sample
Rescue (0/1)	0.097	1.513***	1.244	0.652***	-0.041	1.055***	1.666	0.679***
	(0.010)	*(0.102)*	*(0.159)*	*(0.070)*	*(-0.004)*	*(0.062)*	*(0.216)*	*(0.069)*
Stock market index	0.128	-0.224	0.602	0.107	-0.018	-0.363*	0.574	-0.034
	(0.018)	*(-0.032)*	*(0.088)*	*(0.015)*	*(-0.003)*	*(-0.049)*	*(0.086)*	*(-0.005)*
Size	-0.081	-0.250	1.295	-0.036	-0.002	-0.668	0.756	0.054
	(-0.030)	*(-0.097)*	*(0.446)*	*(-0.013)*	*(-0.001)*	*(-0.257)*	*(0.274)*	*(0.020)*
Capitalization	0.375*	0.402	0.745	0.425**	-0.054	0.124	0.024	-0.043
	(0.042)	*(0.043)*	*(0.086)*	*(0.047)*	*(-0.006)*	*(0.013)*	*(0.003)*	*(-0.005)*
Wholesale funding (%)	0.505***	0.641***	0.857**	0.487***	0.546***	0.903***	1.085**	0.535***
	(0.112)	*(0.135)*	*(0.204)*	*(0.108)*	*(0.125)*	*(0.187)*	*(0.280)*	*(0.122)*
Short-term funding (%)	-0.108	0.188	-3.253**	-0.075	-0.424	0.796	-1.808	-0.377
	(-0.013)	*(0.026)*	*(-0.335)*	*(-0.009)*	*(-0.056)*	*(0.113)*	*(-0.214)*	*(-0.050)*
September 2008 (0/1)	-0.262***			-0.169**	-0.282***			-0.206**
	(-0.035)			*(-0.023)*	*(-0.037)*			*(-0.027)*
Rescue * Sept. 2008				-0.717***				-0.851***
				(-0.071)				*(-0.079)*
Observations	13,634	8,449	5,185	13,634	12,270	7,656	4,614	12,270
R^2	0.493	0.533	0.487	0.494	0.514	0.563	0.483	0.515
P-value				0.001				0.009

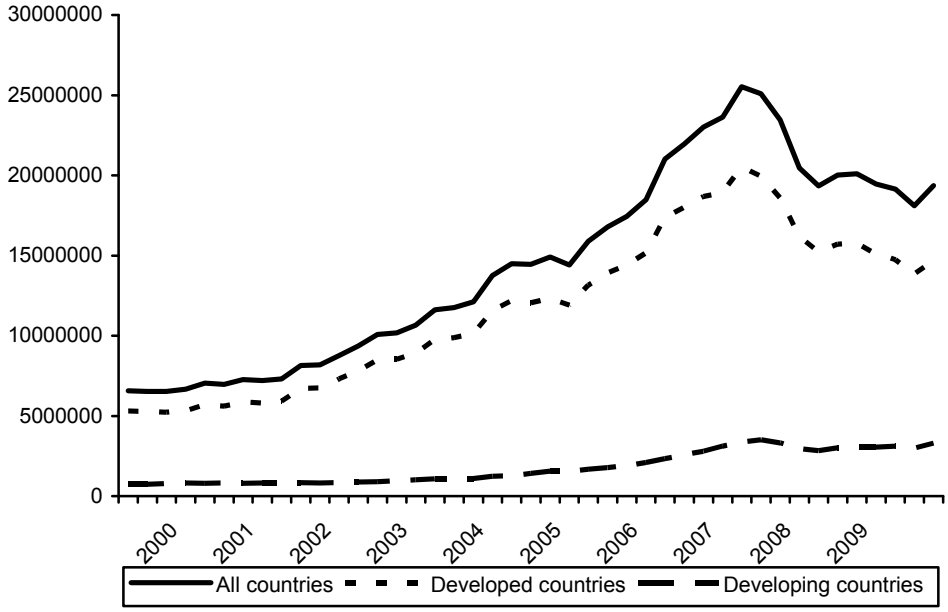
b) Effects of Term Auction Facility (TAF)

	Total assets				Total liabilities			
	Full sample	Before crisis	After crisis	Full sample	Full sample	Before crisis	After crisis	Full sample
Term Auction Facility (0/1)	0.860***	1.096***	5.303***	0.923***	0.695***	0.967***	0.967***	0.752***
	(0.117)	*(0.157)*	*(0.571)*	*(0.125)*	*(0.093)*	*(0.133)*	*(0.133)*	*(0.101)*
Stock market index	-0.028	-0.601***	0.587	-0.005	-0.134	-0.691***	-0.691***	-0.110
	(-0.004)	*(-0.086)*	*(0.087)*	*(-0.001)*	*(-0.019)*	*(-0.094)*	*(-0.094)*	*(-0.016)*
Size	-0.093	-0.308	1.763**	-0.146	-0.008	-0.869	-0.869	-0.098
	(-0.035)	*(-0.119)*	*(0.607)*	*(-0.054)*	*(-0.003)*	*(-0.332)*	*(-0.332)*	*(-0.037)*
Capitalization	0.491***	0.279	0.630	0.561***	0.010	0.392	0.392	0.112
	(0.055)	*(0.030)*	*(0.072)*	*(0.062)*	*(0.001)*	*(0.042)*	*(0.042)*	*(0.012)*
Wholesale funding (%)	0.450***	0.591**	0.920**	0.482***	0.518***	0.853***	0.853***	0.552***
	(0.100)	*(0.124)*	*(0.219)*	*(0.107)*	*(0.119)*	*(0.178)*	*(0.178)*	*(0.126)*
Short-term funding (%)	-0.214	0.000	-3.664**	-0.358	-0.503*	0.533	0.533	-0.741**
	(-0.027)	*(0.000)*	*(-0.378)*	*(-0.044)*	*(-0.067)*	*(0.075)*	*(0.075)*	*(-0.099)*
September 2008 (0/1)	-0.392***			0.016	-0.399***			-0.002
	(-0.053)			*(0.002)*	*(-0.053)*			*(-0.000)*
TAF * Sept. 2008				-0.520***				-0.501***
				(-0.066)				*(-0.063)*
Observations	13,016	8,075	4,941	13,016	11,717	7,316	7,316	11,717
R^2	0.491	0.534	0.481	0.492	0.516	0.567	0.567	0.516
P-value				0.000				0.000

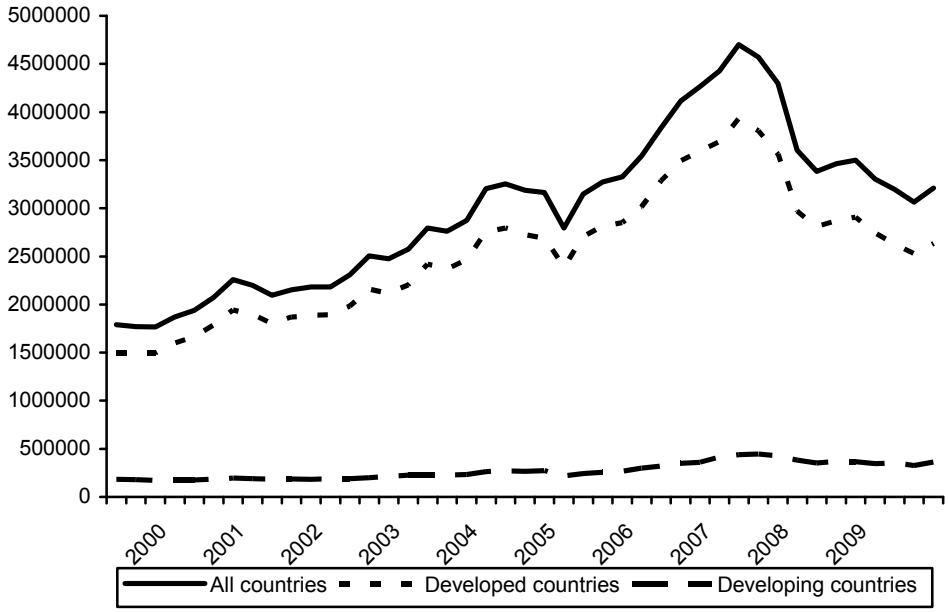
Graph 1: Consolidated Foreign Claims of BIS Reporting Banks

Data are based on Table 9B of the Bank for International Settlements' Consolidated Banking Statistics and are on an immediate borrower basis. Amounts outstanding in millions of US dollars.

(a) European banks



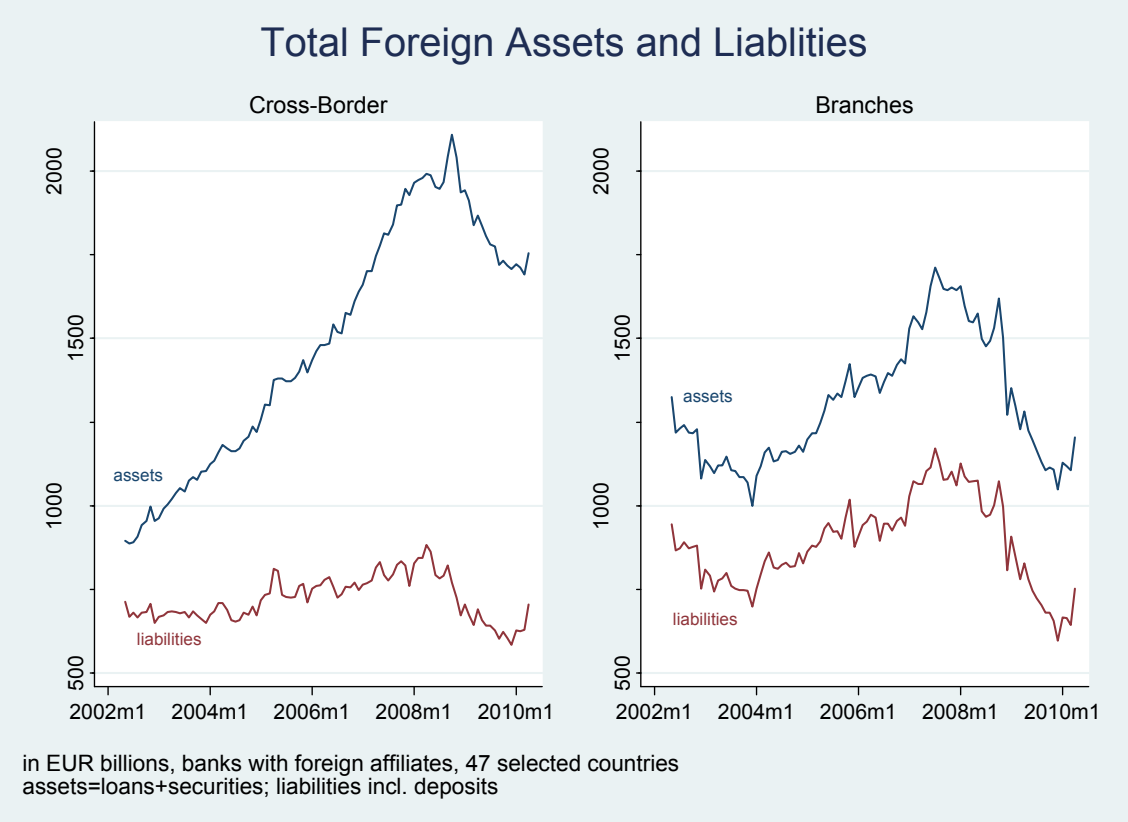
(b) German banks



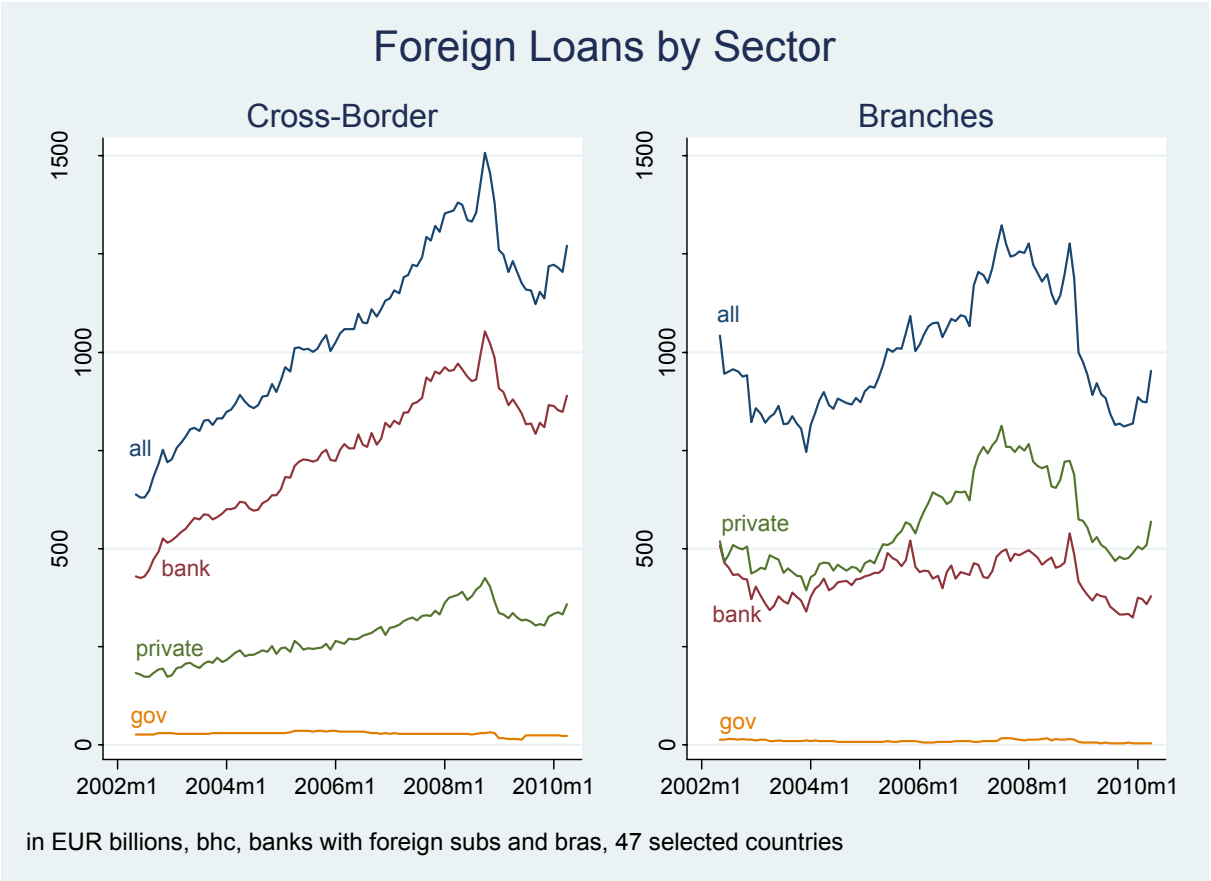
Source: Bank for International Settlements, Consolidated Banking Statistics, www.bis.org, own calculations.

Graph 2: Total Foreign Assets and Liabilities

(a) Total



(b) By Sector



in EUR billions, bhc, banks with foreign subs and bras, 47 selected countries

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