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## Shock Transmission through International Banks: Austria

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## WORKING PAPER 199

# Shock Transmission through International Banks: Austria

Esther Segalla

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# Shock Transmission through International Banks: Austria\*

Esther Segalla<sup>†</sup>

## Abstract

This study provides findings on the transmission of liquidity shocks by Austrian parent banks through the lending channel. I investigate how different types of parent banks adjust their balance sheet positions in response to a liquidity shock and how such an adjustment is transmitted into destination countries. I distinguish between three definitions of cross-border lending activities. In the most general definition I analyze changes in *total lending*, which consists of the two components - lending to banks and lending to non-banks. In a second step I concentrate on a narrower definition of lending, that is *lending to non-affiliated banks*. Finally I focus on an even more targeted definition, such as *lending to affiliated banks* (lending to branches and subsidiaries).

I find that (1) smaller banks (parent banks without affiliates) did not adjust their balance sheet composition in a very pronounced manner in response to a liquidity shock. (2) Large banks (parent banks with affiliates) did decrease moderately their cross-border loan share to other, non-affiliated banks. (3) Internal capital markets are important for the funding structure of Austrian parent banks and their foreign affiliates. (4) Destination countries matter. Countries signing the Vienna Initiative do receive strong support through the internal capital market.

*Keywords:* cross-border lending, liquidity risk, shock transmission, internal capital markets, Vienna Initiative.

*JEL classification:* E44, F30, G18, G21, G32;

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## Non-technical summary

This study investigates the importance of various lending channels for the transmission of liquidity risk affecting Austrian banks. The database for this analysis consists mainly of bank-level balance sheet position that contrast domestic versus cross-border lending activities for financial institutions with an Austrian banking license. I ask the following questions. Is a reallocation observable - away from cross-border lending towards more domestic lending during times of a liquidity shortage? Do larger banks adjust differently to a liquidity shock than smaller banks? What is the role of internal capital markets within this framework?

The analysis is embedded within the International Banking Research Network (IBRN) project 2013 and represents the individual country contribution for Austria. IBRN 2013 aims at analyzing micro-level banking data with a common methodology for 11 countries to explore the global transmission of liquidity risk. The meta-analysis for all countries, the methodology and the theoretical underpinning are to be found in Buch and Goldberg (2014).

The Austrian banking sector is quite diverse in terms of banking business models (sectoral diversification), but also with respect to foreign and domestic ownership structures. Regarding ownership structures it is necessary to differentiate between active (who is owned by an Austrian bank) and passive (who owns the Austrian bank) ownership. We observe around 800 incorporated financial institutions, whereby approximately half of the institutions represent 95% of total industry wide assets. The majority of banks has no foreign affiliates (395) and only a few banks own foreign affiliates (42). The estimation sample introduces a size threshold and includes therefore 150 banks that have no foreign affiliates, and 36 that do have foreign affiliates. The majority of Austrian parent banks that actively own foreign affiliates have them in up to 3 countries (27 Austrian parent banks), 9 Austrian parent banks have affiliates in 4 or more countries, whereof 4 parent banks have affiliates in 14 or more countries.

The analysis uses three definition for cross-border lending activities and compares them to domestic lending activities. In the most general definition I analyze changes in *total lending*, which consists of two components - lending to banks and lending to non-banks. In a second step I concentrate on a narrower definition of lending, that is *lending to banks*, whereby lending to affiliated banks has been excluded. For the last definition I focus on *lending to affiliated banks*, such as branches and subsidiaries. I briefly discuss local lending by foreign subsidiaries in the destination countries.

I find that (1) smaller banks (parent banks without affiliates) did not adjust their balance sheet composition in a very pronounced manner in response to a liquidity shock. (2) Large banks (parent banks with affiliates) did decrease moderately their cross-border loan share to other, non-affiliated banks. (3) Internal capital markets are important for the funding structure of Austrian parent banks and their foreign affiliates. (4) Destination countries matter. Countries signing the Vienna Initiative do receive strong support through the internal capital market.

# 1 Introduction

This study forms part of the international banking research network initiative (IBRN) and reports the results for the country study Austria.

The Austrian banking sector is quite diverse in terms of banking business models (sectoral diversification), but also with respect to foreign and domestic ownership structures. Regarding ownership structures it is necessary to differentiate between active (who is owned by an Austrian bank) and passive (who owns the Austrian bank) ownership. I refer to an Austrian parent bank as a bank that holds an Austrian banking license and resides in Austria (host country principle). It might actively own foreign affiliates - a branch or a subsidiary - or not. The term *affiliated* is used to describe the active ownership link.

The Austrian banking sector has around 800 incorporated financial institutions, whereby approximately half of the institutions represent 95% of total industry wide assets. The majority of banks has no foreign affiliates (395) and only a few banks own foreign affiliates (42). The estimation sample introduces a size threshold and includes therefore 150 banks that have no foreign affiliates, and 36 that do have foreign affiliates. An Austrian bank can be passively owned by a non-Austrian financial institution. This is the case for 43 banks in the sample, and the remaining 143 banks are majority owned by Austrian financial institutions. The majority of Austrian parent banks that actively own foreign affiliates have them in up to 3 countries (27 Austrian parent banks), 9 Austrian parent banks have affiliates in 4 or more countries, whereof 4 parent banks have affiliates in 14 or more countries.

The analysis uses three definition for cross-border lending activities and compares them to domestic lending activities. In the most general definition I analyze changes in *total lending*, which consists of two components - lending to banks and lending to non-banks. In a second step I concentrate on a narrower definition of lending, that is *lending to banks*, whereby lending to affiliated banks has been excluded. For the last definition I focus on *lending to affiliated banks*, such as branches and subsidiaries. I briefly discuss local lending by foreign subsidiaries in the destination countries. I ask the following questions. Is a reallocation observable - away from cross-border lending towards more domestic lending during times of a liquidity shortage? Do larger banks adjust differently to a liquidity shock than smaller banks? What is the role of internal capital markets within this framework?

I find that (1) smaller banks (parent banks without affiliates) did not adjust their balance sheet composition in a very pronounced manner in response to a liquidity shock. (2) Large banks (parent banks with affiliates) did decrease moderately their cross-border loan share to other, non-affiliated banks. (3) Internal capital markets are important for the funding structure of Austrian parent banks and their foreign affiliates. (4) Destination countries matter. Countries signing the Vienna Initiative do receive strong support through the internal capital market.

To put the lending definitions into perspective I present some relative magnitudes for

2012Q4. I begin with unconsolidated figures. The cross-border *total claims* represent approximately 75% of the Austrian GDP (231 billion Euros). About half of that (the equivalent of 36% of GDP, 113 billion Euros) are cross-border *claims to non-affiliated banks*. *Loans to affiliated banks* amount to 18% of GDP (57 billion Euros). *Local claims* by foreign subsidiaries sum up to approximately 95% of GDP (288 billion Euros). If we sum up the volumes of cross-border *total claims*, *loans to affiliated banks* and *local claims* by foreign subsidiaries, we approximate the consolidated share of *total claims* of GDP 163% (503 billion Euros). Figure 2a shows the volumes of the lending definitions over time for the sample representing 95% of total industry wide assets.

Several analyzes have studied the dynamics in the Austrian banking sector using data from the Oesterreichische Nationalbank (OeNB). Here I mention just two, which are most directly aligned in their research theme with the present study. Pühr et al. (2009) find that cross-border lending to non-banks by Austrian banks expanded rapidly in Central, Eastern and Southeastern Europe (CESEE) countries from 2002 to 2008. The evidence suggests complementary effects between direct cross-border lending and indirect lending (through subsidiaries) such that the foreign subsidiary acquires lending business for the parent. Hameter et al. (2012) use a data set to analyze the credit risks of Austrian Banks in CESEE. The data consist of the Austrian Central Credit Register. The authors analyze differences in direct cross-border lending to affiliates and to non-affiliates. Affiliates received more liquidity from their parent banks than non-affiliates during the 2008/09 financial crisis period.<sup>1</sup>

I begin the analysis by an introduction to the data base in section 2, followed by graphical evidence for the three lending definitions in section 3. The analysis continues by embedding the figurative evidence into a regression framework in section 4 and 5. In section 6 I sum up the findings.

## 2 Data

Several data sources consisting of mandatory reports by Austrian financial institutions to the Oesterreichische Nationalbank (OeNB) have been used. The locational statistics, which builds the basis for the monthly reports to the Bank of International Settlements (BIS) and several data sources from the supervisory statistics, such as ownership data and all data relating to affiliates of Austrian parent banks.<sup>2</sup> The individual bank identifier has been anonymized by the statistical department of the OeNB.

The data mainly contains balance sheet information of financial institutions in Austria. It includes information on affiliates and cross-border activities across all countries. Concerning the reporting banks the OeNB employs the “*Cutting-Off-The-Tail*” principle, which collects detailed data positions from national financial institutions that represent the national banking

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<sup>1</sup>For a general overview of statistical evidence concerning the Austrian banking sector see Statistik (2011).

<sup>2</sup>See EZB *Monetaer Statistik Regulation (EC) No 25/2009* EZB-MONSTAT. Data reports based on the Directive 2006/48/EC of the European Parliament and of the Council.

sector to 95% measured as the total industry wide assets.<sup>3</sup> The total banking sector has around 800 financial institutions. Around 375 banks are included in the “cutting-of-the-tails” sample. More than 400 banks are very small, domestic banks, with close to zero cross-border activities. On average 10 banks in the “cutting-of-the-tails” sample have only domestic claims and no cross-border claims. As the focus of the study relies on cross-border banking activities, I use the “cutting-of-the-tails” sample as a starting sample. For the main estimations I limit the sample to include financial institutions, which have a minimum of a balance sheet total of 0.5 Billion Euros in at least one quarter. The estimation sample includes a total of 186 Austrian parent banks. All descriptive figures have been calculated for the whole sample and can be provided. For the sample of banks without affiliates (150 banks) we do not have any information on undrawn credit lines for 14 banks (whereof 10 banks with non-Austrian passive ownership), which consequently drop out of the estimation. For the sample of banks with affiliates (36 banks) we have a complete set of information on all the variables.

I construct a panel data set using quarterly series of balance sheet variables for individual banks with the following end of quarter dates: last day of the month of March, June, September, December of the corresponding year. The panel data set starts 2005Q2 and ends 2012Q4.<sup>4</sup> The data is unconsolidated at the level of each financial institution and is reported over the full country dimension of foreign claims. Financial institutions report net claims (“net due from”) and net liabilities (“net due to”) foreign branches. A corresponding position for the internal capital market between parent bank and foreign subsidiaries needs to be approximated. For this purpose I use the assumption that if an individual bank has a subsidiary in a particular country at time t, the individual loan position to a bank in that country and time t is classified as a loan towards the affiliated bank. I use a similar assumption for the “net due to” liability position regarding foreign subsidiaries. All cross-border claims are then adjusted such that they exclude claims to the foreign branches and subsidiaries. A positive value of “net due to” indicates that the parent owes money to its foreign affiliates. Subsidiaries are included if they are majority owned (ownership percentage larger than 50%) by an Austrian parent bank. For a detailed description of the variable definitions see the appendix 7. Most of the descriptive results carry over to consolidated data, where figures are consolidated at the head institution (holding company). Some of the banking data used for the comparison with consolidated figures (table 5, figure 2a) are drawn from the OeNB reports to BIS *International Banking Statistics*.<sup>5</sup>

To identify when parent banks are exposed to liquidity shocks, I use information from the *Bank Lending Survey*, which surveys the five largest Austrian banks on a regular basis about individual financing conditions. I have selected the question regarding factors that

<sup>3</sup>The OeNB determines once a year during the data collection process for EZB-MONSTAT report, which financial institutions need to report according to the *Cutting-Off-The-Tail* principle.

<sup>4</sup>The starting date of the data set corresponds to a change in the reporting criteria *Monetaer Statistik - Ausweisrichtlinie, Beleg 23, V 0413.pdf; Abschnitt: Version 2.0 April 2004*

<sup>5</sup>The OeNB requires Austrian banks to report consolidated data using different reporting criteria than for unconsolidated reports. I mainly use unconsolidated data bases for the present study as it allows for a more refined definition of balance sheet positions and lending channels.



affect changes in lending criteria and re-financing costs. Figure 9b plots the aggregate answers of those banks with respect to the relative change in financing conditions. The banks participating in the survey report a substantial worsening of financing conditions in 2008Q4.<sup>6</sup>

To understand how the lending and balance sheet of Austrian banks has adjusted during periods of crisis, I present information on banks receiving governmental support. The Austrian government allowed for a total package of 100 billion Euros consisting of several rescue measures in November 2008. An independent clearing house (passively owned by the largest Austrian commercial banks), supported through state liabilities, was incorporated in the second quarter of 2009 until the first quarter of 2011. The clearing bank AG (OeCAG) acted like an auction platform to help liquidity enhancing transactions between banks. Furthermore the programm allowed banks access to state liabilities and recapitalization (up to a total volume of 90 billion Euros) depending on its size of the balance sheet and solvability (tier 1 capital ratio of at least 7% and equity ratio of at least 10%). 8 large banks made use of this programm, see table 10. The last measure was a core deposit insurance (volume of 10 billion Euros), that guaranteed up to 100,000 Euros for private households until 2009, afterwards without volume limits.

Because bank identifiers are anonymized, I introduce an indicator variable to incorporate the access to official liquidity providing programmes as of 2008Q4. Even if a bank specific indicator could be constructed, results are not expected to differ significantly due to the following reasons. On the one hand the largest Austrian-owned banks participated in the rescue measures, whereby it is unknown how the support measures have been passed through the sectoral holding structures. Therefore we would need to assume that individual institutions belonging to the same sector benefited from the head institution participation in the rescue measures. Moreover there is no time variation in the access of government support across banks. This would yield two-thirds of the sample (e.g. 25 parent banks with affiliates that are passively owned by Austrian institutions) to have an indicator of one as of 2008Q4. On the other hand, foreign-owned banks received government support in their home countries. These arguments lead me to believe that the indicator variable as of 2008Q4 is qualitatively not inferior to a bank specific variable indicating access to official funds.

### 3 Descriptive evidence

The analysis centers around the question how Austrian parent banks are affected by liquidity shocks and how it is transmitted into different lending channels. For this purpose I present arguments along three dimensions. In a first step I show results for domestic and cross-border total lending, whereby total lending decomposes into lending to banks and lending to non-banks (first dimension). Secondly I take a closer look at the two components and single out lending to banks (second dimension). In a final step I investigate the role of internal capital

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<sup>6</sup>For a more detailed description of the EZB bank lending survey see Beer and Waschiczek (2012)

markets and differences in the destination country (third dimension). Throughout the analysis I maintain the differentiation of results by lending behavior for Austrian parent banks, which own actively foreign affiliates and those, which do not.<sup>7</sup>

I begin with an overview for the geographical dispersion using the different lending definitions. Figure 1a shows the geographical distribution of cross-border lending activities for 2012Q4 (first definition of lending channel). Germany is the number one destination country in terms of loan volume and deposit volume from the perspective of an Austrian parent banks. Whereby Croatia receives the highest loan volume in terms of the country's GDP.<sup>8</sup> Figure 1b shows the volumes and geographical distribution of lending to affiliated banks for 2012Q4 (third definition of lending channel). Croatia, Hungary, Romania and Russia are the most important destination countries for affiliate lending. In addition figure 5b in the appendix 7 shows the volumes of local claims by foreign subsidiaries. The Eastern European subsidiaries have substantial local claim volumes (sometimes larger than the direct cross-border lending through Austrian parent banks). In 2012Q4 the top ranking country in terms of local claims is the Czech Republic with approximately 40 billion Euros, followed by Russia with 30 billion Euros and Croatia with 24 billion Euros. Due to differences in reporting requirements of BIS (e.g. domestic versus foreign ownership of parent institution, local claims defined to be international or foreign) the volume of cross-border and local claims differ to some extent between the presented aggregated figures and the published unconsolidated and consolidated BIS statistics for Austria.

Table 5 in the appendix 7 shows the sum of claims of the Austrian banking sector for the top destination countries, whereby countries are ranked according to their corresponding claim volumes. It shows the number of banks and lending volumes for different definitions of lending channels: cross-border total claims, cross-border claims to affiliates, local claims by subsidiaries and the consolidated cross-border claims by destination country.

The individual share of loans over total assets remains very stable over the sample period, whereby the total domestic lending share amount to around 50% and the total cross-border lending share (excluding lending to foreign affiliates) sums up to 20%.<sup>9</sup> Aggregated shares hide the heterogeneity across banks and their global activities. An important distinction of banking types is by ownership of foreign affiliates. Austrian parent banks without affiliates are primarily engaged in domestic banking activities, they are substantially smaller in their total balance sheet (mean: 1.2 billion Euros in 2012, median: 0.3 billion Euros) than banks with affiliates (mean: 18 billion Euros, median: 6 billion Euros), they have an average core deposits ratio of 64% (median: 72%) and an average capital ratio of 12% (median: 11%).

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<sup>7</sup>In the appendix 7 tables 8 and 9 show the results for the sub-sample of Austrian parent institutions excluding banks with non-Austrian passive ownership (home country principle).

<sup>8</sup>In the appendix 7 I have included the same figure weighted by the GDP of the destination country, see 5a. In Croatia the cross-border loans share represents more than 10% of it's GDP. Slovakia has the second highest share in terms of loan volume of Austrian parent banks of the country's GDP.

<sup>9</sup>The exact aggregate shares vary depending on the sample selection criteria such as the threshold for the total balance sheet size. Figures for the population of all Austrian banks can be provided by the author.

Austrian parent banks with affiliates engage both domestically and abroad (the average share of aggregate domestic loans over total assets is just below 30% and on average 18% is the aggregate cross-border lending share). They have an average core deposit ratio of 35% (median: 34%) and an average capital ratio of 11% (median: 8%) over the sample period. If we are interested in a sample split based on total balance sheet size (small versus large banks), the dividing line is the engagement in cross-border banking paired with ownership of foreign affiliates. All Austrian banks owning foreign affiliates can be considered to be larger banks, and all larger banks own foreign affiliates. Figure 2b shows the frequency and geographical distribution of foreign affiliates and corresponding parent banks. Germany sticks out with a very large number of branches. Most subsidiaries are located in Eastern Europe.

The heterogeneity of the banking sector becomes apparent if one compares the distribution of individual domestic and cross-border lending shares over total assets. In the appendix 7 in figure 9a I show a QQ-plot with the individual share of loans over total assets for each bank, distinguishing between domestic and cross-border shares of total loans. Concentrating first on the domestic loan shares, we see that the majority of banks have a share that is larger than the aggregated share of total domestic loans (the mean aggregated domestic loan share in 2012Q4 is 58%.) Many small banks lend predominantly domestically. The complete opposite holds for the cross-border lending activities. Only few banks (those above the 80th percentile) have a share larger than the aggregated share of total cross-border loans (the mean aggregated cross-border loan share in 2012Q4 is 20%). Due to the skewed distributions of bank-specific lending shares, I present median shares in most figures.<sup>10</sup>

In general domestic and cross-border lending activities by the Austrian banking sector from 2005 to 2012 can be described quite adequately using figure 3. It shows the different aspects of lending activities along the first two definitions. In figure 3a I plot the median of individual lending shares differentiating domestic and cross-border lending, in addition to affiliate ownership. The shares are very stable for banks with affiliates and without. I do not observe any reallocation or compositional changes in the total lending. In figure 3b I present the median shares of domestic and cross-border lending to other banks.<sup>11</sup> The magnitude of lending to other banks is around 10% in terms of share of total assets, which corresponds to an equivalent of 113 billion Euros in volume). A moderately pronounced pattern of reallocation towards domestic lending, particularly for banks without affiliates, can be observed. I will revisit this argument using the regression evidence in section 5.

Figure 4 shows the last dimension within my arguments when analyzing how liquidity shocks have been transmitted into different types of lending. Panel 4a shows the median of individual lending shares and deposits by Austrian parent banks to its foreign affiliates. The internal capital market between parent bank and affiliate is substantial in volume. 4% of total assets in 2012Q4 (503 billion Euros for banks with affiliates) are 21 billion Euros,

<sup>10</sup>One can transform the individual share into an aggregated share, by re-weighting each observation with its bank-specific weight, the weight the particular bank has within the distribution of total assets for all banks.

<sup>11</sup>Aggregate shares of non-bank lending remain very stable over the sample period and can be obtained from the author.

which translates to approximately 7% of GDP (see figure 2a and 4a). The graph further distinguishes between loans to subsidiaries and those to branches, whereby the subsidiaries dominate the volumes of branches by a multiple. Branches and subsidiaries are substitutes in terms of ownership structure. Parent banks have either branches in a country or a subsidiary, not both. The lending share is acyclical between branches and subsidiaries. One can notice that the median of individual lending shares to subsidiaries is higher in 2009 than the median share for affiliates (which is the sum of subsidiaries and branches). Parent banks decreased loans to branches significantly (reporting zero lending, but positive deposits by the branch), which results in a lower lending share for the median affiliate.

The last figure for this section sets the cross-border lending into relation to affiliate lending (second and third channels). Figure 4b shows the relative importance of destination countries by cross-border loans and loans to affiliates over the entire sample period<sup>12</sup>. Countries far to the right on the horizontal axis (such as Croatia, Hungary, Italy, Romania, Slovenia and Russia) but also countries up on the vertical axis (Germany, Great Britain and the non-euro countries) receive a high volume from the internal capital market of their Austrian parent banks, but are also important destinations for cross-border lending activities of Austrian parent banks without affiliates in those countries. The countries in the graph are almost all countries, where Austrian parent banks own affiliates (except Turkey and the Netherlands) and correspond with the important destination countries for 2012 from table 5. Branches are mostly located in the upper, left part of the chart, whereby subsidiaries spread out along the lower horizontal dimension.

## 4 Empirical specification

Within the IBRN framework we are interested in the question, which ex-ante balance sheet characteristics explain best the adjustment of lending growth in response to liquidity shocks. Throughout we want to highlight differences in the balance sheet adjustments by using information of active ownership features (no affiliates versus affiliates). I start by summarizing the descriptive evidence from section 3. First I observe very stable domestic and cross-border total lending shares throughout times of crisis. Second, lending to foreign banks seems to be a relevant channel of adjustment. Large banks (banks with affiliates) adjust their lending portfolio more pronounced than smaller banks (banks without affiliates). Third, the role of internal capital markets is relevant for the overall adjustment in lending growth (cross-border and affiliate lending are affected).

The empirical strategy attempts to compare changes in domestic, cross-border and net internal loan positions (balance sheet adjustments) across Austrian parent banks, controlling for ex-ante exposure of parent banks to liquidity constraints. The idea is to capture the prior exposure through bank-specific characteristics such as balance sheet size (larger banks

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<sup>12</sup>Plotting the geographical distribution and importance of destination countries for the year 2012 yields a similar picture in terms of aspect ratio and lending volumes are one tenth as big as in the here presented figure.

have a different access to financial markets than smaller banks), the ratio of illiquid assets to total assets (a higher share of illiquid assets constraints a bank more in case of a liquidity shock), the ratio of committed credit lines to total assets (a higher share of off-balance sheet commitments in previous periods requires more pronounced balance sheet adjustments in subsequent periods in case of a liquidity shock), the ratio of core deposits over total liabilities (the higher the core deposit ratio, the less reliance on wholesale deposits, presumably helps a bank to mitigate effects of a liquidity shock), the ratio of capital over asset (the risk premium for banks with high capital ratios will be lower, therefore refinancing costs are expected to be lower) and the potential use of internal capital market fund, such as deposits by affiliates (the higher the deposit ratio of affiliates, a less pronounced adjustment of the current balance sheet might be necessary in response to a liquidity shock). The omitted category is wholesale deposits.

The main regression specification follows the empirical model set out in Buch and Goldberg (2014), wherein changes in different types of lending are regressed on balance sheet characteristics, measures of liquidity risk, and information on public interventions.

$$\Delta Y_{it} = \gamma_i + \mu_t + (\beta^0 + \beta^1 LIB\_OIS_t)X_{i,t-1} + (\alpha^0 + \alpha^1 LIB\_OIS_t * X_{i,t-1})F_{it} + \epsilon_{it} \quad (1)$$

$X_{i,t-1}$  is a vector of lagged control variables that capture the degree to which a bank is exposed to liquidity risk through ex-ante balance sheet characteristics such as liquid asset share, the share of core-deposits in bank funding, bank size, the share of outstanding commitments, and through internal capital markets.

Liquidity shocks are approximated using the Libor over overnight indexed swap rates ( $LIB\_OIS_t$ ), whereby an increase in the spread relates to increased liquidity funding risk and this applies to all Austrian banks uniformly. During the sample period the Austrian government provided all Austrian banks with access to banking rescue packages from the last quarter of 2008 onwards. For an overview of individual Austrian banks that have actually participated in rescue measures see table 10 in the appendix 7. The access to additional liquidity through recapitalization by the government poses a challenge for the empirical identification during crisis times. I present estimation results allowing slopes to be different after official sector liquidity has been provided to Austrian parent banks. Official sector liquidity has been provided to the largest banks shortly after 2008Q4. The indicator variable “official use” is a time indicator to incorporate the access to official liquidity providing programmes to all banks as of 2008Q4.<sup>13</sup>

Table 2 and table 3 present the marginal effects of the balance sheet variables (illiquid assets, commitment ratio, log real assets, core deposit ratio, tier 1 capital, net due from affiliated banks) of Austrian parent banks with and without affiliates interacted with the Libor-Ois spread (column: not utilized), the additional interaction with access to central bank

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<sup>13</sup>The empirical variable description “utilized” versus “non-utilized” is for the Austrian case a bit misleading, as it is not a bank specific variable for governmental liquidity support, but rather a sectoral indicator of governmental liquidity support.

facilities (column: utilized) and the difference between the two effects (column: difference). The interaction of the balance sheet variables with the Libor-Ois spread allow to differentiate in the sensitivity of responses to a liquidity shock between banks with different balance sheet characteristics. The additional interaction of a particular balance sheet variable with Libor-Ois spread and with the official use indicator variable provides insights into changes in the sensitivity for periods after the crisis of 2008. Table 2 uses domestic and cross-border *total* loan growth as dependent variable and table 3 uses cross-border *bank* loan growth.

I exploit the geographical dispersion of destination countries (for parent-subsidiary pairs only, no foreign branches are included) to analyse the relative adjustments of parent banks exposed to liquidity risk using a variant of the following specification:

$$\begin{aligned} \Delta Y_{it}^c = & \gamma_i + \mu_t^c + \\ & (\beta^0 + \beta^1 * LIB\_OIS_t + \beta^2 * X_{i,t-1}^c + \beta^3 * LIB\_OIS_t * X_{i,t-1}^c) X_{i,t-1} + \\ & (\alpha^1 * LIB\_OIS_t + \alpha^3 * LIB\_OIS_t * X_{i,t-1}^c) * X_{i,t-1} * F_{it} + \\ & \epsilon_{it} \end{aligned} \quad (2)$$

The dependent variable is the growth rate of “net due to” foreign subsidiaries in a particular destination country. Now the panel dimension consists of parent-foreign-subsidiary bank at each quarter over the distribution of foreign subsidiaries’ countries. The sample is split into parent-foreign-subsidiaries’ countries that have signed the Vienna Initiative and those which have not. The independent variable  $X_{i,t-1}^c$  consists of loans by the foreign subsidiary to it’s Austrian parent bank. The idea is that global banks adjust their lending relative to characteristics of their foreign subsidiaries depending on the subsidiaries’ location. Table 4 presents the results for this estimation. The estimation equation includes destination country - time fixed effects to absorb changes in demand conditions. By construction the sample includes only destination countries where at least two distinguished parent-foreign subsidiary pairs are present.

## 5 Empirical results

Lets begin with responses to liquidity shocks by Austrian parent banks without affiliates in panel A of table 2. The first three columns show the change in domestic loans, the latter three columns the change of cross-border loans as the dependent variable. For a higher price of market liquidity, banks with an ex-ante higher commitment ratio decreased their domestic lending (-0.258\*\*), something that was reversed after the crisis (difference: +0.372\*) Banks with higher core deposit ratios, reduced their cross-border lending positions for increasing liquidity prices (-0.065\*). Whereby the core deposit ratio has no significant impact on cross-border lending growth after 2008 (difference +0.069\*\*).

Panel B shows the results for Austrian parent banks with affiliates, where banks with higher commitment ratios had no effect on domestic lending before the crisis, but increased

their domestic lending share (+0.227\*) after the crisis. With respect to their cross-border lending positions there seem to be some offsetting tendencies at work. For a given market liquidity price, banks with a higher commitment ratio increase their cross-border loan share (+0.248\*\*) before the crisis, but decrease it sharply (difference: -0.442\*\*\*), whereby banks that receive net-deposits from their affiliates decrease it (net due from: -0.260\*) also through the crisis (net due from: -0.137\*). I interpret the effects for the internal capital market variable that banks that receive higher deposits from affiliates (compared to other banks with affiliates) adjust their loan portfolio after the crisis more towards Austria.

Summing up - which balance sheet characteristics are most responsive to changes in liquidity pricing on loan growth? Changes to the composition of domestic and cross-border *total* lending shares during times of higher liquidity financing can only be described as being very moderate, which is also suggested by graph 3a. Small banks (without affiliates) with higher commitment ratios decrease domestic total lending, those with higher core deposits decrease their cross-border total lending, relative to other banks without affiliates. Large banks (with affiliates) with higher commitment ratios increase cross-border total lending, those with higher deposits from affiliates decrease cross-border total lending, relative to other banks with affiliates.

Table 8 in the appendix 7 show the results excluding non-Austrian owned parent institutions. How are Austrian parent institutions that are majority owned by Austrian institutions (home country principle) different from all Austrian parent institutions? In the top 10 of the largest banks in Austria several are non-Austrian majority owned parent institutions (total assets in billion Euros mean: 27.8, median: 3.3). These banks have a median share of cross-border loans over total assets of 41.7% (domestic median share: 11.4%) compared to Austrian majority owned banks with a median cross-border share of 18.3% (domestic median share: 51.1%). If we exclude the non-Austrian owned parent institutions the estimation sample consists of 114 banks without affiliates and 25 banks with affiliates. Although divergent in some aspects the broad pattern of the results description remain intact. A sample split based on non-Austrian ownership has also its caveats as some of the largest Austrian banks have experienced an ownership change in response to the strained liquidity situation.

So far I have analyzed *total lending* shares, which is a composite term consisting of lending to banks and non-banks. Graph 3b indicates that particular lending to other banks appears to be the more sensitive part. The median cross-border *bank lending* share is around 8% for parents with affiliates, but only 0.004% for parent banks without affiliates. The median domestic *bank lending* share for parents with affiliates is 8% and for parents without affiliates 12%. I turn to table 3, where the dependent variable is changes in cross-border *bank loans* by Austrian parent banks without (first three columns) and with affiliates (latter three columns).

Comparing the results from the cross-border estimations (total lending as the dependent variable) and now the results with the change in bank lending as the dependent variable, it seems that the changes in *total lending* are essentially the result from adjustments in *bank lending* by large parent banks - banks with affiliates (size: -0.012\*\*). The differences between

periods where banks had access to official liquidity provision or not for the commitment ratio and the deposit ratio are quite large (commitment ration:  $-0.294^{**}$ , deposit ratio:  $-0.097^*$ ). Parent banks which received larger deposit transfers from their affiliates, did reduce their cross-border lending ( $-0.124^*$ ) more compared with banks that received less internal funds during times of crisis. Smaller banks (banks without affiliates) did not adjust their cross-border financial lending activities in any pronounced way, whereby banks with affiliates decreased their cross-border financial lending shares in response to higher liquidity costs.

This leads us to question the role of internal capital markets. If Austrian parent banks decreased their cross-border lending to non-affiliated foreign financial institutions, did they adjust their internal capital flows in a similar manner? Figure 4a shows the total volume of loans to affiliates overtime. The aggregated volume of loans over all Austrian parent banks to their affiliates (either branch or subsidiary) is 57 billion Euros for 2012Q4. The median of net due to (internal capital market loans minus deposits) is 0.18 billion Euros over the whole sample period and 0.08 billion euros in 2012Q4. Affiliates and parent banks make extensive use of reallocation of funds. The decomposition of affiliate lending into loans to branches and loans to subsidiaries show that the flows of fund are not synchronic. I investigate the extend of changes in net due to parent banks balance sheet characteristics using panel D in table 3. The coefficient for deposits from affiliates remains negative (for the sample excluding non-Austrian owned parent institution the coefficient becomes significant negative). Suggesting that banks with a relatively high share of net deposits of affiliates compared to other banks with affiliates, lend less to affiliates. Suggesting a fund retrieval towards the Austrian parent institution, when liquidity becomes more expensive. But the regression uses parent bank net flows to affiliate aggregating over all countries of its ownership structure. This aggregates out all differences with respect to a ranking of affiliates within the global banking structure of a particular bank. It seems that this set-up aggregates over many important features, such as not distinguishing between affiliate types (branches and subsidiaries) and ignoring the importance of country destinations.

Ultimately I want to analyze wether shock transmission differs by destination countries concentrating on one particular affiliate relationship - the subsidiary. I exploit variation from a policy, the “Vienna Initiative”, which coordinated multinational banks, country supervisors, central banks, governments and international organizations to achieve stable funding for subsidiary countries at risk during the financial crisis. 5 countries (Bosnia-Herzegovina, Hungary, Latvia, Romania, Serbia) signed an agreement with the 5 (among others) largest Austrian parent banks having subsidiaries in those countries to ensure that interbank liquidity would not dry up. The Austrian parent banks have committed themselves to keep their subsidiaries capitalized, providing them with sufficient liquidity. For an overview of the Vienna Initiative and its impact on host countries see Haas et al. (2014).

As five Austrian banks have voluntarily participated in the initiative, I exploit the variation over the ownership structure, all destination countries and the countries directly affected by the Vienna Initiative agreements. I would expect subsidiaries net lending in countries,



which have signed the Vienna Initiative to be less affected during times of higher liquidity costs even for the Austrian parent bank. Table 4 shows regression results over the complete country dimension of parent banks-affiliates-destination countries. The first three columns are the sample of countries, which have not signed the Vienna Initiative agreement. The latter three columns represent the estimation for countries, which have indeed signed the agreement. 7 Austrian parent banks have 39 subsidiaries in the five Vienna Initiative countries. If a parent bank has several subsidiaries per country and date, I implicitly assume one subsidiary per date and country. This becomes necessary due to the fact that I need to approximate lending from the parent bank to the subsidiary. Among the already large banks with affiliates, the largest ones are engaged in those countries. I find the illiquid asset ratio, the commitment ratio, the size, the tier 1 capital ratio and the net due from ratio to be relevant balance sheet characteristics to explain changes in the net due to ratio. Parent banks with ex-ante high net due from ratios (deposits from the subsidiary to the Austrian parent bank), higher capitalization and higher commitment ratios, increase their net lending to subsidiaries after the Vienna Initiative was negotiated (net due from: +0.506\*\*, commitments: +0.028\*, capital: +0.506\*\*) compared to banks with lower ratios during times of liquidity shortages. Larger parent banks, with higher commitment ratios and higher capital ratios decreased their net lending to foreign subsidiaries (difference capital: -0.079\*, difference commitments: -0.073\*). Yet higher deposit ratios from subsidiaries increased their net lending to subsidiaries (+0.108\*\*) after 2008. It confirms that parent banks prioritize internal funds allocations to subsidiaries according to their importance within the organizational structure.

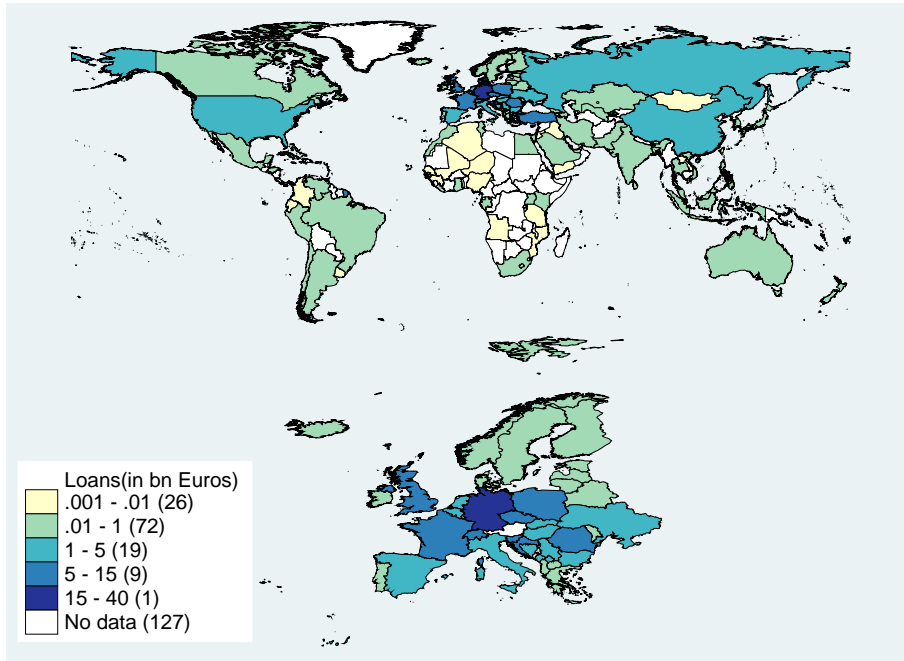
## 6 Conclusions

Do banks adjust to worsening conditions by shifting credit growth towards their home market? How does this translate through the business structure of global banks? This study investigates how Austrian banks adjust their balance sheet positions in response to a tighter liquidity providing environment. I distinguish between three definitions of cross-border lending such as *total lending*, *lending to non-affiliated banks* and *lending to affiliated banks*. I find that (1) smaller banks (parent banks without affiliates) did not adjust their balance sheet composition in a very pronounced manner in response to a liquidity shock. (2) Large banks (parent banks with affiliates) did decrease moderately their cross-border loan share to other, non-affiliated banks. (3) Internal capital markets are important for the funding structure of Austrian parent banks and their foreign affiliates. (4) Destination countries matter. Countries signing the Vienna Initiative do receive strong support through the internal capital market.

Figure 1: Lending types across the World

(i) Map 1a shows the volume of cross-border loans (excluding loans to affiliates) of Austrian parent banks for 2012Q4 by its geographical distribution. (ii) Both maps 1a and 1b includes only Austrian parent banks with a minimum of 500 Mio. Euros balance sheet sum at least once during the sample period. (iii) The bottom part of map 1a shows an enlarged picture of Europe and bracket figures in the legend show the number of countries in each category. (iv) Map 1b shows figures for European affiliates only. At the bottom of the legend the affiliate countries excluded of the map are documented.

(a) Cross-border Lending Q4 2012



(b) Lending to Affiliates Q4 2012

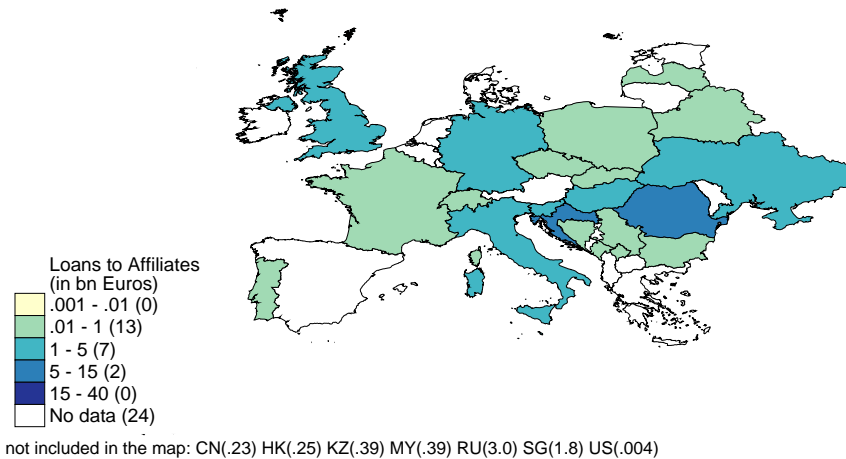
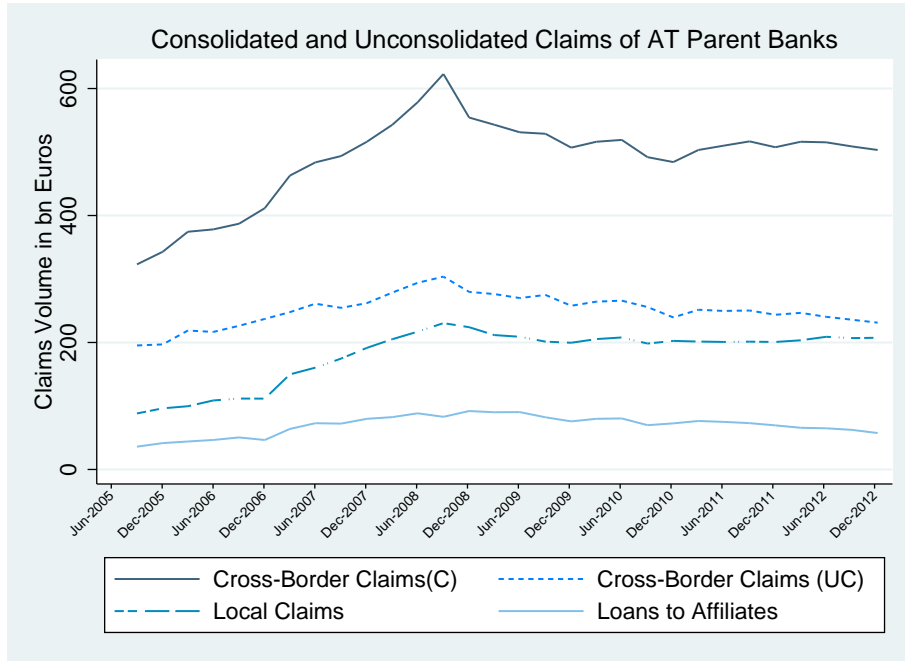


Figure 2: Aspects of the Austrian Banking Sector

(i) Figure 2a shows the aggregated volumes of the Austrian banking sector for the different lending channels for the “cutting-off-the-tails” sample (375 banks). (ii) It includes cross-border, unconsolidated claims (dashed line), unconsolidated loans to affiliated foreign banks (internal capital market, solid light blue line), local unconsolidated claims by foreign subsidiaries (dash-dotted line) and cross-border consolidated claims of Austrian parent banks (dark blue solid line). (iii) Summing up the three unconsolidated volumes of claims approximates the consolidated volume of claims. (iv) Figure 2b shows the geographical distribution of affiliates and their Austrian parent banks. It distinguishes affiliates between foreign branches and foreign subsidiaries. (v) Some countries were grouped together to maintain data protection requirements.

(a) Comparison of Lending Volume



(b) Geographical Distribution of Affiliate Ownership

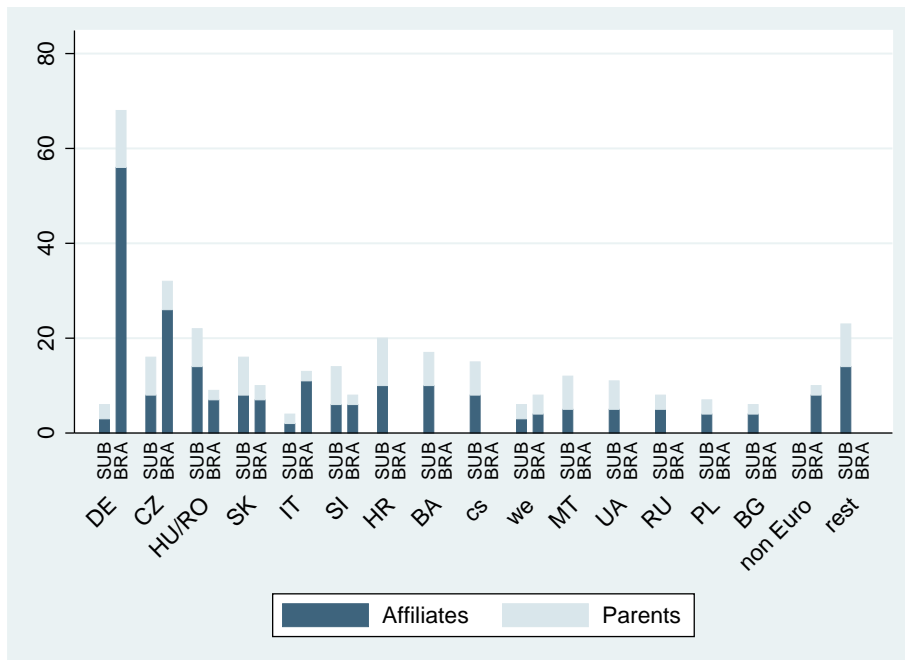
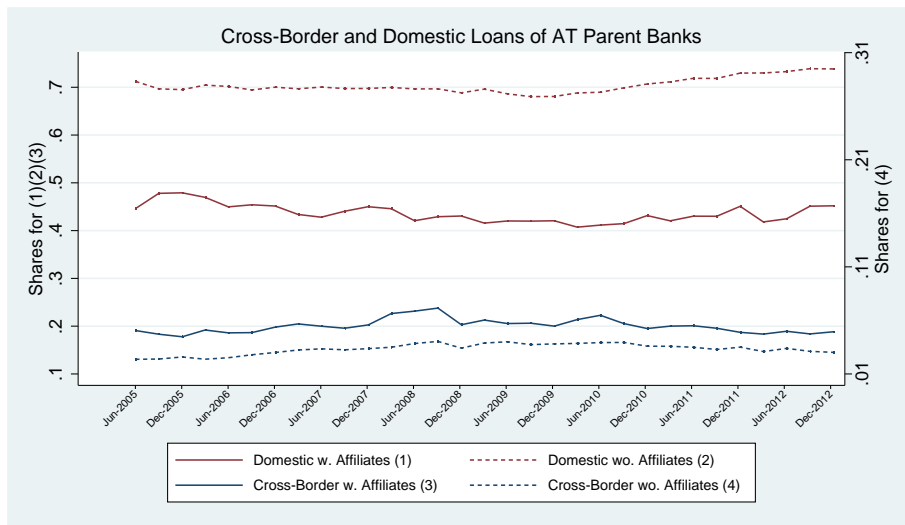


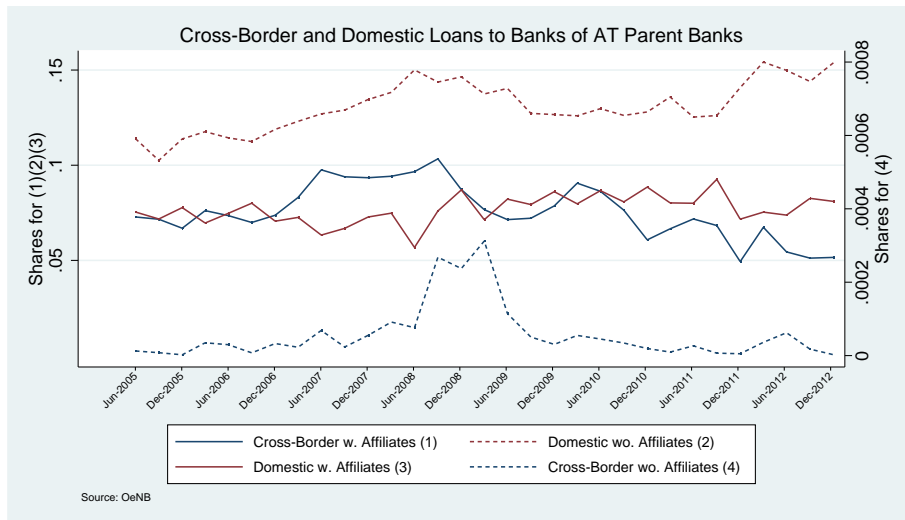
Figure 3: Domestic and Cross-border Lending Shares

(i) Figure 3a shows the median shares of domestic and cross-border *total* lending over total assets overtime (red is domestic, blue is cross-border). (ii) Figure 3a differentiates between parent banks with affiliates (solid line) and without affiliates (dashed line). (iii) Figure 3b shows the median shares of domestic and cross-border *bank* lending over total assets and overtime (red is domestic, blue is cross-border). (iv) Figure 3b differentiates between parent banks with affiliates (solid line) and without affiliates (dashed line).

(a) Median Share of Loans



(b) Median Share of Loans to Banks

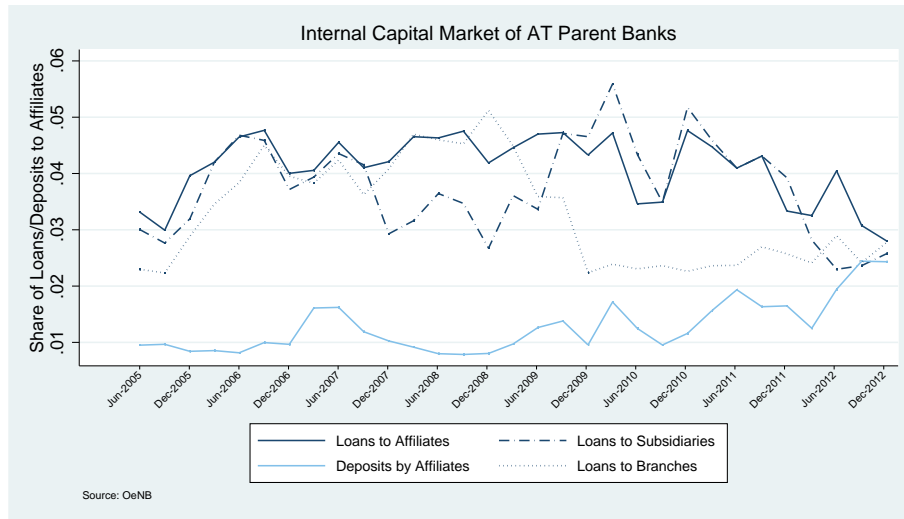


Source: OeNB

Figure 4: Cross-Border and Affiliate Lending Shares

(i) Figure 4a shows the median shares of loans *to affiliates* over total assets overtime (solid dark line). (ii) Figure 4a shows the median shares of deposits *by affiliates* over total assets overtime (solid light line). (iii) Figure 4a differentiates between loans to subsidiaries (dash-dotted line) and loans to branches (dotted line). (iv) Figure 4b shows the volume of cross-border loans on the vertical axis and the volume of loans to affiliates on the horizontal axis by country over the whole sample period. (v) The top 15 destination countries based on 2012Q4 cross-border loan volume are represented and therefore the country distribution is not exclusively limited to countries with affiliates.

(a) Median Share of Loans and Deposits to Affiliates



(b) Importance of Destination Countries

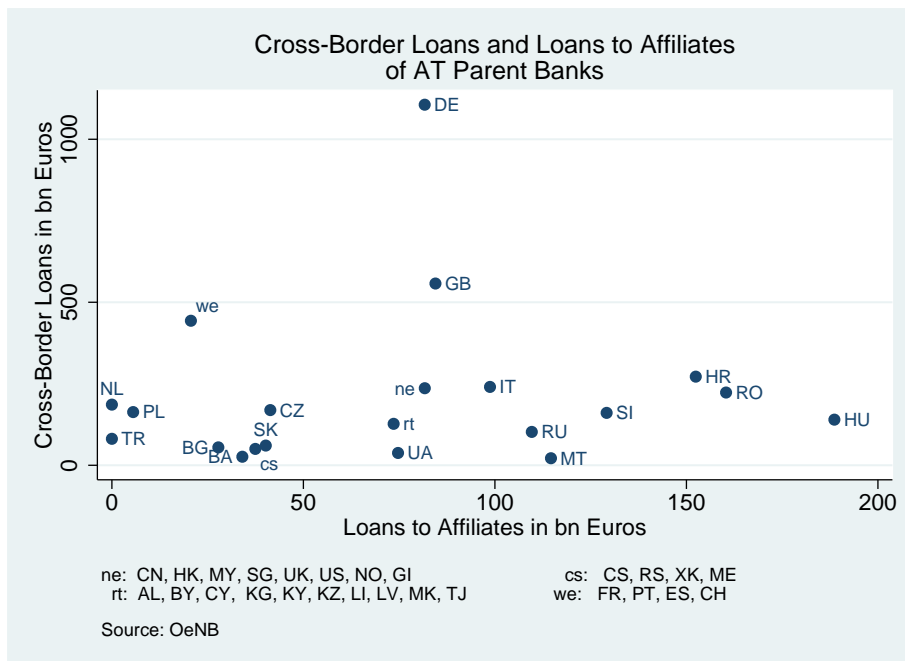


Table 1: **Summary Statistics for Austrian Banks over 2005Q2 to 2012Q4**  
Percent (unless otherwise specified)

Variable	Austrian-owned parent Banks						Foreign-owned parent Banks					
	No affiliates(n=118)			With foreign affiliates(n=25)			No affiliates(n=32)			With affiliates(n=11)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Balance sheet data (for each bank / and quarter i)												
Observations	3,239			587			765			256		
<i>Dependent Variables</i>												
Δ Liquid Assets/TA	0.000	0.000	0.006	0.001	0.000	0.007	0.001	-0.000	0.014	-0.000	-0.000	0.012
Δ Domestic Loans/TA	0.009	0.008	0.020	0.006	0.006	0.020	0.009	0.004	0.026	0.004	0.000	0.021
Δ Foreign Loans/TA	0.001	0.000	0.004	0.003	0.002	0.006	0.002	0.000	0.006	0.004	0.008	0.007
Δ Local Claims 1/TA				0.003	0.000	0.011				0.004	0.001	0.013
Δ Local Claims 2/TA				0.001	0.000	0.003				0.001	0.000	0.004
Δ Net Due to Affiliates/TA				0.000	0.000	0.007				-0.000	0.000	0.007
<i>Independent Variables</i>												
Illiquid Assets/TA	0.757	0.761	0.127	0.685	0.708	0.151	0.802	0.894	0.231	0.583	0.612	0.184
Commitments/TA+Com	0.085	0.079	0.043	0.096	0.094	0.045	0.092	0.031	0.136	0.077	0.048	0.075
Real Assets (in BN Euros)	2.866	0.863	5.652	17.333	8.101	24.143	1.279	0.762	1.438	27.907	3.288	46.236
Real Assets 4Q 2012 (in BN Euros)	3.222	0.994	5.789	16.273	7.597	23.918	1.283	0.685	1.670	19.274	4.246	37.540
Deposits/Liabilities	0.570	0.647	0.250	0.360	0.329	0.207	0.492	0.612	0.384	0.343	0.350	0.261
Capital/TA	0.095	0.095	0.053	0.085	0.080	0.054	0.093	0.048	0.158	0.098	0.084	0.071
Foreign Loans/TA	0.064	0.026	0.116	0.179	0.182	0.106	0.428	0.388	0.387	0.419	0.395	0.236
Domestic Loans/TA	0.706	0.723	0.166	0.517	0.510	0.179	0.469	0.381	0.362	0.184	0.115	0.176
Deposits from Affiliates/TA				0.034	0.010	0.090				0.039	0.008	0.081

(i) Source: OeNB.

(ii) Beginning of quarter assets are used to standardize growth in all dependent variables.

(iii) The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures.

(iv) The sample is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter.

(v) The dependent variables are winsorised at the 1st and 99th percentile.

(vi) To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%.

(vii) Affiliates include foreign branches and subsidiaries of Austrian parent banks.

(viii) The appendix 7 provides the same table with winsorised and outlier corrected variables.

Table 2: Domestic and Cross-border Lending Activities

This table reports the marginal effects of liquidity risk conditions and central bank credit facility access on firm characteristics' effects on growth in *domestic and cross-border total loans* (to banks and non-banks) for parent banks without affiliates (upper panel) and parent banks with affiliates (lower panel). The underlying fixed effects regressions of quarterly growth in total loans on Libor-Ois, central bank facility access, firm characteristics, and interactions are presented in appendix 7. Beginning of quarter assets are used to standardize growth in loans. The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures. The panel is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter during the sample period. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Firm characteristics data comes from a variety of supervisory data sources provided by OeNB. The Libor-Ois is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. \*\*\*, \*\*, and \* respectively indicate significance at the 1%, 5%, and 10% level.

Panel A: Austrian Parent Banks *without* Affiliates

$\Delta$ Loans/Assets	$\Delta$ Domestic Loans Central Bank Facility Access			$\Delta$ Cross-Border Loans Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	0.002	0.000	-0.002	-0.064	-0.013	0.050
Commitment	-0.258**	0.114	0.372*	0.110	0.052	-0.058
Log Real Assets	0.007*	-0.003	-0.010	-0.008	0.002	0.010*
Deposits	0.017	-0.017	-0.035	-0.065*	0.004	0.069**
Capital	-0.011	-0.046	-0.035	0.017	0.021	0.004
Observations	3,457			3,368		
Number of Banks	136			133		
R2 within	0.067			0.052		
R2 between	0.139			0.001		
R2 overall	0.023			0.003		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

Panel B: Austrian Parent Banks *with* Affiliates

$\Delta$ Loans/Assets	$\Delta$ Domestic Loans Central Bank Facility Access			$\Delta$ Cross-Border Loans Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	-0.008	-0.013	-0.005	-0.042	0.080	0.122
Commitment	0.094	0.227*	0.134	0.248**	-0.194	-0.442***
Log Real Assets	-0.005	-0.009*	-0.005	-0.017***	-0.002	0.015*
Deposits	-0.006	-0.040	-0.034	-0.032	-0.091**	-0.060
Capital	-0.218	0.091	0.309	-0.323	0.052	0.375
Net Due To	0.144	0.255	0.112	-0.260*	-0.137*	0.123
Observations	777			777		
Parent Banks	36			36		
R2 within	0.136			0.133		
R2 between	0.001			0.026		
R2 overall	0.024			0.018		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

Table 3: Cross-border Lending Activities to Banks

This table reports the marginal effects of liquidity risk conditions and central bank credit facility access on firm characteristics' effects on growth in *cross-border loans to banks* for parent banks without affiliates and banks with affiliates (upper panel) and net-due to affiliates for parent banks with affiliates (lower panel). Affiliates are foreign branches and foreign subsidiaries of parent banks. The underlying fixed effects regressions of quarterly growth in loans to banks on Libor-Ois, central bank facility access, firm characteristics, and interactions are presented in appendix 7. Beginning of quarter assets are used to standardize growth in loans. The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures. The panel is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter during the sample period. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Firm characteristics data comes from a variety of supervisory data sources provided by OeNB. The Libor-Ois is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. \*\*\*, \*\*, and \* respectively indicate significance at the 1%, 5%, and 10% level.

Panel C: Austrian Parent Banks *without* Affiliates and *with* Affiliates

$\Delta$ Loans	Banks without Affiliates $\Delta$ Cross-Border Loans Central Bank Facility Access			Banks with Affiliates $\Delta$ Cross-Border Loans Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	-0.065	-0.008	0.057*	-0.010	0.055	0.065
Commitment	0.071	0.118*	0.047	0.167	-0.127	-0.294**
Log Real Assets	-0.006	-0.002	0.004	-0.012**	-0.004	0.008
Deposits	-0.050*	-0.006	0.044	0.001	-0.096***	-0.097*
Capital	0.041	-0.020	-0.061	-0.216	0.180	0.397
Net Due To				-0.125	-0.124*	-0.004
Observations	3,390			777		
Parent Banks	135			36		
R2 within	0.040			0.141		
R2 between	0.000			0.046		
R2 overall	0.005			0.015		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

Panel D: Austrian Parent Banks *with* Affiliates

$\Delta$ Net Due	Central Bank Facility Access		
	Not Utilized	Utilized	Difference
Illiquid Assets	0.033*	-0.009	-0.042
Commitment	0.055	-0.167	-0.222*
Log Real Assets	-0.005	0.007*	0.012**
Deposits	-0.020	0.008	0.029
Capital	0.062	-0.066	-0.129
Net Due To	-0.022	-0.171	-0.148
Observations	777		
Parent Banks	36		
R2 within	0.119		
R2 between	0.030		
R2 overall	0.011		
Time fixed effects	Yes		
Bank fixed effects	Yes		



Table 4: Austrian Parent Banks with Affiliates across Country Dimension

This table reports the marginal effects of liquidity risk conditions and central bank credit facility access on firm characteristics' effects on growth in *net-due to subsidiaries* for parent banks with subsidiaries. The panel dimension consists now of parent banks at each quarter over the distribution of subsidiaries' countries. The sample is split into countries, which have not signed the Vienna Initiative (Non-VI Countries in the first three columns) and countries, which have signed the agreement (VI countries in the last three columns). The variable "due from" refers to loans of the individual foreign subsidiary to its Austrian parent bank. The underlying fixed effects regressions of quarterly growth in net to to on Libor-Ois, central bank facility access, firm characteristics, and interactions are presented in appendix 7. Beginning of quarter assets are used to standardize growth in net due to. The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures. The panel is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter during the sample period. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Firm characteristics data comes from a variety of supervisory data sources provided by OeNB. The Libor-Ois is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. \*\*\*, \*\*, and \* respectively indicate significance at the 1%, 5%, and 10% level.

Panel E: Austrian Parent Banks *with* Affiliates across Country Dimension

$\Delta$ Net Due	Non VI Countries			VI Countries		
	Central Bank Facility Access			Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	0.006	0.005	-0.001	0.013*	-0.007	-0.020*
Commitment	0.018	-0.055**	-0.073*	0.031	0.028*	-0.003
Log Real Assets	-0.001*	0.002*	0.003**	-0.001*	-0.001	0.000
Deposits	-0.012	-0.002	0.010	0.002	-0.001	-0.003
Capital	0.049*	-0.030	-0.079*	-0.009	0.027***	0.036
Due from	-0.094	0.108**	0.202	0.408	0.506**	0.098
Observations	1,395			619		
Number of Banks	70			25		
R2 within	0.072			0.169		
R2 between	0.028			0.072		
R2 overall	0.003			0.085		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		
Country fixed effects	Yes			Yes		

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## 7 Appendix A

Table 5: Structure and Importance of Destination Countries 2012Q4

Country	Unconsolidated Cross-Border Parents				Unconsolidated Affiliates			Unconsolidated Subsidiaries Local		Consolidated Cross-Border Parents		
	Rank	Banks	Claims	Loans	Banks	Claims	Loans	Banks	Claims	Rank	Banks	Claims
DE	1	358	47.42	0.84	91	2.78	0.81	<4	3.86	2	59	44.38
GB	2	326	17.63	0.79	<4	1.14	1.00	.		10	52	17.83
IT	3	315	12.53	0.29	<4	3.02	0.82	<4	3.01	8	50	20.62
PL	4	245	11.34	0.56	<4	0.21	0.12	<4	0.11	9	42	20.55
FR	5	287	11.28	0.59	<4	0.27	0.20	<4	0.27	12	47	11.95
HR	6	220	9.98	0.94	9	8.74	0.64	9	24.18	3	41	38.80
CH	7	342	9.54	0.92	4	0.78	0.97	<4	0.05	19	56	9.47
TR	8	118	9.47	0.70	.			.		18	29	9.69
NL	9	305	9.01	0.46	.			.		17	51	9.75
US	10	334	8.27	0.36	<4	0.02	1.00	.		13	52	11.29
RO	11	185	7.82	0.89	5	6.92	0.95	4	18.59	5	38	34.51
CZ	12	284	7.78	0.84	25	1.75	0.39	5	40.28	1	47	62.34
SI	13	195	6.72	0.93	11	3.43	0.84	5	6.87	11	42	14.34
HU	14	304	6.24	0.71	14	5.27	0.88	8	18.73	7	46	29.03
RU	15	191	5.06	0.92	4	5.49	0.55	4	30.46	4	39	35.68
SK	16	260	4.73	0.57	12	1.14	0.53	5	18.03	6	43	31.22
LU	17	186	4.19	0.34	.			.		22	46	4.53
KY	18	55	3.40	0.64	.			.		24	22	4.25
CY	19	102	3.04	0.98	.			.		25	37	3.34
ES	20	238	2.91	0.42	.			.		26	41	3.24
BG	21	133	2.26	0.88	<4	2.34	0.38	<4	7.36	14	33	10.76
BE	22	214	2.20	0.58	.			.		27	51	2.20
UA	23	117	2.08	0.66	4	3.26	0.63	4	6.47	15	19	10.41
CS	24	153	1.97	0.87	7	1.63	0.59	7	6.31	20	24	9.16
SG	25	92	1.95	1.00	<4	1.81	1.00	.		40	23	1.23
SE	26	260	1.76	0.27	<4	0.00		.		33	43	1.75
IE	27	152	1.69	0.18	.			.		32	38	1.92
DK	28	165	1.34	0.40	.			.		38	41	1.38
BA	29	160	1.24	0.93	9	1.24	0.52	9	15.43	21	25	6.97

The table reports the volumes of lending types and importance of destination countries for Austrian parent banks for 2012Q4. It shows the unconsolidated cross-border claims, claims to affiliates, local subsidiary claims and consolidated total claims. If a country does not host an affiliate, no value is shown for affiliate and subsidiary claims. For banks with a frequency of < 4 per country, no exact count is shown due to data confidentiality requirements. All figures are volumes in billion Euros.

Table 6: Lending channels: Cross-Border, to Affiliates and Subsidiaries Local Claims

Date	Cross-Border Parents		Unconsolidated				Consolidated	
	Banks	Claims	Affiliates	Loans	Subsidiaries	Local Claims	Banks	Claims
2005Q2	365	190.28	114	34.65	66	82	49	313.36
2005Q3	374	195.35	119	35.92	69	88	48	323.03
2005Q4	371	197.00	131	41.54	73	96	48	342.89
2006Q1	371	218.87	138	44.08	74	100	51	374.45
2006Q2	376	216.63	143	46.46	76	109	51	378.16
2006Q3	377	226.32	149	50.45	75	112	52	387.08
2006Q4	378	237.11	157	46.43	73	112	51	411.54
2007Q1	376	247.82	174	63.87	82	150	51	462.93
2007Q2	377	261.11	178	72.83	82	160	51	483.72
2007Q3	380	254.59	184	72.22	84	175	54	493.66
2007Q4	378	261.98	193	79.79	88	192	55	516.15
2008Q1	381	278.58	199	82.44	88	205	56	542.88
2008Q2	382	294.10	201	88.46	87	217	60	578.46
2008Q3	384	303.72	201	82.94	84	231	60	622.85
2008Q4	382	279.70	204	92.03	84	224	61	554.29
2009Q1	382	276.32	202	90.13	83	212	63	543.02
2009Q2	382	270.03	201	90.35	84	209	64	531.12
2009Q3	382	274.92	207	82.17	85	201	63	528.73
2009Q4	384	257.87	209	75.75	84	200	64	506.95
2010Q1	384	264.33	213	79.80	84	205	65	516.19
2010Q2	384	265.90	217	80.36	84	208	64	519.08
2010Q3	380	255.81	218	69.76	84	198	61	491.91
2010Q4	377	239.52	227	72.63	86	203	62	484.17
2011Q1	377	251.56	234	76.39	87	201	65	503.24
2011Q2	373	249.71	238	74.93	87	201	61	510.05
2011Q3	372	250.38	237	72.96	86	201	61	516.78
2011Q4	371	243.72	237	69.43	86	201	61	507.56
2012Q1	371	246.67	237	65.65	86	203	62	516.17
2012Q2	369	240.48	232	64.86	87	209	60	515.28
2012Q3	369	235.87	234	62.41	87	207	59	508.83
2012Q4	367	231.27	229	57.39	84	207	59	503.24

The table reports the volumes of the different lending channels. The same data is represented graphically in figure 2a. It shows the unconsolidated cross-border claims, claims to affiliates, local subsidiary claims and consolidated claims. The volumes are in billion Euros.

Table 7: **Not Winsorised Summary Statistics for Austrian Banks over 2005Q2 to 2012Q4**  
Percent (unless otherwise specified)

Variable	Austrian-owned parent Banks						Foreign-owned parent Banks					
	No affiliates(n=118)			With foreign affiliates(n=25)			No affiliates(n=32)			With affiliates(n=11)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Balance sheet data (for each bank / and quarter i)												
Observations	3,274			594			830			257		
<i>Dependent Variables</i>												
Δ Liquid Assets/TA	0.000	0.000	0.008	0.001	0.000	0.009	0.003	-0.000	0.050	-0.001	-0.000	0.015
Δ Domestic Loans/TA	0.016	0.008	0.188	0.015	0.006	0.132	0.011	0.003	0.103	0.004	0.000	0.045
Δ Foreign Loans/TA	0.004	0.000	0.101	0.006	0.002	0.078	0.035	0.000	0.494	0.014	0.008	0.068
Δ Local Claims 1/TA				0.003	0.000	0.026				0.004	0.001	0.060
Δ Local Claims 2/TA				0.001	0.000	0.011				0.007	0.000	0.055
Δ Net Due to Affiliates/TA				-0.007	0.000	0.126				-0.002	0.000	0.023
<i>Independent Variables</i>												
Illiquid Assets/TA	0.756	0.760	0.128	0.685	0.708	0.152	0.806	0.902	0.230	0.583	0.612	0.184
Commitments/TA+Com	0.085	0.079	0.043	0.096	0.094	0.045	0.096	0.032	0.139	0.078	0.048	0.076
Real Assets (in BN Euros)	2.891	0.865	5.830	17.185	8.074	24.051	1.236	0.732	1.406	27.803	3.254	46.176
Real Assets 4Q 2012 (in BN Euros)	3.222	0.994	5.789	16.273	7.597	23.918	1.187	0.559	1.629	19.274	4.246	37.540
Deposits/Liabilities	0.567	0.645	0.252	0.357	0.325	0.209	0.500	0.617	0.383	0.341	0.346	0.261
Capital/TA	0.097	0.095	0.061	0.088	0.080	0.073	0.091	0.047	0.165	0.098	0.084	0.071
Foreign Loans/TA	0.069	0.026	0.196	0.182	0.183	0.126	0.468	0.394	0.605	0.417	0.390	0.237
Domestic Loans/TA	0.711	0.723	0.243	0.524	0.511	0.224	0.450	0.355	0.360	0.184	0.114	0.176
Deposits from Affiliates/TA				0.036	0.010	0.097				0.039	0.008	0.081

(i) Source: OeNB.

(ii) Beginning of quarter assets are used to standardize growth in all dependent variables.

(iii) The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures.

(iv) The sample is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter.

(v) The dependent variables are *not* winsorised at the 1st and 99th percentile.

(vi) To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%.

(vii) Affiliates include foreign branches and subsidiaries of Austrian parent banks.

Table 8: Domestic and Cross-border Lending Activities - AT (passive) Ownership

This table reports the marginal effects of liquidity risk conditions and central bank credit facility access on firm characteristics' effects on growth in *domestic and cross-border total loans* (to banks and non-banks) for parent banks without affiliates (upper panel) and parent banks with affiliates (lower panel) that are owned by Austrian institutions. The underlying fixed effects regressions of quarterly growth in total loans on Libor-Ois, central bank facility access, firm characteristics, and interactions are presented in appendix 7. Beginning of quarter assets are used to standardize growth in loans. The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures. The panel is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter during the sample period. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Firm characteristics data comes from a variety of supervisory data sources provided by OeNB. The Libor-Ois is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. \*\*\*, \*\*, and \* respectively indicate significance at the 1%, 5%, and 10% level.

Panel A: Austrian Parent Banks *without* Affiliates - AT (passive) Ownership

$\Delta$ Loans/Assets	$\Delta$ Domestic Loans Central Bank Facility Access			$\Delta$ Cross-Border Loans Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	0.042	-0.042	-0.083*	-0.012	0.017	0.029*
Commitment	-0.113	-0.153*	-0.040	0.025	0.118*	0.078
Log Real Assets	0.003	0.007*	0.004	0.001	-0.002	-0.003
Deposits	0.012	-0.018	-0.031	-0.020	-0.003	0.017
Capital	0.068	0.253*	0.186	0.090	-0.080	-0.017
Observations	3,034			2,975		
Number of Banks	114			112		
R2 within	0.083			0.119		
R2 between	0.095			0.000		
R2 overall	0.008			0.003		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

Panel B: Austrian Parent Banks *with* Affiliates - AT (passive) Ownership

$\Delta$ Loans/Assets	$\Delta$ Domestic Loans Central Bank Facility Access			$\Delta$ Cross-Border Loans Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	-0.033	-0.056	-0.023	0.003	0.062*	0.059
Commitment	0.318**	0.067	-0.251	0.160	-0.152	-0.312*
Log Real Assets	-0.012	-0.014*	-0.002	-0.013**	-0.003	0.010*
Deposits	-0.036	-0.043	-0.007	-0.071	-0.069*	0.002
Capital	-0.297	-0.112	0.184	-0.022	-0.035	-0.013
Net Due To	0.134	0.297*	0.163	-0.164	-0.109*	0.055
Observations	562			562		
Parent Banks	25			25		
R2 within	0.234			0.191		
R2 between	0.002			0.111		
R2 overall	0.022			0.002		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

Table 9: Cross-border Lending Activities of Banks - AT (passive) Ownership

This table reports the marginal effects of liquidity risk conditions and central bank credit facility access on firm characteristics' effects on growth in *cross-border loans to banks* (upper panel) for parent banks without affiliates and banks with affiliates. Affiliates are foreign branches and foreign subsidiaries of parent banks. The sample includes only parent banks with Austrian ownership, parent banks with non-Austrian ownership are excluded (passive ownership). The underlying fixed effects regressions of quarterly growth in loans to banks on Libor-Ois, central bank facility access, firm characteristics, and interactions are presented in appendix 7. Beginning of quarter assets are used to standardize growth in loans. The data are observed quarterly from 2005Q1 to 2012Q4 for a panel of individual banks, which report unconsolidated figures. The panel is restricted to banks with greater than 0.5 billion Euros in total assets (2012 prices) at least once in a quarter during the sample period. To mitigate the effect of bank mergers on the dependent variable, banks are excluded in a particular quarter when asset growth exceeds 10%. Firm characteristics data comes from a variety of supervisory data sources provided by OeNB. The Libor-Ois is the quarterly average of the daily difference between the London Interbank Offered Rate and the effective federal funds rate. Growth variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank. \*\*\*, \*\*, and \* respectively indicate significance at the 1%, 5%, and 10% level.

Panel C: Austrian Parent Banks *without* Affiliates and *with* Affiliates - AT (passive) Ownership

$\Delta$ Loans	Banks without Affiliates			Banks with Affiliates		
	$\Delta$ Cross-Border Loans	$\Delta$ Cross-Border Loans	$\Delta$ Cross-Border Loans	$\Delta$ Cross-Border Loans	$\Delta$ Cross-Border Loans	$\Delta$ Cross-Border Loans
	Central Bank Facility Access			Central Bank Facility Access		
	Not Utilized	Utilized	Difference	Not Utilized	Utilized	Difference
Illiquid Assets	-0.008	0.004	0.011*	-0.09	-0.001	0.008
Commitment	-0.014	0.078	0.092*	0.113*	0.016*	-0.097
Log Real Assets	0.000	-0.003	-0.003	-0.011*	-0.005*	0.006
Deposits	-0.009	0.010*	0.019*	-0.036	0.050	-0.014
Capital	0.069	-0.098	-0.167	-0.002	-0.116**	-0.114
Net Due To				-0.135	-0.080*	0.055
Observations	2,981			562		
Parent Banks	113			25		
R2 within	0.113			0.184		
R2 between	0.001			0.006		
R2 overall	0.006			0.016		
Time fixed effects	Yes			Yes		
Bank fixed effects	Yes			Yes		

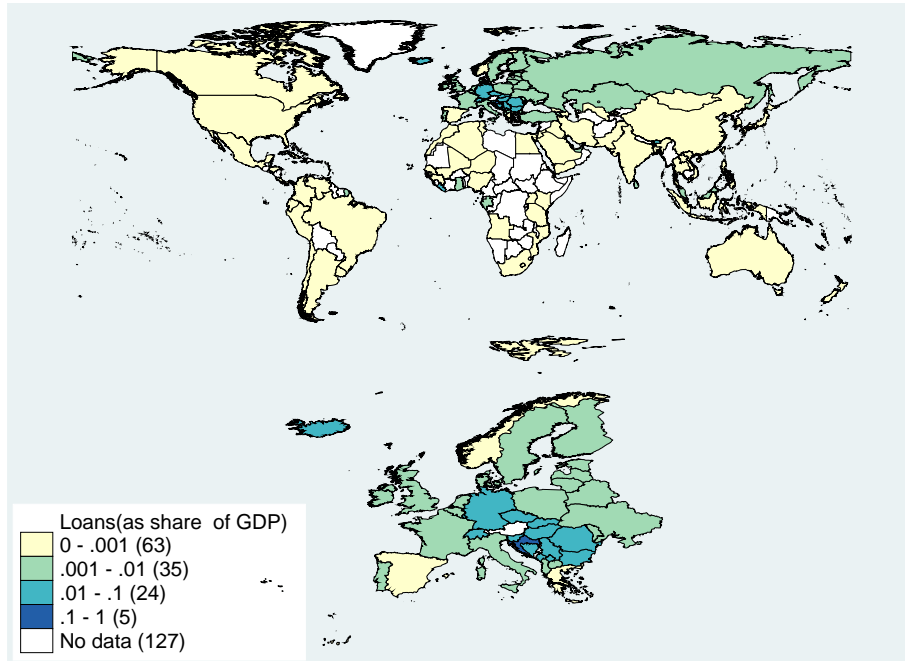
Panel D: Austrian Parent Banks *with* Affiliates - AT (passive) Ownership

	Central Bank Facility Access		
$\Delta$ Net Due	Not Utilized	Utilized	Difference
Illiquid Assets	0.026	-0.045	-0.072
Commitment	-0.005	-0.082	-0.077
Log Real Assets	-0.005	0.005	0.009*
Deposits	-0.006	0.007	0.013
Capital	0.084	-0.028	-0.112
Net Due To	-0.122	-0.216*	-0.094
Observations	562		
Parent Banks	25		
R2 within	0.132		
R2 between	0.389		
R2 overall	0.001		
Time fixed effects	Yes		
Bank fixed effects	Yes		

Figure 5: Geographical Distribution of Lending Activities

(i) Figure 5a shows the volumes of cross-border loans to European destination countries weighted by destination country's GDP. The difference to figure 1a lies in the weighting and the resulting perspective for the lende. (ii) Figure 5b shows the volumes of local claims from the perspective of the subsidiary country. This means a foreign, majority owned subsidiary of an Austrian parent bank lending in it's own country and cross-border.

(a) Geographical Distribution of Cross-Border Total Loans



(b) Geographical Distribution of Local Subsidiary Claims

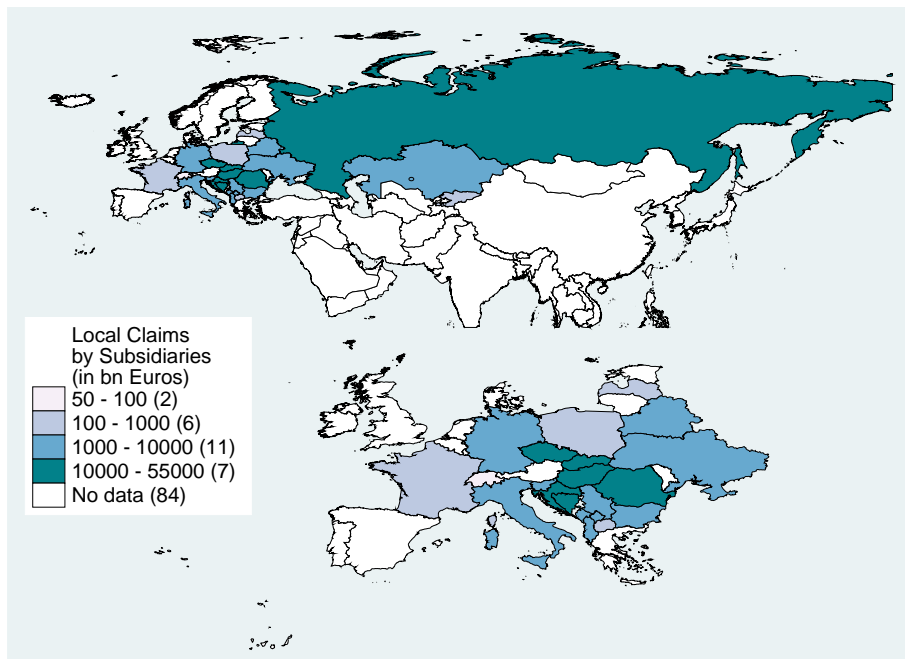
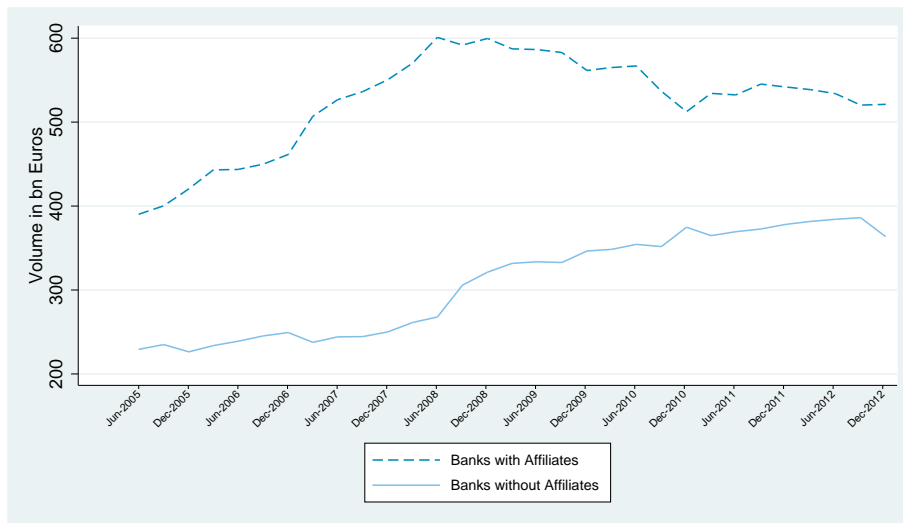




Figure 6: Magnitudes of Balance Sheet Positions of the Austrian Banking Sector I

(i) Figure 6a shows the volume of total assets in billion Euros for Austrian parent institutions in the estimation sample (186 banks). (ii) It distinguishes between banks without affiliates (solid line) and with affiliates (dashed line). (iii) Figure 6b shows the median of commitments over the sum of commitments and total liabilities for Austrian parent institutions. (iv) It distinguishes between banks without affiliates (solid line) and with affiliates (dashed line).

(a) Total Assets in Billion Euros



(b) Commitment Ratio over Commitments and Total Liabilities

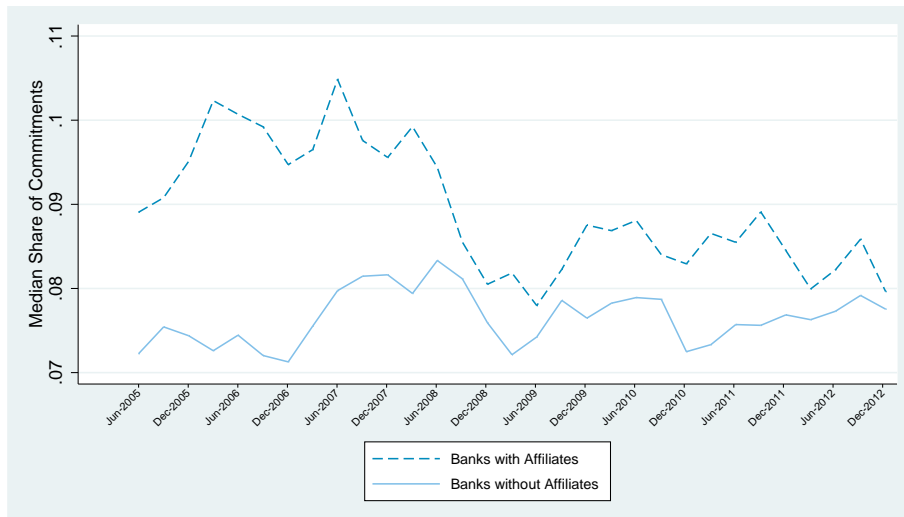
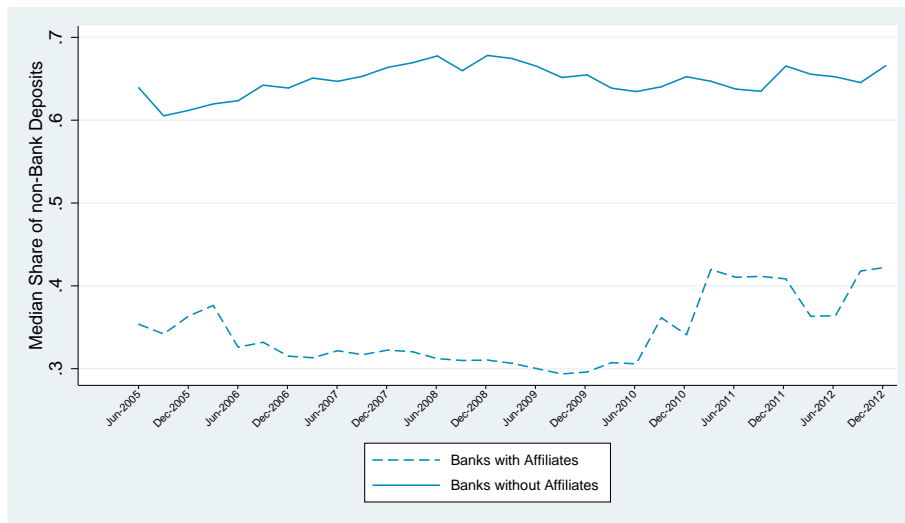


Figure 7: Magnitudes of Balance Sheet Positions of the Austrian Banking Sector II

(i) Figure 7a shows the median of non-bank deposits over total liabilities for Austrian parent institutions in the estimation sample (186 banks). (ii) It distinguishes between banks without affiliates (solid line) and with affiliates (dashed line). (iii) Figure 7b shows the median of liquid assets (cash and bonds) over total assets for Austrian parent institutions. (iv) It distinguishes between banks without affiliates (solid line) and with affiliates (dashed line).

(a) Deposits Ratio over Total Liabilities



(b) Liquid Assets over Total Assets

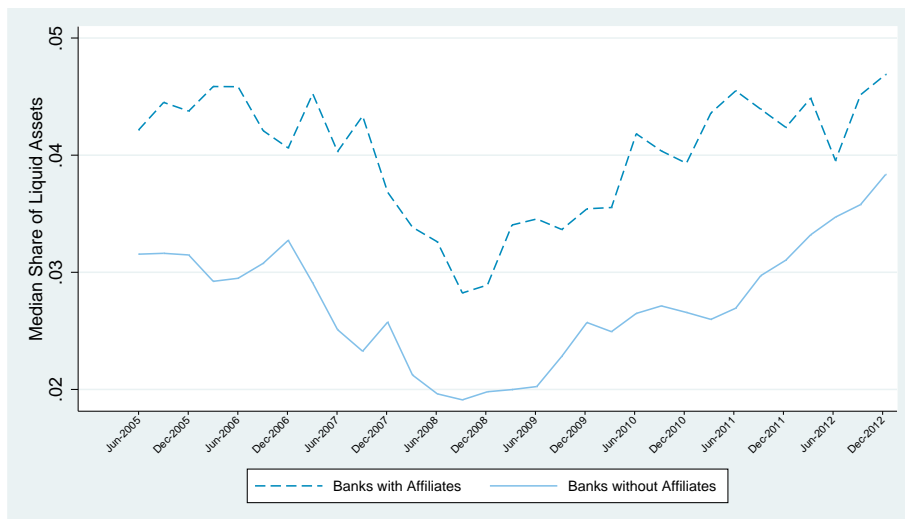
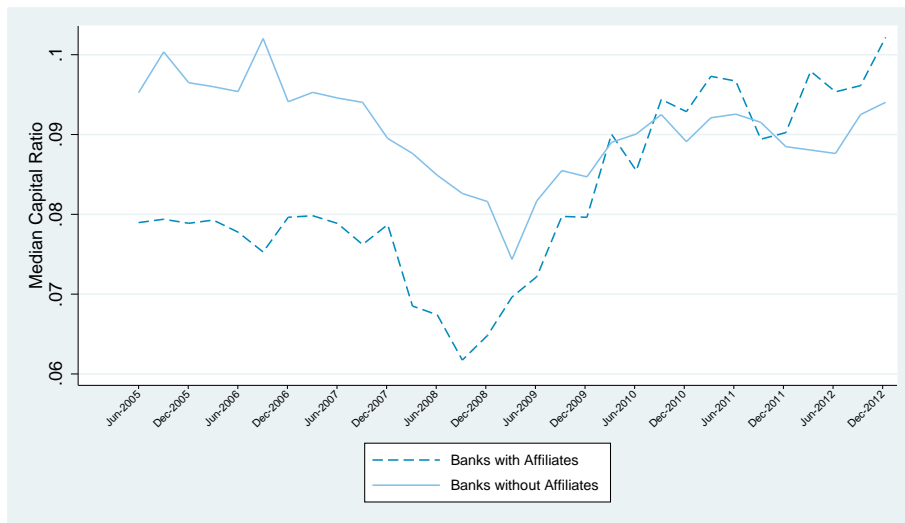


Figure 8: Magnitudes of Balance Sheet Positions of the Austrian Banking Sector III

(i) Figure 8a shows the median of subscribed capital over total liabilities for Austrian parent institutions in the estimation sample (186 banks). (ii) It distinguishes between banks without affiliates (solid line) and with affiliates (dashed line). (iii) Figure 8b shows the volume of net-due to and net-due from in billion Euros Austrian parent institutions with affiliates (36 banks). (iv) It distinguishes between net-due to affiliates (dashed line), net-due to branches (dotted line) and net-due to subsidiaries (dash-dotted line).

(a) Capital Ratio over Total Assets



(b) Total Volume of Net Due

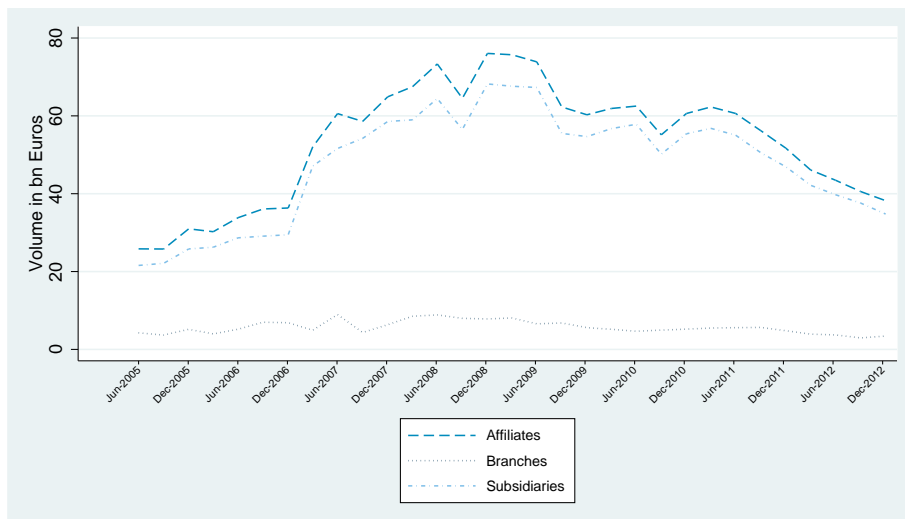
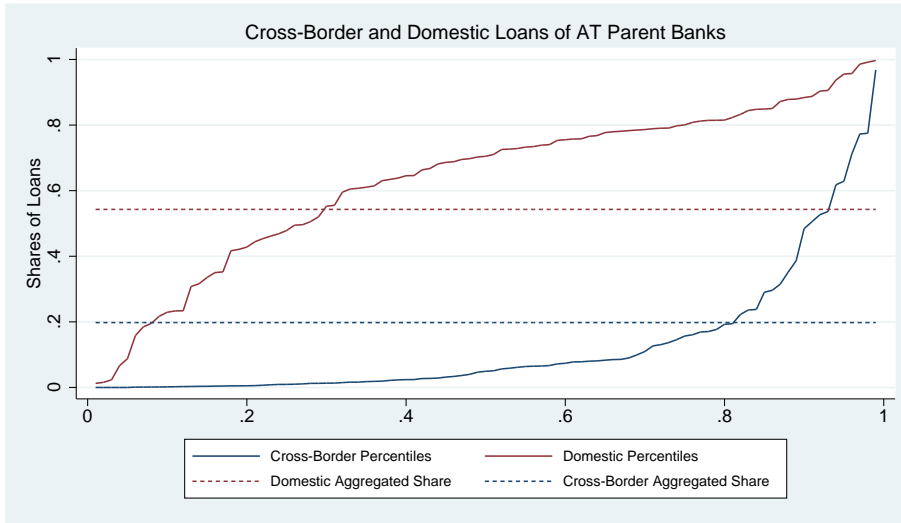


Figure 9: Additional Aspects of the Austrian Banking Sector

(i) Figure 9a shows the distribution of individual shares over the percentile distribution for 2012Q4. (ii) Figure 9a includes the median share of total loans over total assets for 2012Q4 (short dashed line). (iii) Figure 9a differentiates between domestic and cross-border shares over total assets (red is domestic, blue is cross-border). (iv) The 5 largest Austrian banks answer to the following Bank Lending Survey question: How have the following factors affected your bank's credit standards as applied to the approval of loans or credit lines to enterprises? (i) Costs related to your bank's capital position, (ii) your bank's ability to access market financing, (iii) your bank's liquidity position. A considerable tightening of credit standards is assigned a value of -1, and a slight tightening a value of -0.5. Accordingly, a considerable easing of credit standards has the value of 1 and a slight easing the value of 0.5.

(a) Distribution Shares of Loans Q4 2012



(b) Bank Lending Survey: Question about Refinancing Costs

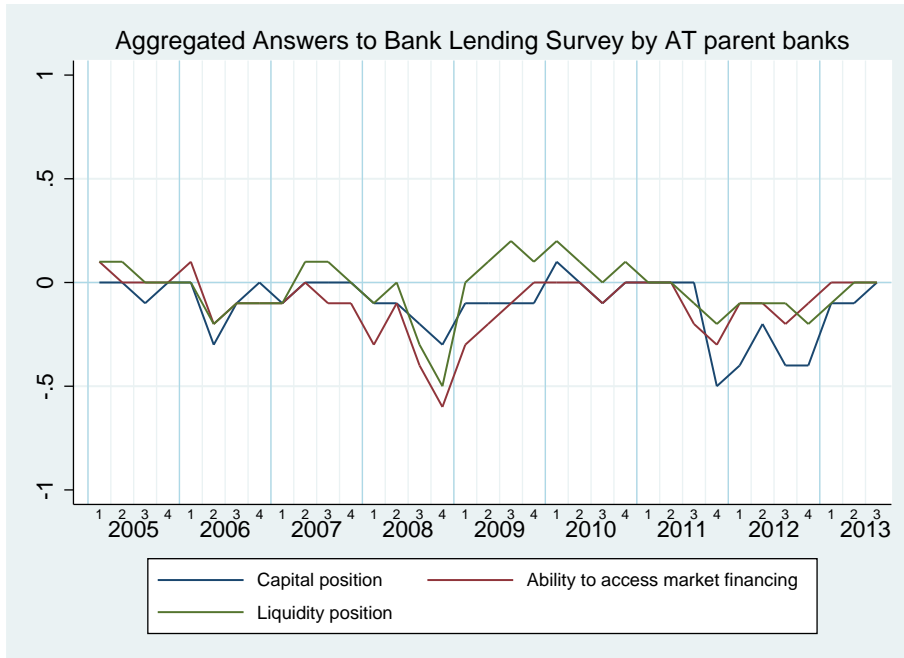


Table 10: Austrian Banking Rescue Packages

Bank	Type State Intervention	Date	Amount Bn. Euros
Kommunalkredit Austria AG	State liability	21.11.2008	7.508
	State liability	08.07.2009	1
	Takeover	05.01.2009	2
	Recapitalization	17.11.2009	0.22
	Recapitalization	30.11.2009	0.03
KA Finanz AG	State liability	28.01.2009	8.765
	Recapitalization	15.12.2009	0.135
Hypo Alpe Adria AG (HAAI)	State liability	24.07.2009	1.35
	State liability	30.12.2009	0.3
	Takeover	30.12.2009	4
	Recapitalization	29.12.2008	1.35
Oesterr.Volksbanken AG (VBAG)	State liability	09.02.2009	3
	Takeover	04.07.1905	
	Recapitalization	03.04.2009	1
Constantia Privatbank AG	Recapitalization	27.10.2008	0.4
BAWAG PSK	State liability	23.12.2009	0.4
	Recapitalization	23.12.2009	0.55
Erste Group Bank AG	State liability	23.01.2009	6
	Recapitalization	10.03.2009	1.224
Raiffeisen Zentralbank Oesterreich AG (RZB)	State liability	05.02.2009	4.25
	Recapitalization	27.03.2009	1.75
Oesterreichische Clearing Bank	State liability	01.11.2008	4

(i) Source: Bericht des Rechnungshofes.

(ii) The total volume of the Austrian banking rescue measures was initially 100 billion Euros.

Table 11: Variables definitions

	Austria	Source
Liquid assets	Government Securities	23
	All Countries	
	+ Cash	23
Commitments	Undrawn credit facilities	15
	Off balance items	
	Medium risk	
	Medium/low risk	
	Low risk	
Loans		
	Loans to banks	23
		23
	Loans to non-banks	23
		23
Intragroup lending	Loans to Branches	23
	Loans to Subsidiaries	approximated
Credit	Commitments + Loans	
Illiquid assets	Loans to banks	23
		23
	Loans to non-banks	23
		23
Capital	1. Subscribed capital	23
	+ reserves	
	+ risk adjustments	
	+ value adjustments	
	- loss	
	2. Tier 1 capital	80
Deposits	Deposit liabilities	23
	by banks	23
	by non-banks	23
Liabilities	All deposits	23
	Debt securities	23
	Capital and reserves	23
	remaining liabilities	23
Intragroup liabilities	Deposits by Branches	23
	Deposits by Subsidiaries	approximated

<sup>1</sup> 23 refers to data positions from the OeNB EZB-MONSTAT Statistics 23

<sup>2</sup> 15 refers to data positions from the OeNB VERA Beleg 15

<sup>3</sup> 80 refers to data positions from the OeNB VERA Beleg 80

<sup>4</sup> Definition of loans/deposits according to the Regulation (EC) No 25/2009. See also *DefBalanceItems.pdf*.

<sup>5</sup> Definition of commitments according to Council Directive 2006/46/EC. See also *DefOffBalanceItems.pdf*. MFI credit lines shall be defined as "Undrawn credit facilities" ("Medium risk", "Medium/low risk" and "Low risk").



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## Call for Entries: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably post-doc) who work in the fields of macroeconomics, international economics or financial economics and/or with a regional focus on Central, Eastern and Southeastern Europe.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between 3 and 6 months, but timing is flexible.

Applications (in English) should include

- a curriculum vitae,
- a research proposal that motivates and clearly describes the envisaged research project,
- an indication of the period envisaged for the research visit, and
- information on previous scientific work.

Applications for 2014/2015 should be e-mailed to [eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at) by May 1, 2015.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2015.