

Bremus, Franziska; Fratzscher, Marcel

Working Paper

Drivers of structural change in cross-border banking since the global financial crisis

DIW Discussion Papers, No. 1411

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Bremus, Franziska; Fratzscher, Marcel (2014) : Drivers of structural change in cross-border banking since the global financial crisis, DIW Discussion Papers, No. 1411, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/103362>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

1411

Discussion Papers

Drivers of Structural Change in Cross-Border Banking since the Global Financial Crisis

Opinions expressed in this paper are those of the author(s) and do not necessarily reflect views of the institute.

IMPRESSUM

© DIW Berlin, 2014

DIW Berlin
German Institute for Economic Research
Mohrenstr. 58
10117 Berlin

Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
<http://www.diw.de>

ISSN electronic edition 1619-4535

Papers can be downloaded free of charge from the DIW Berlin website:
<http://www.diw.de/discussionpapers>

Discussion Papers of DIW Berlin are indexed in RePEc and SSRN:
<http://ideas.repec.org/s/diw/diwwpp.html>
<http://www.ssrn.com/link/DIW-Berlin-German-Inst-Econ-Res.html>

Drivers of Structural Change in Cross-Border Banking since the Global Financial Crisis*

Franziska Bremus¹

(DIW Berlin)

Marcel Fratzscher²

(DIW Berlin, Humboldt-University Berlin, and CEPR)

September 2014

Abstract

The paper analyzes the effects of changes to regulatory policy and to monetary policy on cross-border bank lending since the global financial crisis. Cross-border bank lending has decreased, and the home bias in the credit portfolio of banks has risen sharply, especially among banks in the euro area. Our results suggest that expansionary monetary policy in the source countries – as measured by the change in reserves held at central banks - has encouraged cross-border lending, both in euro area and non-euro area countries. Regarding regulatory policy, increases in financial supervisory power or independence of the supervisory authorities have encouraged credit outflows from source countries. The findings thus underline the importance of regulatory arbitrage as a driver of cross-border bank flows since the global financial crisis. However, in the euro area, arbitrage in capital stringency was linked to lower cross-border lending since the crisis.

Key words: Cross-border bank lending, financial integration, regulation, arbitrage, monetary policy, home bias.

JEL classification: F30, G11, G15, G28

¹ DIW Berlin, Mohrenstr. 58, 10117 Berlin, Germany, fbremus@diw.de,

² Corresponding author, DIW Berlin, Mohrenstr. 58, 10117 Berlin, Germany, Phone: +49(0)30 897 89 311, Fax: +49(0)30 897 89 100, mfratzscher@diw.de

* The authors thank participants at the JIMF-USC-Conference on “Financial Adjustment in the Aftermath of the Global Crisis 2008-9: New Global Order?”, and in particular Joshua Aizenman, Menzie Chinn and Robert Dekle, and Mark Spiegel for very helpful comments and suggestions. Hanna Schwank provided very valuable research assistance.

1 Motivation

After a period of continuously rising cross-border financial claims, the 2007-08 global financial crisis (henceforth: GFC) led to a partial reversal of international capital flows. The retrenchment has been particularly pronounced for cross-border bank lending, as banks have withdrawn from foreign markets. Total cross-border bank claims have significantly decreased in response to the GFC and did not resume the pre-crisis upward trend since then.

Some of the retrenchment in cross-border banking might have been cyclical. However, part of the adjustment seems to be structural, given that growth in cross-border bank claims has not significantly picked up during the recovery - even though the liquidity provision by central banks has been abundant since the onset of the crisis. Loan markets haven't gotten increasingly segmented, especially in the euro area, with banks focusing more on their national markets. As a consequence, home bias in banks' portfolios has increased. While the crisis may have functioned like a common shock, the effects have been different across sectors and regions. This may be explained by push factors (in source countries of banks), pull factors (in recipient countries) or both.

The purpose of this paper is twofold. We first analyze the role of changes in regulatory policy and in monetary policy outcomes in influencing cross-border bank flows. Recent data from the International Banking Statistics by the Bank for International Settlements (BIS) suggest that the development of cross-border bank claims has been quite heterogeneous. For example, it can be observed that credit to the euro area declined most, whereas claims against emerging market economies tended slightly upwards (Figure 1). Given these heterogeneous developments, our goal is to analyze how different regions are affected by changes in regulation and monetary policy. A special focus is on the evolution of cross-border lending in the euro area, given the euro area financial crisis that has hit in early 2010. We study the determinants of the structural changes in cross-border banking in the aftermath of the GFC. In particular, we are interested in the importance of specific push and pull factors that have been recently discussed, namely adjustments in banking regulation and the role of monetary policy in advanced countries.

In a second step, we ask how the home bias in the credit portfolio of banking systems has been affected by changes in regulatory and monetary policy since the crisis. The analysis of the home bias is a complementary analysis as it takes a different perspective on the same question of the drivers of cross-border banking. Using the bilateral home bias between country pairs as the dependent variable allows us to take the portfolio decision of banks more directly into account. That is, it allows us to

investigate how changes to regulatory policy and monetary policy have influenced the decision of banks to invest in a particular country compared to the home country and third countries.

As discussed in previous studies, differences in banking regulation may be important push or pull factors for cross-border bank claims (e.g. Houston, Lin and Ma, 2012), and hence for credit home bias. If regulatory conditions differ across countries, banks may be attracted by regions offering a less restrictive regulatory environment. A factor that could reduce cross-border lending are stricter regulatory requirements that make foreign lending more expensive. Using information on changes in different domains of banking regulation provided by Barth, Caprio and Levine (2013), we investigate the effects on bilateral bank lending and credit home bias.

In fora such as the G20, the role of the unconventional monetary policy in advanced economies and its effects on cross-border capital flows has been intensely debated. Given the extended period of expansionary monetary policy, banks operate in an environment of low interest rates with bond yields and credit margins at very low levels. Extensive policy support has lately eased financial market stress, such that risk appetite has resurged (Bernanke 2013, BIS 2013). Under these circumstances, banks may “search for yields” by leaning their foreign activities towards higher-yielding markets. We analyze the role of expansive monetary policy using different proxies for the monetary policy outcomes, such as reserves held by commercial banks at central banks, short-term interest rates, and long-term interest rates.

Understanding potential structural changes in banks’ international lending activities is highly important for policy makers for several reasons. First, bank lending is particularly important for small and medium-sized firms. If external funding from abroad becomes scarce, the costs of borrowing for certain groups of borrowers may significantly increase in some countries. Second, the financing of cross-border trade may suffer from increasingly segmented loan markets - with adverse effects on international trade flows. Third, international banking sector integration has not only enhanced cross-border lending, but also other types of capital flows. If cross-border banking decreases, other international capital flows may be reduced as well. This may imply, for instance, less risk-sharing between countries and higher external funding costs for firms. Moreover, credit market fragmentation reduces competitive pressures in the banking system (Allen et al. 2011, Bremus 2013).

In our empirical analysis, we estimate a cross-sectional regression model where the dependent variable is the change in bilateral cross-border bank claims between the pre- and the post-crisis period. We try to explain the change in bilateral bank lending through a number of control variables, such as the change in GDP in the source and recipient country of bilateral credit, trade and financial openness. Our focus then lies on the impact of regulatory changes and monetary policy outcomes on

this change in bilateral bank lending. A first key result is that a more expansionary monetary policy in the source country, i.e. a larger increase in reserve deposits, induces higher bank lending abroad. This result is fairly robust using alternative proxies for monetary policy outcomes, such as short-term and long-term interest rates. It suggests that monetary policy indeed played a stabilizing role and prevented an even sharper increase in financial fragmentation.

Turning to regulatory changes, we find that a higher degree of independence and power of the financial regulator in the source country encourages cross-border bank lending. However, there is a significant degree of heterogeneity across countries. For euro area recipient countries, a higher degree of supervisory independence in the source country relative to the recipient country is actually associated with less cross-border bank lending. Similar results are found for capital stringency. The tighter the capital requirements in the source country are, also relative to the recipient country, the higher is the increase in cross-border bank claims of the source country. However, this result differs when both source and recipient country are in the euro area; here, a larger increase in capital stringency is associated with less cross-border lending. These general findings are broadly confirmed when using the change in the home bias instead of the change in bilateral capital flows.

The empirical results of the paper have a number of policy implications. For one, they stress the importance of monetary policy as a stabilizer of cross-border bank flows. Interestingly, the findings suggest that tighter capital requirements may have contributed to the decline in cross-border bank lending in the *post-crisis* period. This raises a number of questions. Is this the result of an effort of banks to deleverage after the global financial crisis? Or have regulators induced pressure on banks to focus more of their activity at home, rather than abroad?

Our research is closely linked to different strands of literature. Milesi-Ferretti and Tille (2011) find that the decline in international capital flows during the GFC differs depending on the time period, the region, and the type of capital flows considered. They show that cross-border lending dropped most after the crisis and has become less stable since. In a similar vein, Lane (2014) provides evidence that international debt-type flows, particularly those related to the banking sector, were more affected during the GFC than equity-type financial flows. Moreover, Lane (2013a, b) presents evidence for a boom-bust cycle in international capital flows during the period 2003-2012, and finds that the recovery in 2010-2012 has been stronger for international capital flows to the emerging and developing world than for the industrialized economies. We contribute to this literature by exploring policy-related drivers of the different evolution of cross-border bank claims across countries and regions.

Using aggregate bilateral bank lending data from the Bank for International Settlements (BIS), Cetorelli and Goldberg (2011) show that cross-border lending to emerging markets was significantly reduced during the crisis. They find that foreign lending decreased more in banking systems which were more vulnerable to a drying up of U.S. Dollar funding, while policy interventions like the Vienna Initiative mitigated the reduction in cross-border lending. Bruno and Shin (2013) analyze driving factors of international bank capital flows and show that bank leverage and hence the balance sheet capacity of banks plays a crucial role in driving international bank capital flows. Based on bilateral banking data from the BIS and regulatory information from Barth et al. (2008) for the period 1996-2007, Houston et al. (2012) conclude that banks shift credit activities towards countries with more lenient banking regulation. Our approach differs as we concentrate on different policy drivers of adjustments in cross-border banking comparing the post-and the pre-crisis regimes.

De Haas and van Horen (2012) use loan-level data from syndicated loan issuances for the world's largest banks. They find that, during the GFC, foreign banks have cut back lending less from countries that host an affiliated subsidiary, that are geographically close, and that have built up relationships with local banks. Hence, closeness characteristics of recipient countries have been important for cross-border lending during the GFC. Gianetti and Laeven (2012) analyze the geographic structure of syndicated loan issuances, also using loan-level data. They find a "flight home" effect during crisis periods: banks reallocate lending from foreign to domestic borrowers with this reshuffling being independent of borrower quality. Instead of analyzing cross-border banking during the crisis, we explore the importance of changes in policy-related factors for changes in cross-border lending in the aftermath of the GFC.

Another group of papers uses bank-level data on international banking activity for different countries. Düwel et al. (2011) find that German multinational banks have cut back foreign lending if parent banks got more risk averse, while Cetorelli and Goldberg (2012) study the global liquidity management of U.S. multinational banks. Their findings suggest that U.S. multinational banks that were hit by liquidity shocks during the GFC reshuffled internal funding to foreign affiliates in core investment destinations by drawing liquidity from traditional funding locations. Rose and Wieladek (2011) use bank-level data for the UK banking system and show that the share of loans going to the UK has been reduced by foreign banks which have profited from government support. This increased homeward bias can be interpreted as financial protectionism. We complement these studies by analyzing the impact of changes in regulatory and monetary policy since the crisis for cross-border lending and credit home bias at the banking sector level.

The remainder of this paper is structured as follows. In the next section, we discuss specific driving factors of the change in cross-border credit that are related to regulatory and monetary policy.

Section 3 describes our empirical methodology. Section 4 presents the regression results for changes in cross-border lending and credit home bias, while Section 5 concludes.

2 Push and pull factors of changes in cross-border bank claims

The goal of this paper is to study potential drivers of structural change in cross-border bank claims since the GFC. In the following, we will concentrate on the role of changes in policy variables for cross-border bank claims that have been discussed recently.

First, structural changes in cross-border lending may be due to changes in financial regulation. A priori, the effect of stricter regulatory requirements in source and/or destination countries of cross-border credit is not clear. On the one hand, stronger institutions and better regulation could pull foreign capital to the destination market. For example, using BIS-data for the period 1985-2002 and up to 140 countries, Papaioannou (2009) finds that institutional improvements are an important pull factor for foreign credit. On the other hand, tighter banking regulation may reduce foreign lending and increase home bias in the credit portfolio of banks. After the experiences during the GFC, national regulation aims at facilitating the resolution of internationally active banks in order to better shield domestic tax payers from potential losses (The Economist, 2012). Stricter regulatory requirements for foreign banking activities may increase banks' operating costs abroad (Okawa and van Wincoop 2012, Brüggemann et al. 2012). This could make foreign lending less efficient and thus pull bank credit to the source country. Moreover, new regulatory rules favor government debt as a safe asset. If the trend of increasing shares of government bonds in banks' portfolios increases, this may reduce riskier and thus more funding-expensive banking activities like cross-border lending. Another driving factor for cross-border banking may be regulatory arbitrage. Banks may exploit differences in regulation by concentrating more on markets offering less restrictive regulation (Houston et al. 2012).

Summarizing the key arguments of this debate, we use data on banking regulations provided by Barth et al. (2013) in order to test whether

Hypothesis 1: Stricter regulatory requirements abate outflows of bank credit from the source country.

This hypothesis relates to the argument that the implementation of a new regulatory framework comes along with increased information and funding costs especially when lending abroad, such that international lending gets less attractive.

By contrast, if regulation gets tighter in the source country, this may induce banks to transfer more of their business abroad, namely to those countries that offer a less restrictive regulatory environment. Hence, we investigate whether

Hypothesis 2: Regulatory arbitrage pushes credit to countries with lower regulatory standards.

That is, we examine whether the result found by Houston et al. (2012), namely that tighter regulation in the source country *encourages* credit outflows while tighter regulation in the destination country *discourages* credit inflows, can also explain changes in cross-border bank claims in the pre/post crisis comparison aimed at here.

As a second set of driving factors, we are interested in the effects of monetary policy on changes in cross-border bank claims. Bernanke (2013) points out that a high provision of central bank liquidity may induce banks to invest in markets with higher yields, like the emerging economies. Fratzscher et al. (2012) analyze the impact of U.S. monetary policy since the global financial crisis on cross-border capital flows, and indeed find that U.S. unconventional policies have pushed capital into emerging markets since 2009. Using different measures of monetary policy outcomes, such as the expansion of reserve deposits held at central banks, as well as the change in short- and long-term interest rates, we analyze to what extent

Hypothesis 3: Expansive monetary policy induces credit flows towards foreign markets.

In the next section, we lay out the empirical strategy for testing these three hypotheses.

3 Empirical methodology

In order to analyze the effects of changes in banking regulation and monetary policy, we estimate, in a first step, a cross-sectional model with the dependent variable being the change in bilateral cross-border credit between the post- and the pre-crisis period. This allows us to answer the question whether policy changes have affected the adjustment of international bank lending since the crisis. We also differentiate between the effects of regulation and monetary policy in the euro area and in non-euro area countries. Second, we study the impact of our variables of interest on cross-border bank claims for the pre-crisis period and for the post-crisis period separately. To this goal, we use changes in cross-border bank claims prior to the crisis (2005-2006) and after the crisis (2010-2011) as the dependent variables. Third, we analyze how changes in regulation and monetary policy affect changes in bilateral home bias in the credit portfolio of different banking systems.

3.1 Data and summary statistics

Measuring cross-border bank lending. Information on total cross-border bank claims comes from the BIS Consolidated Banking Statistics. We exploit data on an immediate borrower basis that are available on a quarterly basis as of 2000. Our regression sample covers 15 reporting source countries and 46 recipient countries.³ A list of countries can be found in Appendix A. The data comprise foreign financial claims (e.g. loans, derivatives) by domestic banks' head offices and foreign affiliates. Inter-office positions are netted out, so that claims within a multinational banking institution are not included. Given that most of our explanatory variables are available at an annual frequency only, we take annual averages of the quarterly stocks of cross-border claims. In order to avoid outliers from affecting the results, we drop (the few) negative values of cross-border claims from the sample.

Figure 1 plots the evolution of cross-border bank claims for our regression sample. The top panel shows total claims by all source countries included. Until the GFC, total cross-border lending has expanded rapidly (solid line). Since the crisis, it has decreased. Especially claims against euro area destination countries have been reduced (dashed line), whereas banks have continued to increase activities in emerging economies (dotted line). The bottom chart reveals that the reduction in cross-border credit has been even more pronounced in the euro area; cross-border claims within the euro area have been nearly cut by half since the onset of the crisis (dotted line). Hence, credit markets got more fragmented.

To analyze the drivers of the change in cross-border bank claims pre/post crisis, we follow the literature (e.g. Cetorelli and Goldberg 2011, Lane 2014) and classify the years until 2007 as the “pre-crisis” phase, and the years starting from 2010 as the “post-crisis” phase. We take the log difference of bilateral cross-border claims between the post- and pre-crisis period, $\ln(L_{ij}^{post}) - \ln(L_{ij}^{pre}) = \Delta L_{ij}$, where i denotes the source country of credit and j the destination country. The pre-crisis level of cross-border bank claims is defined as the average level across the period 2005-2007, whereas the post-crisis level is the average across 2010-2012. We winsorize growth rates, i.e. we replace large growth rates with the 99%-percentile. Table 1(a) shows that, on average, cross-border bank lending has slightly increased when comparing our pre- and post-crisis averages. However, as indicated by the sample minimum of -5.64, there have been large reversals of bilateral bank claims as well.

Measuring banking regulation. Data on regulatory variables come from Barth, Caprio, and Levine (2013) and are available for the years 1999, 2002, 2006, 2011 and 180 countries. The authors use

³ Claims on an immediate borrower basis are allocated to the host country of the immediate counterparty. In contrast to this, data on an ultimate risk basis allocate claims to the country where the final risk lies (see http://www.bis.org/statistics/about_banking_stats.htm for a detailed description of the International Banking Statistics).

information from four World Bank surveys on financial regulation to construct summary indexes of key regulatory policies. We use indicators on the stringency of bank capital regulation, on official supervisory power, and on the overall independence of banking supervisory authorities to analyze the effects of changes in banking regulations on cross-border banking. Following Houston et al. (2012), we assign the information published in 2002 to the period 2002-2005 and information from 2006 to 2006-2009. Survey data published in 2011 is assigned to the period 2010-2012. The index on “overall capital stringency” takes on values between 0 and 7 with higher values indicating greater capital stringency. It gauges to what extent capital regulation reflects certain risk elements and whether certain market value losses are deducted from capital before minimum capital adequacy is determined. “Official supervisory power” reflects the degree to which the supervisory authority can take actions to prevent and correct problems. This index assumes values between 0 and 14 with higher values indicating stronger regulatory power. The variable “overall supervisory independence” measures in how far the banking supervisory authority is independent from the government and from the banking industry. It ranges from 0 to 3 with larger values indicating greater independence and thus supposedly stricter regulation. Hence, all regulatory variables are scaled in the same way with larger values marking a tighter regulatory environment.

In analogy to the change in cross-border lending, we are interested in the role of changes in regulatory variables pre/post crisis – both in the source and in the destination countries. Therefore, we compute the (simple) difference between the post- and the pre-crisis average for the three regulatory indexes described above. Table 1(a) indicates that in the source countries, which mainly include industrialized economies, all three regulatory indexes have increased since the crisis, on average. The average rise in capital stringency has been largest. In the group of receiving countries, capital stringency and supervisory independence have increased, on average, whereas supervisory power has decreased.

In order to test our hypothesis whether changes in regulatory arbitrage drive changes in cross-border bank lending, we compute bilateral gaps between the regulatory stance in the source and receiving country. A positive value of this gap indicates stricter regulation in the source country relative to the destination country. This may set an incentive for banks to exploit arbitrage by extending more credit abroad to countries with weaker regulations. As for the other variables, we compute changes in arbitrage between the post- and the pre-crisis period and find that capital stringency has become more similar across countries in our regression sample (Table 1(a)). By contrast, the gap between banking supervisory power in the source and recipient countries and for supervisory independence has widened.

Measuring monetary policy outcomes. As our main measure of the monetary policy stance (or liquidity provided by central banks), we use reserve deposits of depository corporations from the *Other Depository Corporations Survey* by the IMF (in % of GDP). Reserves from the banking system at central banks are a proxy for excess reserves, given that reserve requirements have been relatively stable during the last years in many countries. We transform the two variables into US Dollars using information on US Dollar exchange rates from the International Financial Statistics (IFS) and divide by GDP (in USD) which is available from the WDI. The more accommodative monetary policy was during the crisis, the larger the increase in reserve deposits. As shown by Keister and McAndrews (2009), aggregate reserves of depository institution in the US have soared after the collapse of Lehman Brothers in September 2008, whereas required reserves have changed very little in comparison. The authors illustrate that reserves reflect the size of monetary policy interventions but not their effects on commercial banks' lending activities; total reserves are thus determined nearly exclusively by monetary policy. Even if a single bank can change its reserves held at the central bank, for example by extending credit, this does not affect the amount of total reserves in the banking system as a whole. Thus, we use changes in reserves relative to GDP as measure of changes in monetary policy pre/post crisis here. Table 1(a) reveals that in the group of source (recipient) countries, reserve deposits relative to GDP have increased by 3.12 (1.9) percentage points post/pre-crisis. As a comparison, reserve deposits relative to GDP have not changed, on average, between 2005 and 2006 (Table 1(b)).

We use two alternative proxies for monetary policy outcomes, namely short-term and long-term interest rates. The more accommodative monetary policy was during the crisis, the lower should be the increase in interest rates. As a measure of long-term interest rates, we use ten-year government bond yields from *Datastream*. In order to gauge monetary policy outcomes in the short term, we combine short-term interest data from different sources, given that country coverage is very limited when only using one data source. Thus, we employ money market rates from the IFS as a default measure of short-term rates influenced by monetary policy. For those countries where no information on money market rates is available, we use deposit interest rates from the WDI instead. For Turkey, we employ information on "monetary-policy related interest rates" from the IFS. For Belgium and Greece, neither money market rates nor deposit rates are available, such that we recur to the interest rate on government T-bills from the IFS. Given that we are interested in changes of the respective variables across the pre/post crisis period and not in the interest rates themselves, concerns about comparability across the different short-term interest rate measures should be alleviated. We drop observations that are larger than 100 percent and observations that are above the 99% percentile to eliminate misreportings and large outliers.

Control variables. Besides our main variables of interest, we include a set of additional variables in the regressions below in order to take macroeconomic conditions and banking sector structure in the source and receiving countries into account. To control for the macroeconomic environment, we use data on real GDP from the WDI. Trade openness is measured, as is common in the literature, by the sum of exports and imports relative to GDP, again using data from the WDI. In order to control for de jure financial openness, we use an index of capital controls constructed by Chinn and Ito (2006, 2008) which is available at an annual frequency until 2011. It takes on values between -1.8 and 2.4 with higher values indicating weaker constraints on a country's capital account and hence a greater degree of de jure financial openness. Information on banking sector concentration comes from the Financial Development and Structure Dataset by the World Bank (see Beck et al. 2000, 2010 and Čihák et al. 2012), while the share of government-owned banks is taken from Barth et al. (2013). Moreover, we use information on banking systems' capital to asset ratio which is available from the WDI. To account for overall regulatory quality in an economy, we use the estimate of regulatory quality from the World Bank Governance Indicators. This index is defined on the interval -2.5 to 2.5 with greater values reflecting better regulatory quality. A summary table of all variables used and their sources can be found in Appendix A.

3.2 Regression model

The idea of our baseline estimation approach is to compare cross-border bank claims before and after the crisis between banking systems that were (a) operating under different regulatory regimes and (b) subject to different monetary policy changes. Our starting point is the estimation of the following cross-sectional specification:

$$\Delta L_{ij} = \beta_0 + \beta_1 \Delta R_i + \beta_2 \Delta R_j + \beta_3 \Delta M_i + \beta_4 \Delta M_j + \alpha' X_{ij} + \epsilon_{ij} \quad (1)$$

where ΔL_{ij} is the change in lending by country i 's banking system to country j post- versus pre-crisis. As described above, it is defined as $\Delta L_{ij} = \ln(L_{ij}^{post}) - \ln(L_{ij}^{pre})$ with L_{ij}^{post} denoting the average stock of cross-border bank claims across the period 2010 – 2012 and L_{ij}^{pre} being the average across 2005-2007. ΔR_i (ΔR_j) reflects the change in a specific source (destination) country regulatory policy variable, while ΔM_i (ΔM_j) is the change in the monetary policy variable. Additional control variables which include source- and destination-country characteristics as well as bilateral variables are summarized in the matrix X_{ij} . As an alternative to test for the impact of changes in regulatory arbitrage on cross-border lending, we include ΔR_{ij} , i.e. the change in the differential between source and destination country banking regulation, instead of ΔR_i and ΔR_j in the model.

Even if it is hard to entirely rule out potential endogeneity issues in this setup (Bekaert et al. 2005, Houston et al. 2012), using differenced variables in the regressions at least alleviates endogeneity concerns, because time-invariant unobserved country- and country-pair specific factors that may affect both policy changes and changes in cross-border lending are differenced out.

The simple specification in equation (1) allows us to evaluate our three hypotheses directly. The impact of regulatory policy changes in country i and country j are tested via the coefficients β_1 and β_2 , respectively. By contrast, we use the parameters β_3 and β_4 to gauge the impact of monetary policy outcomes in country i and country j on the adjustment in cross-border lending. While changes in regulation are primarily structural, the effects of changes in our monetary policy variables and in some of the control variables are likely to be more temporary in nature.

Bringing the three hypotheses stated in Section 2 to the data, the expected signs of the coefficients in equation (1) are as follows: Hypothesis 1 suggests that stricter regulatory requirements reduce credit outflows from the source country. That is, the stricter regulation gets in a given source country, the lower will be its increase in costly cross-border lending. Consequently, the coefficient on changes in regulatory stringency in the source country, β_1 , is expected to be negative according to Hypothesis 1.

According to Hypothesis 2, regulatory arbitrage pushes credit to countries with laxer banking regulation. Hence, the coefficient on regulatory stringency in the destination country, β_2 , should be negative; destination countries with a larger increase in the stringency of banking regulation should receive less foreign credit; the tighter banking regulation gets in the destination country, the less attractive is this country for cross-border credit. Regarding the source country, Hypothesis 2 suggests that β_1 should be positive, because an increase in regulatory requirements in the source country induces a shift of bank credit towards foreign markets. Hence, Hypotheses 1 and 2 make opposing statements regarding the effects of source country regulation on international bank lending. If regulatory arbitrage, i.e. the gap between regulatory stringency in the source and the destination country, is included in equation (1) instead, Hypothesis 2 expects its parameter estimate to be positive: The larger the increase in regulatory arbitrage between countries i and j , the larger the increase in bilateral lending between the two economies.

Hypothesis 3 claims that expansive monetary policy since the crisis pushes cross-border credit activities. This implies a positive coefficient estimate of the monetary policy variable in the source country (β_3) if measured by reserve deposits. The greater the increase in central bank support provided to the banking sector in country i , the larger the increase in this country's cross-border credit extension. If interest rates are used as a measure of monetary policy outcomes, β_3 is expected

to be negative: the larger the increase in interest rates in the source country, the weaker the increase in foreign credit.

Furthermore, we investigate to what extent and why cross-border bank flows within the euro area have evolved differently since the crisis. To this goal, a dummy variable indicating source and destination countries' membership in the euro area, EA_{ij} , as well as interactions between this dummy and the explanatory variables of interest are included in the regression model:

$$\Delta L_{ij} = \beta_0 + \beta_1 \Delta R_i + \beta_2 \Delta R_j + \beta_3 \Delta M_i + \beta_4 \Delta M_j + \alpha'_{5} X_{ij} + \gamma_1 EA_{ij} + \gamma_2 \Delta R_i \times EA_{ij} + \gamma_3 \Delta R_j \times EA_{ij} + \gamma_4 \Delta M_i \times EA_{ij} + \gamma_5 \Delta M_j \times EA_{ij} + \epsilon_{ij} \quad (2)$$

Next, we re-run the regression model presented in equation (1), once for changes in cross-border lending in the pre-crisis period (2005-2006), and once for changes in the post-crisis period (2010-2011). This allows us to study whether the importance of policy-related push and pull factors varies across different regimes. Tables 1(b) and (c) have the respective descriptive statistics for these regressions. Finally, we use the bilateral credit home bias as the dependent variable in the regression model presented in equation (1).

4 Regression results

Having data on changes in bilateral cross-border lending, banking regulation and monetary policy outcomes at hand, we address the question of how changes in regulatory and monetary policy have affected cross-border credit since the crisis.

4.1 Determinants of changes in cross-border credit since the crisis

Table 2 presents the regression results for our baseline specification. Robust standard errors clustered at the destination country level are reported in brackets. The regression results are in line with the literature on institutional quality and international capital and trade flows (e.g. Anderson and Marcouiller 2002, Levchenko 2007, Papaioannou 2009). The more overall regulatory quality improves, the more international credit flows into the economy. Thus, overall regulatory quality is a pull factor for cross-border bank claims. Regarding the aggregate capital share of a recipient country banking system, a larger increase in this variable coincides with larger credit inflows. Intuitively, the larger the improvement in shock absorption capacity and hence the more stable a banking system gets, the larger are credit inflows. The higher the degree of trade openness in the destination country, the more cross-border credit it receives. By contrast, the more open the source country gets for international trade in the pre/post crisis comparison, the lower is the international credit extension by its banking system.

In Column 2, we include regulatory changes in the source and in the recipient countries. In line with Hypothesis 2, source countries that experienced larger increases in capital stringency, banking supervisory power or overall independence of the supervisor saw larger increases in cross-border bank claims, i.e. larger outflows of bank credit. However, the effect of capital stringency turns statistically insignificant when monetary policy variables are included (Column 5). The positive impact of stricter regulation can be interpreted as a push factor of cross-border bank credit due to arbitrage motives. This finding complements previous literature which concentrates on cross-border lending in normal times (see Houston et al. 2012). Another interpretation for this finding is that the more independent the supervisory authority is, the less pressure towards a focus on the domestic market can be exerted by governments that supported domestic banking systems during the crisis. Concerning the regulatory environment in the recipient country, our results point to a positive and significant effect of supervisory independence on cross-border bank claims. Yet, in unreported regressions, we find that this result is driven by Portugal and Greece, two countries that are outliers in terms of the change in regulatory variables. If these two countries are eliminated from the regression sample, we find positive and significant effects for source-country regulatory variables only. When including the change in regulatory arbitrage in the regression model (Table 2, Column 3), the results are statistically insignificant in the baseline specification.

In terms of economic significance, our results suggest that, *ceteris paribus*, an increase in the change in supervisory power in the source country pre/post crisis by one standard deviation leads to an increase in cross-border credit growth by about 26 percentage points. Given the sample mean of the change in cross-border credit of 7% (Table 1(a)), the effect of a change in source country regulation is economically important.

Regarding monetary policy outcomes, our results hint at a statistically significant and positive effect on pre/post-crisis growth in cross-border lending. If the change in reserve deposits relative to GDP rises by one percentage point, bilateral credit growth increases, *ceteris paribus*, by 8-10 percentage points (Table 2, Columns 4-5). Compared to Canada where reserve deposits to GDP have stagnated pre/post-crisis (-0.01 percentage points), the US is likely to have experienced about 80 percentage points higher bank outflow growth due to its strong increase in reserve deposits to GDP (8.65 percentage points). Recipient country monetary policy does not matter for changes in international bank claims though. Hence, our findings support Hypothesis 3 which states that expansionary monetary policy in the source country fosters cross-border credit activities.

In Table 3, we add two variables that measure banking system structure to the baseline setup as a robustness check, namely banking sector concentration and the share of government-owned banks in the source and destination country. Our previous results remain broadly unaffected. The effect of

reserve deposits relative to GDP gets even somewhat stronger. The coefficient on the change in capital stringency arbitrage turns statistically significant. Hence, the larger the increase in capital stringency in the source relative to the destination country, the higher the growth in cross-border credit extended by its banks. Holding other things constant, a one-unit increase in the change in capital stringency arbitrage post-pre crisis leads to an increase in bilateral credit growth of 4.9 percentage points.⁴ This finding is thus in line with Hypothesis 2: Banks seem to exploit differences in regulatory stringency across countries, avoiding tighter regulation in their home economies. Including the change in capital stringency in the source and recipient country separately (Column 2) points in the same direction. The larger the increase in capital stringency in the source country, the larger credit outflows.

4.2 Robustness tests

In order to check the robustness of the effect of monetary policy outcomes, we use reserves by commercial banks held at the central bank from the IMF *Central Bank Survey*, as well as short- and long-term interest rates. Due to limited data availability for interest rates across countries, our regression sample shrinks to 212 observations. Still, Table 4 underlines the positive and significant effect of expansive monetary policy in the source country on credit outflows since the crisis. An increase in the growth of reserves held at the central bank (as measured by the IMF Central Bank Survey) by one percentage point coincides with 30 percentage points higher cross-border credit growth pre/post-crisis. The larger the increase in interest rates in the source country (Column 3-4), the lower are cross-border bank flows. Overall, our findings thus point to expansive monetary policy as a push factor of international credit extension. Given that the coefficient estimate of the change in interest rates in the destination country is negative, we find no evidence for a search for yields here. Yet, the effects may differ in larger country samples.

We have conducted a number of further robustness checks. In Table 5, we control for source or recipient country fixed effects in order to alleviate potential concerns about omitted variable or measurement bias. This exercise leaves our results broadly unaffected. While overall regulatory quality and banking sector soundness as measured by the capital to assets ratio pull credit to destination countries, larger increases in supervisory power and independence as well as reserve deposits at the central bank correspond to larger credit outflows from source countries.

⁴ As shown in Table 1(a), arbitrage in capital stringency has declined on average post-pre crisis. Consequently, part of the drop in bilateral bank lending can be explained by more homogenous and stringent capital regulations in our sample. This finding may point to a structural adjustment of cross-border banking that is favorable due to decreased distortions between different markets.

In some countries included in the baseline regressions, regulatory variables did not change since the crisis. Restricting the sample to countries that experienced changes in the explanatory variables of interest does not affect our main results. We have checked for outliers with respect to the change in regulatory variables by plotting the change in regulatory variables against the change in government bond yields as a measure of distress. When dropping outliers (Portugal, Greece) from the regression sample, our results are again broadly unaffected and tend to get stronger.

Is the euro area different? In Table 6, we interact our variables of interest with dummies indicating whether a source or destination country is a member of the euro area. Control variables are included in all regressions but not reported for reasons of visibility. Columns 1 and 2 show the results when interacting the variables of interest with a dummy variable that equals one if the receiving (source) country is in the euro area. Column 3 presents the regression results based on equation (2) where both source and recipient country variables are interacted with a dummy that equals one if both countries i and j are members of the euro area. Our results point to the fact that increasing arbitrage in regulatory capital stringency has discouraged cross-border lending within the euro area. This may be due to uncertainty and increased information and funding costs with respect to the implementation of tighter capital requirements across countries. Moreover, the larger arbitrage in supervisory independence, the lower the change in cross-border bank claims if the destination country is in the euro area. The effect of growth in reserve deposits relative to GDP in the source countries from the euro area does not significantly differ from the rest of the country sample.

4.3 Determinants of changes in cross-border credit in the pre- and the post-crisis period

Having seen that regulatory variables and monetary policy are important drivers of changes in cross-border bank claims since the crisis, we now turn to the question whether these policy-related push and pull factors also matter for changes in international bank lending in the pre- and in the post-crisis period. Table 7 presents regression results for changes in cross-border lending between 2005 and 2006, where we exploit the fact that new information on regulatory variables is available from Barth et al. (2013) in 2006. It appears that changes in regulation do not matter for growth in cross-border bank lending in the pre-crisis period with all regression coefficients being statistically insignificant.⁵ Moreover, changes in reserve deposits relative to GDP do not significantly impact cross-border bank flows - another difference to the results for adjustments in cross-border bank claims post-pre crisis.

What about driving factors of cross-border bank credit flows *after* the GFC? Table 8 presents results for growth in cross-border bank claims between 2010 and 2011. We find that, as opposed to the pre-

⁵ We have re-run the regressions presented in Table 2 on the smaller sample presented in Table 7. Our previous results remain qualitatively unaffected.

crisis period, changes in financial regulation and monetary policy matter in the post-crisis period: Country-pairs that have seen a greater increase in arbitrage regarding supervisory power have experienced a larger growth in cross-border credit.⁶ Interestingly, the coefficient estimates for the change in supervisory power in the recipient countries (Columns 2 and 5) are negative for the post-crisis period, thus indicating that stricter regulation in the destination country discourages credit inflows. This supports the argument that banks are attracted by laxer regulatory environments (Hypothesis 2).

Yet, growing arbitrage in capital stringency has led to weaker cross-border credit growth (Column 3). This may indicate that different approaches to adopt the stricter capital ratios required by Basle III across countries have led to higher information costs for banks that engage in credit activities abroad. In addition, tighter capital requirements in the source country can make funding and risky cross-border business more expensive, so that foreign lending is reduced. Consequently, international activities get less attractive. The negative link between stricter capital regulation in the source country and bilateral credit growth (Column 2) is also in line with the observation that banks that became subject to tighter capital requirements deleveraged by reducing risky activities in foreign markets (Schildbach 2013). Hence, our results show that depending on the specific measure of financial regulation and the time period considered, the effects of changes in the source country regulatory environment can differ; while our findings for the effects of increasing capital stringency support Hypothesis 1 in the post-crisis period, the results for supervisory power and independence conform to Hypothesis 2.

Changes in reserve deposits to GDP in the source country have a negative and significant effect on cross-border credit growth between 2010 and 2011. However, this result is driven by the euro area countries (not reported) which were affected by the debt crisis during that period.

4.4 Determinants of changes in bilateral credit home bias

Since the GFC, home bias in banks' and investors' portfolios has significantly increased, especially in the euro area (e.g. Pockrandt and Radde 2012). In order to complement our analysis about the drivers of structural changes in cross-border lending, we now use the BIS data to compute proxies for bilateral home bias in banking systems' credit portfolios. We then use bilateral credit home bias as an alternative dependent variable and re-run the baseline regressions as laid out in equation (1) above.

Based on a Markowitz-type portfolio selection model, Fidora et al. (2007) propose a measure of bilateral equity (bond) portfolio home bias. It relates a source country i 's portfolio share invested in

⁶ We use the change in regulatory variables between the values from the 2011 and the 2006 World Bank survey here.

equity (bonds) of country j relative to country j 's share in global market capitalization. Adopting the concept of equity home bias to the credit market, we compute bilateral home bias in banking systems' *credit* portfolios as

$$HB_{ij} = \frac{w_j^* - w_{ij}}{w_j^*} = 1 - \frac{w_{ij}}{w_j^*} \quad (3)$$

where w_j^* denotes the market share of country j in the global credit market, and w_{ij} is the fraction of cross-border credit extended by country i to country j in total credit of country i . The world market share of country j is proxied by the sum of domestic credit in country j plus the sum across all credit inflows to country j , namely $\sum_{i=1}^I L_{ij}$, relative to total credit in the sample. It is the benchmark portfolio share considered here. The credit portfolio of country i is computed as the sum of domestic credit and overall cross-border credit extended by banks from country i , $Credit_i = Domcred_i + \sum_{j=1}^J L_{ij}$, so that the share of credit from i to j in source country i 's credit portfolio is given by $w_{ij} = L_{ij}/Credit_i$. As long as $w_j^* > w_{ij}$, bilateral credit home bias is positive and country i is underinvested in country j with respect to the benchmark portfolio. If $w_j^* < w_{ij}$, home bias is negative, meaning that country i is overinvested in country j 's credit market. For $w_j^* = w_{ij}$, home bias is zero and country i optimally extends credit to j according to the benchmark portfolio. Given that some countries attract large values of international credit, bilateral home bias as constructed in equation (3) can assume large negative values. To avoid outliers from affecting the regression results, we follow Fidora et al. (2007) and compute bilateral home bias as

$$HB_{ij} = \begin{cases} \frac{w_j^* - w_{ij}}{w_j^*} & \text{if } w_j^* \geq w_{ij} \\ \frac{w_j^* - w_{ij}}{w_{ij}} & \text{if } w_j^* < w_{ij} \end{cases} \quad (4)$$

so that the variable is defined on the interval $[-1;1]$. We compute this measure at an annual frequency using the BIS data and two alternative measures of domestic credit. As a first measure of the volume of domestic credit, we use data on domestic credit by the banking sector relative to GDP from the WDI. We back out the level of domestic credit by multiplying the ratio with GDP. As a second measure, we use information on the level of domestic credit from the Depository Corporations Survey which is available from the IFS.

Figure 2 illustrates the evolution of bilateral credit home bias (based on WDI-data) for the regression sample. It presents both sample medians and sample means for each year, once for the full country sample and once for the euro area. All sub-plots reveal that bilateral credit home bias has significantly increased since the GFC. Moreover, it can be observed that within the euro area, home

bias is lower than in the full country sample. The plots look very similar for the second measure of home bias (not reported). Given that the first measure is available for a larger sample, we opt for this variable in our regressions below.

As in the baseline setup for cross-border credit, we are interested in the policy-related drivers of changes in bilateral home bias in the post-pre crisis comparison. Therefore, we take the average of home bias across the period 2005-2007 and across 2010-2012 and take the difference between these two values for each country pair. Given that home bias takes on values between -1 and 1, the change in home bias is defined on the interval -2 and 2. Table 1(a) shows that bilateral home bias has, on average, increased by 0.03 when comparing the pre- and post-crisis averages. That is, banks have tilted their credit portfolios more towards domestic credit since the crisis. In contrast to this, credit home bias remained stable between 2005 and 2006 (Table 1(b)). Between 2010 and 2011, home bias increased by 0.01 (Table 1(c)).

Table 9 presents the regression results for the change in bilateral home bias post-pre crisis as the dependent variable. The results for home bias are mostly in line with those for cross-border bank claims. First, overall regulatory quality both in the source and in the destination market mitigates home bias, while larger increases in trade openness in the source country induce more credit home bias. A larger raise in capital stringency or in supervisory power in the source country coincides with reduced home bias (Columns 2 and 5); the larger the strengthening in official supervisory power in the source country, the more inclined is its banking system to shift credit business abroad. As opposed to this, the more independent supervisors in the source country got since the crisis, the more home bias increased. Finally, in line with the effects of monetary policy outcomes presented above, source countries that experienced larger increases in the ratio of reserve deposits relative to GDP have seen smaller increases in their home bias. An increase in reserve deposits in the destination country coincides with higher credit inflows as well.

5 Summary

The goal of this paper has been to analyze the importance of policy-related drivers of adjustments in cross-border bank credit and bilateral credit home bias since the global financial crisis. Our main results are summarized as follows.

First, source countries which have experienced larger increases in financial supervisory power or supervisory independence between the post and the pre-crisis period have extended more credit abroad. By contrast, increasing capital stringency in the source country has discouraged cross-border lending in the euro area, and larger differentials in capital stringency within the euro area have

reduced cross-border credit expansion. Moreover, we have found a negative link between increasing capital stringency in the source country and cross-border bank claims in the period after the GFC. Given that increasing capital to asset ratios in the source country have mitigated cross-border credit activity as well, this finding is in line with the observation that banks have cut back risky cross-border activities when facing the need to deleverage. Our results thus reveal that the effect of changes in financial regulation differs depending on the specific aspect of regulation considered, and depending on the region of source and recipient countries.

Second, we find a significant and positive effect of expansive monetary policy on cross-border lending. The effect of interest rate increases in the source country on cross-border lending is negative. Hence, monetary policy has mitigated the fragmentation in international credit markets since the crisis.

Third, bilateral credit home bias has considerably increased since the crisis. We show that the effects of increased regulatory stringency and unconventional monetary policy on home bias are mostly in line with the results for cross-border lending. Both larger increases in regulatory arbitrage and in reserve deposits relative to GDP in the source country coincide with a weaker increase in home bias since the crisis.

Regarding policy implications, our results indicate that changes in regulatory policy are important drivers of cross-border banking and hence of international banking sector integration. The findings suggest that arbitrage in capital stringency is linked to lower cross-border bank lending in the euro area. In order to avoid a further fragmentation of credit markets, it will be important to implement new regulatory rules in a transparent and harmonized way across countries in order to avoid distortionary lending behavior and reduced international bank activities due to increased information costs. Moreover, monetary policy seems to be important for international bank flows. In future research, it could be interesting to analyze to what extent higher net interest margins or higher yields on equity or private bond markets in recipient countries have encouraged credit outflows from countries with unconventional monetary policies.

References

- Allen, F., Beck, T., Carletti, E., Lane, P., Schoenmaker, D. and W. Wagner (2011): Cross-Border Banking in Europe: Implications for Financial Stability and Macroeconomic Policies, CEPR, Brussels.
- Anderson, J. and Marcouiller, D. (2002): Insecurity and the Pattern of Trade: An Empirical Investigation, *Review of Economics and Statistics*, 84, 342–352. DOI:10.1162/003465302317411587
- Bank for International Settlements (2013): *BIS Quarterly Review*, March, Basel.
- Barth, J. R., Caprio, G. and R. Levine (2008): Bank regulations are changing: For better or worse?, *World Bank Policy Research Paper* 4646, Washington, DC. DOI:10.1057/ces.2008.33
- Barth, J. R., Caprio, G. and R. Levine (2013): Bank Regulation and Supervision in 180 Countries from 1999 to 2011, *Journal of Financial Economic Policy*, Vol. 5(2), pp. 111-219, April. DOI:10.1108/17576381311329661
- Bekaert, G, M., Harvey, C.R. and C. Lundblad (2005): Does Financial Liberalization Spur Growth?, *Journal of Financial Economics*, 77: 3-55. DOI:10.1016/j.jfineco.2004.05.007
- Beck, T., Demirgüç-Kunt, A. and R. Levine, (2000): A New Database on Financial Development and Structure, *World Bank Economic Review* 14: 597-605.
- Beck, T., Demirgüç-Kunt, A. and R. Levine (2010): Financial Institutions and Markets across Countries and over Time: The Updated Financial Development and Structure Database. *World Bank Economic Review* 24(1): 77-92. DOI:10.1093/wber/lhp016
- Bernanke, B.S. (2013): Monitoring the Financial System. Speech at the 49th Annual Conference on Bank Structure and Competition sponsored by the Federal Reserve Bank of Chicago, May 10, Chicago, Illinois.
- Bremus, F. (2013): Cross-border banking, bank market structures and market power: Theory and cross-country evidence, *DIW Discussion Paper* No. 1344, December.
- Brüggemann, B., Kleinert, J. and E. Prieto (2012): The Ideal Loan and the Patterns of Cross-Border Bank Lending, *Graz Economics Papers* 2012-03, Karl-Franzens University Graz, Department of Economics.
- Bruno, V. and H.S. Shin (2013): Capital Flows, Cross-Border Banking and Global Liquidity, *NBER Working Paper* No. 19038, May. DOI:10.3386/w19038
- Cetorelli, N. and L.S. Goldberg (2012): Liquidity management of U.S. global banks: Internal capital markets in the great recession, *Journal of International Economics* (forthcoming). DOI:10.1016/j.jinteco.2012.05.001
- Cetorelli, N. and L. S. Goldberg (2011): Global banks and international shock transmission: Evidence from the crisis, *IMF Economic Review* 59:41–76. DOI:10.1057/imfer.2010.9
- Chinn, M.D., and H. Ito (2006). What Matters for Financial Development? Capital Controls, Institutions, and Interactions. *Journal of Development Economics* 81(1): 163-192. DOI: 10.1016/j.jdeveco.2005.05.010

Chinn, M.D., and H. Ito (2008). A New Measure of Financial Openness. *Journal of Comparative Policy Analysis* 10(3): 309–322. DOI:10.1080/13876980802231123

Čihák, M., Demirgüç-Kunt, A., Feyen, E. and R. Levine (2012): Benchmarking Financial Development Around the World, World Bank Policy Research Working Paper 6175, August, <http://go.worldbank.org/VHV54DRU00>.

De Haas, R. and N. van Horen (2012): International shock transmission after the Lehman Brothers collapse: Evidence from syndicated lending, *American Economic Review: Papers & Proceedings* 102:231–37. DOI:10.1257/aer.102.3.231

Düwel, C., Frey, R. and A. Lipponer (2011): Cross-border bank lending, risk aversion and the financial crisis, Bundesbank Discussion Paper Series 1: Economic Studies, No 29/2011, Deutsche Bundesbank, Frankfurt a.M.

Fidora, M., Fratzscher, M. and C. Thimann (2007): Home bias in global bond and equity markets: The role of real exchange rate volatility, *Journal of International Money and Finance* 26(4): 631-655. DOI:10.1016/j.jimonfin.2007.03.002

Fratzcher, M., Lo Duca, M. and R. Straub (2012): A global monetary tsunami? On the spillovers of US Quantitative Easing, CEPR Discussion Paper No. 9195, October 2012.

Giannetti, M. and L. Laeven (2012): The Flight Home Effect: Evidence from the Syndicated Loan Market During Financial Crises. *Journal of Financial Economics* 104: 23-43. DOI:10.1016/j.jfineco.2011.12.006

Houston, J.F., Lin, C. and Y. Ma (2012): Regulatory Arbitrage and International Bank Flows, *Journal of Finance*, LXVII (5): 1845-1895. DOI:10.1111/j.1540-6261.2012.01774.x

Keister, T. and J. McAndrews (2009): Why are Banks Holding so Many Excess Reserves?, Federal Reserve Bank of New York Staff Report No. 380, July.

Lane, P.R. (2013a): Financial Globalisation and the Crisis, *Open Economies Review* 24(3), 555-580. DOI:10.1007/s11079-012-9266-0

Lane, P.R. (2013b): Capital Flows in the Euro Area, CEPR Discussion Paper No. 9494, May.

Lane, P.R. (2014): Capital Flows in Low-Income Countries, Paper prepared for the Conference on “Macroeconomic Challenges Facing Low-Income Countries” held at the IMF, January 30-31, Washington, D.C.

Levchenko, A.A. (2007): Institutional Quality and International Trade, *Review of Economic Studies* 74: 791-819. DOI: 10.1111/j.1467-937X.2007.00435.x

Milesi-Ferretti, G. M. and C. Tille (2011): The Great Retrenchment: International Capital Flows during the Global Financial Crisis, *Economic Policy*, April, 66:285–342. DOI:10.1111/j.1468-0327.2011.00263.x

Okawa, Y. and E. Van Wincoop (2012): Gravity in International Finance. *Journal of International Economics* 2: 205-215. DOI:10.1016/j.jinteco.2012.01.006

Papaioannou, E. (2009): What drives international financial flows? Politics, institutions and other determinants, *Journal of Development Economics* 88: 269-281. DOI:10.1016/j.jdeveco.2008.04.001

Pockrandt, J. and S. Radde (2012): Need for Reform of EU Banking: Decoupling the Solvency of Banks and Sovereigns. *DIW Economic Bulletin*, 11:11-18.

Rose, A.K. and T. Wieladek (2011): Financial Protectionism: the First Test, NBER Working Paper 17073, Cambridge, MA. DOI: 10.3386/w17073

Schildbach, J. (2013): Bank Performance in the US and Europe: An Ocean Apart, Deutsche Bank Research, Current Issues, Global Financial Markets, Frankfurt a.M., September. Available online at http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000320825.pdf

The Economist (2012): The retreat from everywhere, April 21, available at <http://www.economist.com/node/21553015/print>

Appendix A: Data descriptions

Variable	Unit	Source	Description
<i>Bilateral variables</i>			
International bank claims	mio. USD	Bank for International Settlements (BIS), Consolidated Banking Statistics	We use bilateral total cross-border bank claims on an immediate borrower basis for 15 source and 46 recipient economies.
Bilateral credit home bias	[-1,1]	World Development Indicators, International Financial Statistics, BIS Consolidated Banking Statistics	Bilateral credit home bias compares country i 's credit portfolio share in country j with country j 's world credit market share.
Arbitrage in capital stringency	Difference between index values	Barth et al. (2013)	Arbitrage is computed as the difference between the regulatory variable in the source and recipient country, with a higher value implying stricter regulation in the source relative to the destination country.
Arbitrage in official supervisory power		Barth et al. (2013)	
Arbitrage in independence of supervisor		Barth et al. (2013)	
<i>Source/Recipient country variables</i>			
GDP	constant bn. USD	WDI, World Bank	Gross domestic product
3-bank concentration	%	Financial Development and Structure Dataset, World Bank	Assets of three largest banks as a share of assets of all commercial banks.
Share of government banks	%	Barth et al. (2013)	Fraction of the banking system's assets that are 50% or more government-owned.
Chinn-Ito index	[-1.8; 2.4]	Chinn and Ito (2006,2008)	Larger values indicate greater financial openness (less capital controls).
Trade openness	ratio	WDI	Sum of exports and imports relative to GDP
Regulatory quality	Index, [-2.5;2.5]	World Bank Governance Indicators	Estimate of general regulatory quality, with a higher value implying better institutional and regulatory quality.
Capital / assets	%	World Development Indicators, World Bank	Ratio of bank capital and reserves to total assets.
Overall capital stringency index	Index, 0-7	Barth et al. (2013)	Extent to which capital requirements reflect certain risk elements and to which certain market value losses are deducted from capital before minimum capital adequacy is determined. Higher values indicate stricter capital regulation.
Official supervisory power	Index, 0-14	Barth et al. (2013)	Extent to which supervisory authorities have the authority to take specific actions to prevent and correct problems. Higher values

			indicate stronger supervisory power.
Overall independence of supervisor	Index, 0-3	Barth et al. (2013)	The extent to which the supervisory authority is independent from the government and legally protected from the banking industry. Higher values indicate higher degree of independence.
Reserve deposits/GDP (IFS, ODCS)	%	International Financial Statistics, IMF	Reserve deposits of commercial banks (from the <i>Other Depository Corporations Survey</i>) held at the central bank divided by GDP (in %).
Reserves at CB/GDP (IFS, CBS)	%	International Financial Statistics, IMF	Reserves of commercial banks held at the central bank (from the <i>Central Bank Survey</i>) divided by GDP (in %).
Short-term interest rate	%	International Financial Statistics, IMF	We use money market rates, deposit rates and interest rates on T-bills from the IFS to proxy monetary policy outcomes in terms of changes in short-term interest rates.
Long-term interest rate	%	Datastream, Thomson Reuters	Ten-year government bond yields are used as a proxy for monetary policy outcomes.

List of countries:

Source countries (15, euro area-countries in italics):

Austria, Belgium, Brazil, Canada, Denmark, *France, Germany, Greece, Italy*, Mexico, *Netherlands, Portugal, Spain*, Turkey, United States.

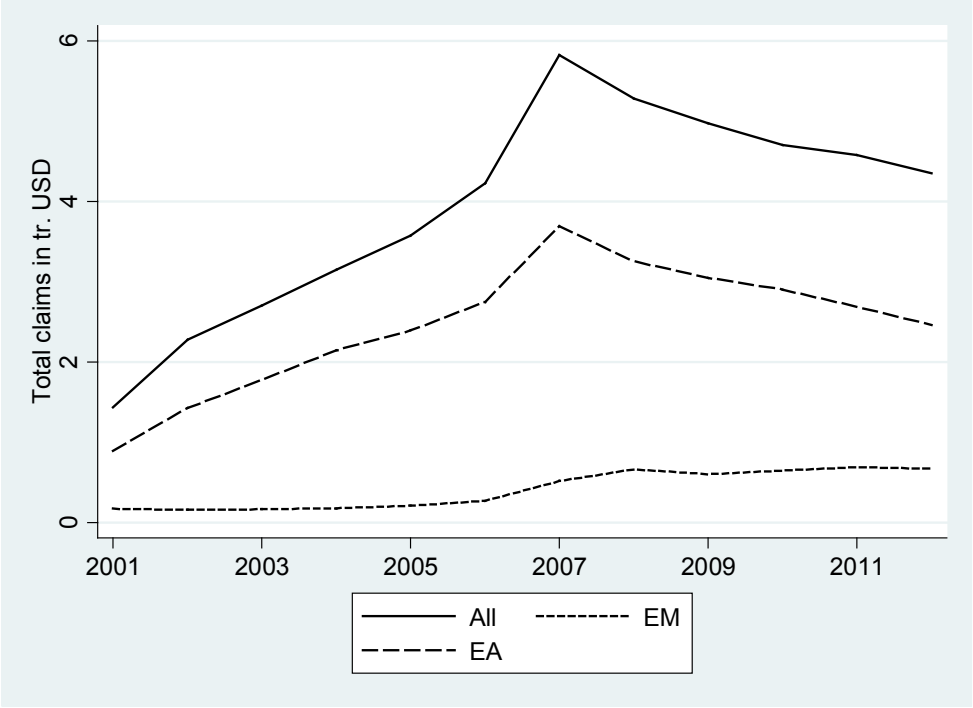
Recipient countries (46, euro area -countries in italics):

Armenia, *Austria*, Belarus, *Belgium*, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Colombia, Costa Rica, Croatia, Denmark, Ecuador, El Salvador, *Finland, France, Germany*, Ghana, *Greece*, Guatemala, Honduras, Hungary, Indonesia, *Italy*, Kenya, Latvia, Lithuania, Malaysia, Mauritius, Mexico, Moldova, *Netherlands*, Nigeria, Pakistan, Poland, *Portugal*, Romania, Russia, *Slovakia, Slovenia*, South Korea, *Spain*, Thailand, Turkey, Ukraine, United States.

Figure 1: Evolution of cross-border bank claims by region

This figure shows bilateral total bank claims for the regression sample (15 source countries, 46 receiving countries). Source: Bank for International Settlements, Consolidated Banking Statistics (immediate borrower basis).

(a) Claims by all reporting countries



(b) Claims by euro area reporting countries

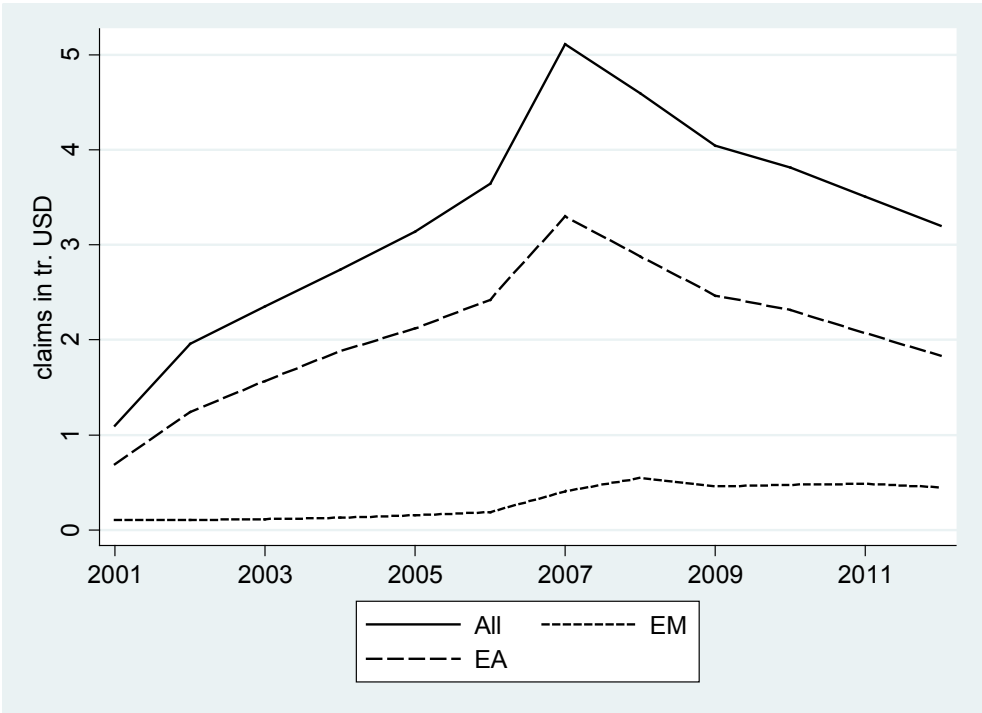


Figure 2: Evolution of bilateral credit home bias

This figure plots sample medians and means of bilateral credit home bias, computed as described in Section 4.4 (based on WDI-data).

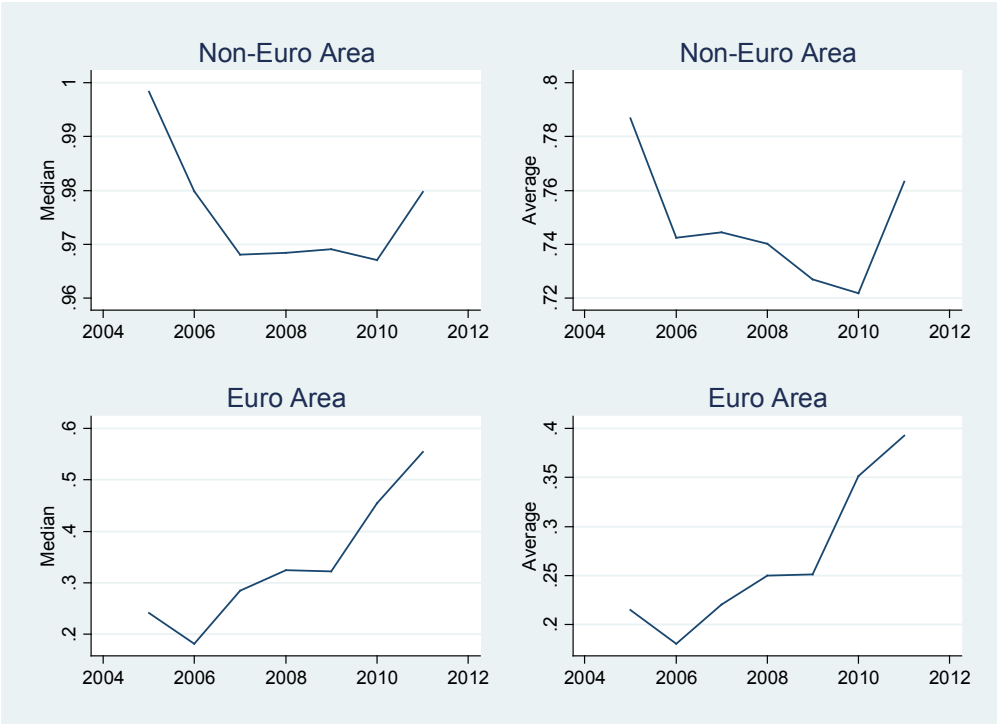


Table 1: Descriptive statistics**(a) Changes pre/post crisis**

This table presents descriptive statistics for the baseline regression sample (Table 2). All variables are expressed as changes pre-post crisis, where the pre-crisis period is the average across 2005-2007 and the post-crisis period is the average across 2010-2012.

	Obs	Mean	Std. Dev.	Min	Max
<i>Bilateral variables</i>					
International claims pre/post crisis	514	0.07	1.20	-5.64	3.45
Bilateral credit home bias 1 (based on WDI)	492	0.03	0.33	-1.56	1.15
Bilateral credit home bias 2 (based on IFS)	492	0.02	0.25	-1.36	1.03
Arbitrage capital stringency	514	-0.47	3.08	-9.33	7.90
Arbitrage official supervisory power	514	1.07	3.70	-9.50	11.03
Arbitrage independence of supervisor	514	0.03	0.82	-2.33	2.67
<i>Source country variables</i>					
GDP (bn USD)	514	0.17	0.14	0.08	0.73
3-bank concentration (%)	514	2.23	9.30	-19.49	24.85
Share of government banks (%)	514	-0.27	6.57	-12.00	13.00
Chinn-Ito index	514	0.04	0.26	-0.31	1.23
Trade openness	514	2.46	4.81	-8.43	16.39
Regulatory quality	514	-0.07	0.15	-0.42	0.19
Capital / assets (%)	514	0.45	0.88	-0.71	1.85
Overall capital stringency index	514	0.81	2.23	-4.33	3.60
Official supervisory power	514	0.51	2.52	-3.50	6.00
Overall independence of supervisor	514	0.39	0.53	-0.33	1.67
Reserve deposits/GDP (% IFS, ODCS)	514	3.12	3.91	-0.78	15.72
Reserves at CB/GDP (% IFS, CBS)	514	1.06	1.22	-0.78	4.20
Short-term interest rate	434	-2.30	1.22	-4.73	-0.59
Long-term interest rate	480	0.47	2.80	-1.59	10.04
<i>Recipient country variables</i>					
GDP (bn USD)	514	0.30	0.18	0.08	0.77
3-bank-concentration (%)	514	-1.88	12.08	-49.15	24.84
Share of government banks (%)	514	-0.38	8.93	-33.90	34.84
Chinn-Ito index	514	-0.04	0.50	-1.06	1.23
Trade openness	514	1.44	10.91	-30.83	27.30
Regulatory quality	514	0.03	0.17	-0.42	0.36
Capital / assets (%)	514	0.23	2.38	-11.62	6.30
Overall capital stringency index	514	1.27	2.04	-4.30	5.00
Official supervisory power	514	-0.55	2.60	-5.03	6.00
Overall independence of supervisor	514	0.36	0.61	-1.00	2.00
Reserve deposits/GDP (% IFS, ODCS)	514	1.90	4.73	-2.58	22.72
Reserves at CB/GDP (% IFS, CBS)	514	0.75	0.98	-0.79	4.19
Short-term interest rate	470	-1.57	1.85	-4.75	3.75
Long-term interest rate	314	0.13	2.57	-3.28	10.36

(b) Change pre-crisis (2005/2006)

This table presents descriptive statistics for the regression sample in Table 7. All variables are expressed as changes between 2005 and 2006.

	Obs	Mean	Std. Dev.	Min	Max
<i>Bilateral variables</i>					
International claims pre/post crisis	369	0.20	0.63	-3.00	2.71
Bilateral credit home bias 1 (based on WDI)	492	0.00	0.04	-0.26	0.43
Bilateral credit home bias 2 (based on IFS)	492	0.00	0.03	-0.24	0.39
Arbitrage capital stringency	369	-0.14	2.82	-7.50	6.50
Arbitrage official supervisory power	369	0.45	3.01	-9.00	9.30
Arbitrage independence of supervisor	369	0.09	1.21	-4.00	3.00
<i>Source country variables</i>					
GDP (bn USD)	369	0.08	0.05	0.05	0.22
3-bank concentration (%)	369	0.06	6.55	-8.84	23.59
Share of government banks (%)	369	1.04	3.17	-2.21	13.20
Chinn-Ito index	369	0.02	0.06	0.00	0.26
Trade openness	369	3.76	2.15	-0.81	7.99
Regulatory quality	369	-0.02	0.09	-0.21	0.14
Capital / assets (%)	369	0.11	0.50	-0.80	1.00
Overall capital stringency index	369	-0.65	2.04	-4.50	2.00
Official supervisory power	369	0.88	1.91	-3.00	4.80
Overall independence of supervisor	369	0.33	0.85	-1.00	2.00
Reserve deposits/GDP (% IFS, ODCS)	369	0.00	0.00	-0.01	0.00
<i>Recipient country variables</i>					
GDP (bn USD)	369	0.12	0.07	0.05	0.35
3-bank-concentration (%)	369	-0.69	6.26	-13.97	23.59
Share of government banks (%)	369	-1.18	7.92	-33.99	18.38
Chinn-Ito index	369	0.05	0.33	0.00	2.55
Trade openness	369	3.59	6.66	-9.43	43.84
Regulatory quality	369	-0.02	0.12	-0.26	0.24
Capital / assets (%)	369	0.10	0.87	-2.60	3.60
Overall capital stringency index	369	-0.51	1.85	-4.50	3.00
Official supervisory power	369	0.43	2.34	-5.36	6.00
Overall independence of supervisor	369	0.23	0.82	-1.00	3.00
Reserve deposits/GDP (% IFS, ODCS)	369	0.00	0.01	-0.03	0.06

(c) Change post-crisis (2010/2011)

This table presents descriptive statistics for the regression sample in Table 8. All variables are expressed as changes between 2010 and 2011.

	Obs	Mean	Std. Dev.	Min	Max
<i>Bilateral variables</i>					
International claims pre/post crisis	367	-0.02	0.51	-3.72	2.15
Bilateral credit home bias (based on WDI)	486	0.01	0.04	-0.16	0.17
Bilateral credit home bias (based on IFS)	486	0.01	0.03	-0.16	0.19
Arbitrage capital stringency (09/10)	367	0.04	3.19	-10.00	9.00
Arbitrage official supervisory power (09/10)	367	0.94	3.96	-9.50	11.50
Arbitrage independence of supervisor (09/10)	367	-0.15	0.99	-3.00	3.00
<i>Source country variables</i>					
GDP (bn USD)	367	0.09	0.04	0.04	0.20
3-bank concentration (%)	367	1.83	2.94	-4.01	6.68
Share of government banks (%)	367	-0.00	0.06	-0.09	0.12
Chinn-Ito index	367	-0.02	0.06	-0.26	0.00
Trade openness	367	5.23	2.60	1.22	9.83
Regulatory quality	367	-0.04	0.08	-0.20	0.15
Capital / assets (%)	367	-0.21	0.40	-1.40	0.40
Overall capital stringency index	367	0.84	2.21	-5.00	4.00
Official supervisory power	367	0.53	2.63	-4.00	6.00
Overall independence of supervisor	367	0.26	0.73	-1.00	2.00
Reserve deposits/GDP (% , IFS, ODCS)	367	0.03	0.05	0.00	0.26
<i>Recipient country variables</i>					
GDP (bn USD)	367	0.11	0.05	0.04	0.22
3-bank-concentration (%)	367	1.45	5.15	-15.67	20.13
Share of government banks (%)	367	0.01	0.08	-0.11	0.41
Chinn-Ito index	367	-0.02	0.31	-1.23	1.23
Trade openness	367	6.79	7.00	-3.11	41.17
Regulatory quality	367	-0.00	0.08	-0.20	0.15
Capital / assets (%)	367	-0.03	1.07	-3.00	4.00
Overall capital stringency index	367	0.81	2.22	-5.00	5.00
Official supervisory power	367	-0.41	2.93	-6.00	6.00
Overall independence of supervisor	367	0.40	0.65	-1.00	2.00
Reserve deposits/GDP (% , IFS, ODCS)	367	0.02	0.06	-0.02	0.26

Table 2: Determinants of changes in cross-border bank claims (post- vs. pre-crisis)

The dependent variable is the change in cross-border bank claims, defined as $\Delta L_{ij} = \ln(L_{ij}^{\text{post}}) - \ln(L_{ij}^{\text{pre}})$. A constant is included in all regressions but not reported. All variables are expressed in differences between the post- and pre-crisis period. Post-crisis = 2010 – 2012, Pre crisis = 2005 – 2007. “Arbitrage” is computed as the gap between regulation in the source and destination country. Heteroskedasticity-robust standard errors clustered at the recipient-country level. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1) Controls	(2) Regulation	(3) Regulation	(4) Mon.pol.	(5) All
Control variables					
GDP (bn USD) (source)	0.085 (0.604)	1.545* (0.791)	0.327 (0.671)	-0.142 (0.603)	1.382* (0.783)
GDP (bn USD)	0.336 (0.305)	0.359 (0.307)	0.284 (0.296)	0.248 (0.288)	0.214 (0.331)
Chinn-Ito index of capital controls (source)	-0.194 (0.277)	-0.307 (0.297)	-0.308 (0.296)	-0.039 (0.278)	0.125 (0.293)
Chinn-Ito index of capital controls	0.058 (0.102)	0.053 (0.098)	0.101 (0.101)	0.068 (0.100)	0.022 (0.107)
Trade openness (source)	-0.045*** (0.009)	-0.015 (0.009)	-0.041*** (0.010)	-0.085*** (0.016)	-0.068*** (0.016)
Trade openness	0.012** (0.005)	0.016*** (0.004)	0.013** (0.005)	0.012** (0.005)	0.016*** (0.004)
Regulatory quality (WBG) (source)	0.194 (0.447)	-1.677** (0.754)	-0.206 (0.573)	-0.339 (0.453)	-2.363*** (0.827)
Regulatory quality (WBG)	0.790* (0.398)	0.986** (0.418)	1.212*** (0.445)	1.050** (0.443)	1.138** (0.438)
Capital / assets (%) (source)		-0.107 (0.072)	-0.053 (0.068)	-0.096 (0.061)	-0.270*** (0.091)
Capital / assets (%)		0.047** (0.023)	0.058** (0.025)	0.048* (0.025)	0.045* (0.023)
Regulation and Monetary Policy					
Overall capital stringency index (source)		0.064* (0.037)			0.028 (0.036)
Overall capital stringency index		-0.022 (0.030)			-0.023 (0.030)
Official supervisory power (source)		0.105*** (0.036)			0.157*** (0.045)
Official supervisory power		0.021 (0.019)			0.020 (0.019)
Overall independence of supervisor (source)		0.509*** (0.136)			0.406*** (0.136)
Overall independence of supervisor		0.177** (0.070)			0.192** (0.071)
Arbitrage capital stringency			0.040 (0.026)		
Arbitrage supervisory power			0.002 (0.018)		
Arbitrage independence of supervisor			0.003 (0.062)		
Reserve deposits/GDP (% , IFS, ODCS) (source)				0.084*** (0.017)	0.096*** (0.022)
Reserve deposits /GDP (% , IFS, ODCS)				-0.010 (0.008)	-0.014 (0.009)
Observations	514	514	514	514	514
R-squared	0.060	0.108	0.077	0.107	0.145

Table 3: Determinants of changes in cross-border bank claims (post/pre-crisis), additional controls

The dependent variable is the change in cross-border bank claims, defined as $\Delta L_{ij} = \ln(L_{ij}^{\text{post}}) - \ln(L_{ij}^{\text{pre}})$. A constant is included in all regressions but not reported. All variables are expressed in differences between the post- and pre-crisis period. Post-crisis = 2010 – 2012, Pre crisis = 2005 – 2007. “Arbitrage” is computed as the gap between regulation in the source and destination country. Heteroskedasticity-robust standard errors clustered at the recipient-country level. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1) Controls	(2) Regulation	(3) Regulation	(4) Mon.pol.	(5) All
Control variables					
GDP (bn USD) (source)	0.072 (0.657)	1.990** (0.756)	0.093 (0.739)	-1.153* (0.677)	0.351 (0.709)
GDP (bn USD)	0.330 (0.310)	0.336 (0.314)	0.237 (0.300)	0.231 (0.291)	0.172 (0.338)
Chinn-Ito index of capital controls (source)	0.005 (0.008)	0.033** (0.014)	0.016 (0.013)	0.060*** (0.012)	0.062*** (0.012)
Chinn-Ito index of capital controls	0.004 (0.006)	0.001 (0.006)	0.003 (0.005)	0.005 (0.006)	0.002 (0.006)
Trade openness (source)	-0.003 (0.013)	0.080*** (0.028)	0.017 (0.022)	0.035* (0.018)	0.059** (0.029)
Trade openness	-0.001 (0.007)	-0.005 (0.008)	-0.004 (0.009)	-0.001 (0.008)	-0.004 (0.008)
3-bank concentration (%) (source)	-0.112 (0.332)	0.029 (0.355)	-0.090 (0.356)	1.062*** (0.337)	1.129*** (0.343)
3-bank concentration (%)	0.079 (0.099)	0.042 (0.110)	0.110 (0.104)	0.103 (0.093)	0.029 (0.115)
Government-owned banks (%) (source)	-0.044*** (0.009)	-0.009 (0.009)	-0.041*** (0.009)	-0.116*** (0.016)	-0.089*** (0.019)
Government-owned banks (%)	0.013*** (0.005)	0.016*** (0.005)	0.014*** (0.005)	0.014*** (0.005)	0.017*** (0.004)
Regulatory quality (WBGI) (source)	0.275 (0.475)	-3.918*** (0.795)	-0.209 (0.576)	-0.213 (0.469)	-2.503*** (0.806)
Regulatory quality (WBGI)	0.883** (0.407)	1.040** (0.464)	1.325*** (0.449)	1.174** (0.485)	1.166** (0.492)
Capital / assets (%) (source)		-0.556*** (0.177)	-0.120 (0.113)	-0.325*** (0.094)	-0.540*** (0.174)
Capital / assets (%)		0.050** (0.023)	0.061** (0.025)	0.049* (0.025)	0.046** (0.023)
Regulation and Monetary Policy					
Overall capital stringency index (source)		0.216*** (0.045)			0.059 (0.054)
Overall capital stringency index		-0.025 (0.032)			-0.024 (0.033)
Official supervisory power (source)		0.200*** (0.042)			0.156*** (0.040)
Official supervisory power		0.019 (0.022)			0.018 (0.021)
Overall independence of supervisor (source)		0.509*** (0.131)			0.456*** (0.139)
Overall independence of supervisor		0.186** (0.073)			0.196** (0.075)
Arbitrage capital stringency			0.049* (0.027)		
Arbitrage official supervisory power			0.004 (0.019)		
Arbitrage supervisory independence			0.012 (0.062)		
Reserve deposits /GDP (% , IFS, ODCS) (source)				0.151*** (0.022)	0.145*** (0.027)
Reserve deposits /GDP (% , IFS, ODCS)				-0.008 (0.008)	-0.012 (0.009)
Observations	514	514	514	514	514
R-squared	0.064	0.126	0.081	0.148	0.180

Table 4: Alternative measures of monetary policy outcomes

The dependent variable is the change in cross-border bank claims post/pre crisis. All explanatory changes are expressed as changes post/pre crisis. Column 1 uses the baseline measure. Column 2 uses central bank claims against commercial banks to GDP from the Central Bank Survey (IFS). Columns 3-4 use data on monetary policy outcomes measured by long- and short-term interest rates. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)	(4)
Control variables				
GDP (bn USD) (source)	-3.020** (1.089)	-2.441* (1.268)	-1.466 (0.874)	-4.249*** (0.808)
GDP (bn USD)	0.186 (0.459)	0.156 (0.422)	0.434 (0.271)	0.728* (0.373)
3-bank concentration (%) (source)	0.034* (0.018)	-0.030 (0.018)	-0.035** (0.016)	-0.023 (0.019)
3-bank concentration (%)	0.005 (0.015)	0.014 (0.016)	0.004 (0.011)	-0.003 (0.014)
Government-owned banks (%) (source)	-0.013 (0.018)	-0.038* (0.020)	-0.020 (0.016)	-0.015 (0.018)
Government-owned banks (%)	0.009 (0.007)	0.011 (0.008)	0.002 (0.006)	0.002 (0.005)
Chinn-Ito index of capital controls (source)	-2.022 (3.527)	-6.179* (3.587)	-7.432** (3.385)	-9.470*** (3.266)
Chinn-Ito index of capital controls	0.045 (0.171)	0.031 (0.194)	-0.049 (0.216)	0.086 (0.221)
Trade openness (source)	-0.139*** (0.022)	-0.066*** (0.010)	-0.035*** (0.007)	-0.038*** (0.007)
Trade openness	0.014 (0.010)	0.017 (0.011)	0.021* (0.011)	0.015 (0.012)
Regulatory quality (WBGI) (source)	1.261 (1.571)	0.432 (1.580)	-3.765*** (1.293)	0.404 (1.324)
Regulatory quality (WBGI)	0.796 (0.895)	1.023 (0.762)	0.348 (0.555)	0.092 (0.601)
Capital / assets (%) (source)	-0.218 (0.142)	0.101 (0.137)	-0.119 (0.127)	0.045 (0.120)
Capital / assets (%)	0.053*** (0.018)	0.062*** (0.015)	0.064*** (0.017)	0.086*** (0.025)
Regulation and Monetary Policy				
Arbitrage capital stringency	0.023 (0.077)	-0.018 (0.084)	0.033 (0.052)	0.079 (0.064)
Arbitrage official supervisory power	0.021 (0.050)	0.069 (0.054)	0.050 (0.047)	0.028 (0.054)
Arbitrage supervisory independence	0.035 (0.083)	0.078 (0.105)	-0.060 (0.093)	0.033 (0.098)
Reserve deposits/GDP (% IFS, ODCS) (source)	0.188*** (0.033)			
Reserve deposits/GDP (% IFS, ODCS)	-0.007 (0.012)			
Reserves at CB/GDP (% IFS, CBS) (source)		0.300*** (0.053)		
Reserves at CB/GDP (% IFS, CBS)		-0.049 (0.083)		
Long-term interest rate (source)			-0.132*** (0.029)	
Long-term interest rate			-0.022 (0.021)	
Short-term interest rate (source)				-0.093** (0.044)
Short-term interest rate				-0.085* (0.048)
Observations	212	212	212	212
R-squared	0.286	0.230	0.182	0.157

Table 5: Source/receiving-country fixed effects

This table presents regression results including either source or receiving country fixed effects. The dependent variable is the change in cross-border bank claims post/pre crisis. All explanatory changes are expressed as changes post/pre crisis. Columns 1-2 include source-country fixed effects, Columns 3-4 include receiving country fixed effects. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)	(4)
	i-FE	i-FE	j-FE	j-FE
Receiving country variables				
GDP (bn USD)	0.203 (0.328)	0.203 (0.328)		
Chinn-Ito index of capital controls	0.039 (0.105)	0.039 (0.105)		
Trade openness	0.016*** (0.004)	0.016*** (0.004)		
Regulatory quality (WBGI)	1.161** (0.444)	1.161** (0.444)		
Capital / assets (%)	0.043* (0.024)	0.043* (0.024)		
Overall capital stringency index	-0.022 (0.030)			
Official supervisory power	0.019 (0.018)			
Overall independence of supervisor	0.198*** (0.071)			
Reserve deposits/GDP (IFS, ODCS)	-0.014 (0.009)	-0.014 (0.009)		
Bilateral variables				
Arbitrage capital stringency		0.022 (0.030)		0.025 (0.037)
Arbitrage Official supervisory power		-0.019 (0.018)		0.164*** (0.046)
Arbitrage Overall supervisory independence		-0.198*** (0.071)		0.417*** (0.141)
Source country variables				
GDP (bn USD)			1.560* (0.819)	1.560* (0.819)
Chinn-Ito index of capital controls			0.080 (0.305)	0.080 (0.305)
Trade openness			-0.068*** (0.017)	-0.068*** (0.017)
Regulatory quality (WBGI)			-2.382*** (0.842)	-2.382*** (0.842)
Capital / assets (%)			-0.275*** (0.092)	-0.275*** (0.092)
Overall capital stringency index			0.025 (0.037)	
Official supervisory power			0.164*** (0.046)	
Overall independence of supervisor			0.417*** (0.141)	
Reserve deposits/GDP (IFS, ODCS)			0.099*** (0.022)	0.099*** (0.022)
Observations	514	514	514	514
R-squared	0.190	0.190	0.224	0.224

Table 6: Interactions with euro area dummies

The dependent variable is the change in cross-border bank claims post/pre crisis. Control variables are included as in the baseline regressions (Table 2) but not reported. In Column 1, we interact the policy variables with a dummy variable that equals one if the receiving country is a euro area member state. Column 2 shows regression results with interaction terms between policy variables and a dummy variable that equals one if the source country is in the euro area. Column 3 shows results for interaction terms with a dummy that equals one if both countries are in the euro area. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)
EA (receiving), 1 if receiving country in the EA	-0.377 (0.163)		
EA (source), 1 if source country in the EA		0.115 (0.618)	
EA(source&receiving), 1 if both countries in the EA			-0.223 (0.446)
Regulation			
Arbitrage capital stringency [CS]	0.031 (0.032)	0.059 (0.040)	0.040 (0.031)
EA(receiving) * CS	-0.049 (0.038)		
EA(source) * CS		-0.057 (0.052)	
EA(source and receiving) * CS			-0.110** (0.045)
Arbitrage official supervisory power [SP]	0.011 (0.025)	-0.057* (0.032)	0.004 (0.021)
EA(receiving) * SP	-0.033 (0.045)		
EA(source) * SP		0.097** (0.038)	
EA(source and receiving) * SP			0.023 (0.062)
Arbitrage supervisory independence [SI]	0.031 (0.092)	-0.146 (0.141)	-0.012 (0.076)
EA(receiving) * SI	-0.308** (0.142)		
EA(source) * SI		0.057 (0.187)	
EA(source and receiving) * SI			-0.245 (0.228)
Monetary Policy			
Reserve deposits/GDP (%) (source)	0.086*** (0.017)	0.093*** (0.027)	0.085*** (0.020)
Reserve deposits/GDP (%) [RD]	0.032** (0.015)	-0.016 (0.014)	-0.006 (0.012)
EA(receiving)* RD	-0.008 (0.031)		
EA(source) * RD		0.003 (0.014)	
EA(source&receiving) * RD (source)			-0.021 (0.024)
EA(source&receiving) * RD			0.031 (0.033)
Observations	514	514	514
R-squared	0.138	0.127	0.128

Table 7: Determinants of changes in cross-border bank claims (2005-2006)

The dependent variable is the change in cross-border bank claims, defined as $\Delta L_{ij} = \ln(L_{ij}^{2006}) - \ln(L_{ij}^{2005})$.

Heteroskedasticity-robust standard errors clustered at the recipient-country level. All variables are expressed in differences between 2005 and 2006. "Arbitrage" is computed as the gap between regulation in the source and the receiving country. A constant is included in each regression but not reported. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)	(4)	(5)
	Controls	Regulation	Regulation	Mon.pol.	All
Control variables					
GDP (bn USD) (source)	-0.044 (1.334)	-0.130 (1.646)	0.142 (1.482)	0.383 (1.367)	-0.092 (1.653)
GDP (bn USD)	1.902*** (0.552)	2.194*** (0.633)	2.082*** (0.631)	1.721*** (0.614)	2.018*** (0.643)
Chinn-Ito index of capital controls (source)	-1.462 (0.928)	-1.300 (1.640)	-1.917 (1.185)	-2.517** (0.993)	-1.133 (1.800)
Chinn-Ito index of capital controls	-0.348* (0.177)	-0.390** (0.183)	-0.369* (0.185)	-0.401** (0.178)	-0.427** (0.176)
Trade openness (source)	0.009 (0.015)	0.006 (0.014)	0.003 (0.013)	-0.004 (0.016)	0.009 (0.019)
Trade openness	0.010 (0.011)	0.012 (0.011)	0.011 (0.011)	0.013 (0.011)	0.014 (0.010)
Regulatory quality (WBG) (source)	-0.037 (0.346)	0.437 (0.446)	0.119 (0.356)	-0.117 (0.396)	0.532 (0.608)
Regulatory quality (WBG)	0.173 (0.286)	0.148 (0.289)	0.085 (0.307)	0.150 (0.277)	0.105 (0.278)
Capital / assets (%) (source)		0.105 (0.108)	0.120 (0.089)	0.141* (0.083)	0.104 (0.108)
Capital / assets (%)		0.016 (0.030)	0.015 (0.031)	0.027 (0.034)	0.028 (0.033)
Regulation and Monetary Policy					
Overall capital stringency index (source)		0.031 (0.026)			0.035 (0.030)
Overall capital stringency index		0.004 (0.017)			0.002 (0.017)
Official supervisory power (source)		-0.015 (0.017)			-0.015 (0.017)
Official supervisory power		0.013 (0.013)			0.020 (0.015)
Overall independence of supervisor (source)		-0.038 (0.053)			-0.043 (0.057)
Overall independence of supervisor		0.013 (0.038)			0.025 (0.038)
Arbitrage capital stringency			0.010 (0.013)		
Arbitrage supervisory power			-0.011 (0.010)		
Arbitrage independence of supervisor			-0.015 (0.023)		
Reserve deposits /GDP (% , IFS, ODCS) (source)				-8.194 (11.241)	3.838 (13.662)
Reserve deposits /GDP (% , IFS, ODCS)				2.347 (2.096)	3.541 (2.420)
Observations	369	369	369	369	369
R-squared	0.064	0.081	0.077	0.076	0.085

Table 8: Determinants of changes in cross-border bank claims (2010-2011)

The dependent variable is the change in cross-border bank claims, defined as $\Delta L_{ij} = \ln(L_{ij}^{2011}) - \ln(L_{ij}^{2010})$.

Heteroskedasticity-robust standard errors clustered at the recipient-country level. All variables are expressed in differences between 2011 and 2010. For the regulatory variables, the change between the third and the fourth World Bank Survey on regulation is used. "Arbitrage" is computed as the gap between regulation in the source and the receiving country. A constant is included in each regression but not reported. ***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)	(4)	(5)
	Controls	Regulation	Regulation	Mon.pol.	All
Control variables					
GDP (bn USD) (source)	0.170 (0.792)	-0.322 (0.982)	-0.981 (0.885)	-0.617 (0.856)	-0.474 (1.029)
GDP (bn USD)	0.877 (0.664)	0.727 (0.455)	0.753 (0.494)	0.950 (0.643)	0.759 (0.450)
Chinn-Ito index of capital controls (source)	0.298 (0.977)	-0.520 (0.997)	-0.835 (0.976)	-0.351 (0.973)	-0.546 (1.017)
Chinn-Ito index of capital controls	-0.041 (0.073)	-0.024 (0.035)	-0.023 (0.041)	-0.039 (0.075)	-0.028 (0.036)
Trade openness (source)	-0.028** (0.011)	-0.012 (0.011)	-0.010 (0.011)	-0.012 (0.011)	-0.007 (0.011)
Trade openness	0.009*** (0.003)	0.009*** (0.003)	0.009*** (0.003)	0.009*** (0.003)	0.009*** (0.003)
Regulatory quality (WBGI) (source)	0.609** (0.272)	0.304 (0.483)	0.839** (0.330)	0.484* (0.284)	0.373 (0.505)
Regulatory quality (WBGI)	-0.585 (0.388)	-0.859** (0.319)	-0.801** (0.331)	-0.605 (0.367)	-0.851** (0.313)
Capital / assets (%) (source)		0.419*** (0.110)	0.372*** (0.073)	0.285*** (0.048)	0.423*** (0.109)
Capital / assets (%)		-0.000 (0.016)	-0.001 (0.016)	0.008 (0.022)	0.002 (0.017)
Regulation and Monetary Policy					
Overall capital stringency index (source)		-0.023* (0.013)			-0.022 (0.013)
Overall capital stringency index		0.041** (0.016)			0.039** (0.016)
Official supervisory power (source)		-0.014 (0.023)			-0.013 (0.023)
Official supervisory power		-0.022** (0.008)			-0.021** (0.009)
Overall independence of supervisor (source)		-0.057 (0.062)			-0.045 (0.064)
Overall independence of supervisor		-0.034 (0.041)			-0.034 (0.040)
Arbitrage capital stringency			-0.034*** (0.012)		
Arbitrage supervisory power			0.017** (0.008)		
Arbitrage independence of supervisor			0.024 (0.028)		
Reserve deposits /GDP (% , IFS, ODCS) (source)				-0.761** (0.364)	-0.643* (0.354)
Reserve deposits /GDP (% , IFS, ODCS)				0.593* (0.336)	0.201 (0.341)
Observations	367	367	367	367	367
R-squared	0.056	0.129	0.123	0.102	0.132

Table 9: Determinants of changes in bilateral credit home bias (post- vs. pre-crisis)

The dependent variable is the change in bilateral home bias (based on WDI-data), defined as $\Delta HB_{ij} = HB_{ij}^{post} - HB_{ij}^{pre}$.

Home bias is computed as described in the text. Heteroskedasticity-robust standard errors clustered at the recipient-country level. All variables are expressed in post/pre-differences. A constant is included in each regression but not reported.

***, **, * indicates significance at the 1-,5-,10-% level.

	(1)	(2)	(3)	(4)	(5)
Control variables					
GDP (bn USD) (source)	0.255*** (0.083)	0.161 (0.103)	0.249*** (0.090)	0.272*** (0.084)	0.187* (0.107)
GDP (bn USD)	0.032 (0.079)	0.016 (0.080)	0.067 (0.091)	0.005 (0.086)	-0.020 (0.077)
Chinn-Ito index of capital controls (source)	-0.036 (0.040)	-0.072 (0.049)	-0.065 (0.045)	-0.071* (0.042)	-0.137** (0.058)
Chinn-Ito index of capital controls	0.020 (0.034)	0.010 (0.036)	0.017 (0.036)	0.008 (0.033)	0.009 (0.036)
Trade openness (source)	0.029*** (0.003)	0.033*** (0.003)	0.032*** (0.003)	0.034*** (0.004)	0.041*** (0.005)
Trade openness	-0.002* (0.001)	-0.002 (0.001)	-0.003** (0.001)	-0.002* (0.001)	-0.002 (0.001)
Regulatory quality (WBGI) (source)	-0.386*** (0.124)	-0.204 (0.181)	-0.347** (0.134)	-0.343*** (0.120)	-0.085 (0.181)
Regulatory quality (WBGI)	-0.204** (0.081)	-0.247** (0.112)	-0.299*** (0.110)	-0.236*** (0.086)	-0.225** (0.109)
Capital / assets (%) (source)		0.020 (0.030)	-0.010 (0.027)	-0.022 (0.024)	0.046 (0.036)
Capital / assets (%)		-0.017* (0.009)	-0.019** (0.009)	-0.019** (0.009)	-0.018* (0.009)
Regulation and Monetary Policy					
Overall capital stringency index (source)		-0.015* (0.008)			-0.009 (0.008)
Overall capital stringency index		-0.001 (0.006)			-0.001 (0.006)
Official supervisory power (source)		-0.009 (0.008)			-0.018* (0.009)
Official supervisory power		-0.004 (0.007)			-0.004 (0.007)
Overall independence of supervisor (source)		0.095*** (0.024)			0.109*** (0.027)
Overall independence of supervisor		-0.015 (0.026)			-0.008 (0.027)
Arbitrage capital stringency			-0.005 (0.004)		
Arbitrage supervisory power			-0.001 (0.005)		
Arbitrage independence of supervisor			0.048** (0.021)		
Reserve deposits /GDP (% , IFS, ODCS) (source)				-0.693* (0.394)	-1.544** (0.605)
Reserve deposits /GDP (% , IFS, ODCS)				-0.363** (0.175)	-0.326* (0.179)
Observations	492	492	492	492	492
R-squared	0.184	0.232	0.216	0.209	0.245