Domestic banks as lightning rods? Home bias during Eurozone crisis*

Orkun Saka†

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Abstract

Governments and domestic banks in Europe have attracted criticism due to heightening inclination of banks to hold more local sovereign debt in the midst of the crisis, which has been interpreted as an evidence of financial repression or moral suasion. By using a novel dataset on bank-level exposures of sovereign and private debt covering the entire Eurozone crisis, I first confirm that sovereign debt has been reallocated from foreign to domestic banks at the peak of the crisis. Furthermore, this reallocation has been especially visible for banks as opposed to other domestic private agents and cannot be explained by the risk-shifting tendency of the banks located in troubled countries. However, in contrast with the previous literature focusing only on sovereign debt, I show that banks' private sector exposures have (at least) equally suffered from a rising home bias. Finally, I present a direct information channel and demonstrate that foreign banks -free from moral suasion- located in informationally-closer territories have relatively increased their exposures to crisis-countries.

JEL classification: F21, F34, F36, G01, G11, G21.

Keywords: Home bias; Information asymmetries; Eurozone crisis; Sovereign debt

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†Cass Business School, City, University of London. 24 Chiswell Street London, EC1Y 4UE United Kingdom; Tel: +44 (0)75 9306 9236. E-mail address: orkun.saka.1@cass.city.ac.uk.

"The same personal and professional ties that may allow sovereigns to apply moral suasion on domestic banks might also give domestic bankers better information about the likelihood of sovereign default or repayment."
Ethan Ilzetzki, in Economic Policy Discussion Panel (2014)

1. Introduction

Can domestic banks act as lightning rods in the midst of a stormy financial climate? On the contrary, by now, the deathly loop between sovereign and bank credit risks has been very well documented, especially in the context of recent Eurozone crises. Increasing risk pressures in the banking sector put unnecessary burden on public finances due to potential future bailout costs and negative spillovers to the lending in real economy. In turn, a spike in the sovereign credit risk might trigger deterioration in the bank finances through losses on banks' government bond holdings and the loss of credibility for future government support (Acharya, Drechsler, and Schnabl, 2014). Many studies have already pointed that European banks' relatively high exposure to sovereign debt has led them to decrease the loan supply in their respective territories, thus transferring the financial turmoil to the real economy (Acharya, Eisert, Eufinger, and Hirsch, 2016a; Altavilla, Pagano, and Simonelli, 2016; Popov and Van Horen, 2015).

[Insert Figure 1 near here]

One of the most interesting observations, however, was the banks' escalating home bias for sovereign debt, especially in crisis countries. That is, at the peak of the government debt problems, banks started accumulating the local government bonds. Figure 1 illustrates the initial rise and the gradual reversal of this trend -alongside with the respective bond spreads- in periphery part of the Eurozone. In contrast, the corresponding bias in core Euro countries seems to have been more or less stable throughout the Eurozone crisis. Intriguingly, the observation still stands in Figure 2 even after correcting for how much of the domestic debt the banks should hold in a standard Capital Asset Pricing Model (CAPM).[1]

[Insert Figure 2 near here]

[1] As discussed later in the Data section, a simple asset pricing model would predict that banks must hold sovereign debt in proportion to the relative weight of their sovereign portfolio in the universe of total sovereign bond holdings.

With the dismal interaction between sovereign and banking crisis in the background, most of the recent literature attributed this observation to the argument of financial repression/moral suasion (Becker and Ivashina, 2014; De Marco and Macchiavelli, 2015; Ongena, Popov, and Van Horen, 2016). In other words, in order to gain relief from crisis and to be able to rollover their debts, governments may have (implicitly) forced the banks in their jurisdiction to increase domestic sovereign exposures. Pointing to the highly positive correlations between government-relatedness[2] and public bond holdings of the banks, these papers argue that there has been a clear tendency of troubled governments to impose moral suasion on the banks that they can control. From this perspective, the resulting home bias has been mostly involuntary for domestic banks and created an unnecessary burden on the financial health of the banking sectors in crisis countries.

Another competing argument for the repatriation of public debt from non-crisis to crisis countries is based on the assumption that governments would be less willing to default if their debt was held by the domestic agents rather than foreign ones due to the costs such a default would inflict on the domestic economy (Broner, Martin, and Ventura, 2010; Gennaioli, Martin, and Rossi, 2014b). Hence, in the existence of well-functioning secondary markets, sovereign debt should naturally be reallocated back to host countries as domestic agents will attach a higher value to these securities than their foreign counterparts. According to this view, the resulting home bias has been a dark side-effect of secondary bond markets and might have even benefited the creditors if it eventually decreased governments' willingness to default. With respect to this argument, Figure 3 illustrates the evolution of the home bias for different types of domestic agents in periphery and core Euro countries. Though it is clear that resident banks in the periphery accumulated a big portion of domestic debt, this is hardly true for other residents in the same countries, which goes against the intuition of Broner et al. (2010) and asks for a further link between resident banks and government debt.

[Insert Figure 3 near here]

In this paper, I propose an alternative channel and show that European banks' increasing sovereign home bias in crisis countries is not so surprising if one takes into account one of the most conventional (albeit lately-forgotten) theories of the home bias in asset markets: informational frictions (Brennan and Cao, 1997; Van Nieuwerburgh and Veldkamp, 2009; Dziuda and Mondria, 2012). As true for most asset classes, home bias usually exists when there is an informational advantage in favour of domestic agents. In tranquil periods and well-integrated markets such as in Europe, one would not expect to observe a high level of

[2]Either through direct government ownership of the bank or political links in the board of directors.

home bias. Nonetheless, in crisis episodes during which domestic agents are likely to gain an informational advantage over their foreign peers, one would expect the home bias to rise since foreign agents would be more likely to react negatively on bad news (Brennan, Cao, Strong, and Xu, 2005). This is especially true if the crisis episodes are associated with large-scale market panic as illustrated by the recent studies for the Eurozone (De Grauwe and Ji, 2013; Saka, Fuertes, and Kalotychou, 2015). If this view is correct, one would expect to see the sovereign debt to be especially reallocated to local banks rather than other domestic agents due to the strong informational linkages between banks and governments. In fact, if the information channel was operational, it is expected that the reallocation would be concentrated on banks that were closely linked to the government. Hence, the conclusions of above-mentioned studies arguing in favour of moral suasion hypothesis based on such empirical findings might be biased in the absence of an explicit control for the information channel.

By taking a global portfolio approach and using a novel bank-level dataset compiled from various stress-tests, transparency and capital exercises of the European Banking Authority (EBA), I first show that European banks' home bias increased and sovereign debt was indeed reallocated from foreign to domestic banks at the peak of the crisis. Consistent with Acharya and Steffen (2015) and Crosignani (2015), I also find evidence of risk-shifting behaviour for banks located in crisis countries; however it is also shown that home bias goes much beyond this behaviour. Interestingly, and in contrast with the secondary market theory of Broner et al. (2010), this reallocation does not seem to be visible at all for the domestic agents other than banks, which is compatible with the information asymmetry theory of home bias given the informational advantages that banks enjoy in comparison to other local agents in government debt markets. Additionally, I illustrate that, in response to crisis, private forms of debt (retail and corporate) in bank balance sheets have experienced an equally large (if not larger) increase in home bias, which is in sharp contradiction with the moral suasion story unless one assumes corporate/retail borrowers can somehow force the domestic banks to lend to them. On the other hand, this finding is exactly what one would expect from informationally more sensitive assets (such as private debt) if crisis episodes were associated with informational frictions. Finally, I present a direct information channel and demonstrate that foreign banks -free from moral suasion- headquartered in informationally-closer territories have increased their relative exposures to troubled countries during crisis.

Overall, the evidence presented in this paper is only compatible with the conventional theory of increasing informational asymmetries between domestic and foreign agents during crisis. Thus, answering the question in the beginning, it is possible that domestic banks may have acted as lightning rods collecting the sovereign debt while governments were suffering

from informational frictions as foreign banks left the market in panic, triggering a financial storm.

The rest of the paper is organized as follows. Next section briefly outlines the relevant background literature. Section 3 describes the data. The empirical methodology and results are presented in section 4. Final section concludes the paper.

2. The Related Literature

2.1. Recent home bias in the Eurozone

The main motivation of the paper comes from the recently-aroused interest in academic and policy circles on the causes of rising fragmentation -home bias- across Eurozone sovereign debt markets. One of the earlier contributions by Becker and Ivashina (2014) illustrates the positive association between country-level government ownership in the banking sector and domestic government bond holdings of the banks. They further extend this finding by showing the significance of the positive relationship between government-relatedness of the banks' board members and government bond holdings in crisis-country banks. De Marco and Macchiavelli (2015) follow a similar path to point out that, upon receiving liquidity injections, only politically-related European banks increased their exposure to domestic sovereign debt. Using a proprietary bank-level dataset from European Central Bank (ECB), Ongena et al. (2016) demonstrate that, compared to foreign ones, domestic banks were more inclined to increase their exposures when governments had to rollover large chunks of outstanding public debt. Many other recent papers confirm these observations (Horváth, Huizinga, and Ioannidou, 2015; Altavilla et al., 2016) and conclude that a moral suasion channel was in operation during Eurozone crisis.[3] Nonetheless, none of these studies take into account the possible information channel that might have been active between governments and related banks. I contribute to this literature by first presenting evidence on the equally-rising home bias for asset classes other than sovereign debt and then illustrating that information channel was operational even in the sovereign exposures of foreign banks.

Another strand of home bias literature specific to sovereign debt underlines the assumption that it is harder for governments to default on their promises when most of the debt is held domestically. In such a scenario, government would rather choose not to default since the benefits could be offset by its harm on the domestic economy. Hence, in expec-

[3]These findings are not always consistent though. For example, using the same source of data as in Ongena et al. (2016), Altavilla et al. (2016) find evidence for moral suasion also in core Euro countries, which ex-post is hard to reconcile with the observation that these countries did not have any difficulty in rolling over their debts at the time.

tation of this by local agents, government debt will flow back to the host country in times of crisis (Broner et al., 2010). Analysing a vast database covering 191 countries, Gennaioli, Martin, and Rossi (2014a) show empirical patterns consistent with this prediction although they cannot differentiate between domestic and foreign bonds at the bank-level. In a recent paper, Brutti and Sauré (2016) present confirming evidence in the context of Eurozone crisis by demonstrating that reallocation was more intense for sovereign debt than the private one. Furthermore, debt of the crisis governments tended toward those banks whose countries were politically more powerful in the Euro area, implying that debt reallocation was mainly driven to discourage the troubled governments from declaring bankruptcy. By using a dataset covering the entire Eurozone crisis episode for 30 European countries at the bank-level, I complement and challenge these findings: I find that reallocation of sovereign debt indeed occurred in the Eurozone crisis; however this only holds for domestic banks as opposed to other domestic agents, which goes against the earlier prediction of Broner et al. (2010). Furthermore, compared to government debt, retail and corporate debt in bank balance-sheets equally suffered (if not more) from an increase in home bias in response to crisis, which is hard to reconcile with the earlier finding of Brutti and Sauré (2016) who only focus on the first part of the Eurozone crisis in their sample period with a limited coverage of European countries.[4]

A related literature focuses on the risk-shifting tendency of the undercapitalized banks. According to this argument, banks with low capital ratios prefer high-risk instruments such as the government bonds of crisis countries so that the shareholders would benefit from a resurrection of the country while their losses would be limited in case of a default. (Acharya and Steffen, 2015; Horváth et al., 2015). However, this argument does not necessarily explain why weak banks would especially risk-shift by accumulating domestic government bonds rather than the bonds of other governments struck by crisis. In line with Crosignani (2015), I find evidence that (potentially weak) banks located in crisis countries shift their sovereign portfolios more favourably towards other countries in crisis; but this behaviour is found to be much more prominent when it is the domestic government who is in crisis, indicating the need for a further investigation of the link between banks and domestic sovereign bond holdings.

2.2. Home bias in other markets

There is a massive literature on home bias in portfolio holdings of different asset classes. Most of this literature focuses on equity holdings (French and Poterba, 1991) whereas some recent

[4]Their sample period goes from 2007 to late-2011 and is mainly restricted to Eurozone countries with also some non-European countries such as Brazil and Mexico.

studies look at the regional biases in international bond portfolios of various country groups (Lane, 2005). Previous studies mainly revolve around three broad categorical explanations for home bias: exchange rate risk, transaction costs in financial markets and informational frictions (Coeurdacier and Rey, 2013). In the specific context of Europe, with the increasing financial integration and exchange rate stability over the years, a more realistic culprit for the recently sky-rocketing home bias would be the informational asymmetries.

Brennan and Cao (1997), for example, model the sensitivity to asset-related news when there is a difference between informational endowments of domestic and foreign agents. They illustrate that, in such a scenario, home bias would be positively associated with the negative news as foreign investors would try to infer the local information from past asset prices and react more to such news.[5] On a similar path, Van Nieuwerburgh and Veldkamp (2009) show that, in the existence of (even initially small) informational differences between foreign and domestic agents, costly information acquisition process may boost the agents' home bias. Lastly, Dziuda and Mondria (2012) demonstrate that, even in the existence of sophisticated investors such as investment funds, home bias may arise due to the fact that investors would be better at judging the performance of fund managers when they invest in local assets rather than foreign ones. Therefore, one might observe a home bias even in the portfolios of highly sophisticated institutions such as banks or mutual funds.

Following the intuition that informational frictions might lie behind the widely-observed home bias for various asset classes,[6] many researchers have empirically studied the effects of several forms of informational-distance on portfolio holdings. For instance, Coval and Moskowitz (1999, 2001) find that geographical proximity is crucial for US investors' portfolio composition and the risk-adjusted returns, even within the same country. Grinblatt and Keloharju (2001) discover that investors might be biased towards firms that are close to them in terms of physical location, culture and language of communication. Hau (2001) exemplifies a case in which professional traders located in Germany or in German-speaking cities make more profit in German stocks. Finally, Portes and Rey (2005) conclude that geographical distance matters for cross-border capital flows; however it mostly proxies the effects of other informational variables such as bank branches across countries or telephone call traffic. I contribute to this literature by demonstrating that informational proxies (such as geographical distance, bank branches and past merger announcements) have had a signif-

[5]Inspired by Brennan and Cao (1997), there is a stream of studies in the asset-pricing literature that detect the foreign investors' trend-following behavior. See Choe, Kho and Stulz (1999; 2005); Grinblatt and Keloharju (2000); Froot, Oconnell, and Seasholes (2001); Kim and Wei (2002); Griffin, Nardari, and Stulz (2004); Richards (2005); Edison and Warnock (2008).

[6]For further evidence on the informational advantage that domestic investors may hold vis-à-vis foreign investors, see Kang and Stulz (1997) and Kaufmann, Mehrez, and Schmukler (2005).

icant effect on European banks' sovereign portfolios during Eurozone crisis.

3. Data Description

The main body of data that I use in the paper comes from various stress-tests, transparency and recapitalization exercises that are undertaken by the European Banking Authority (EBA) over the course of 5 years for a large set of European banks covering 30 members of the European Economic Area (EEA). The first of these disclosures was undertaken by the Committee of European Banking Supervisors (CEBS), which was comprised of senior representatives of bank supervisory authorities and central banks of the European Union and later succeeded by the EBA. Its results were made public by national regulators at the time; however EBA does not provide the related data. Hence, this dataset was obtained from the Peterson Institute for International Economics while all other datasets were acquired from EBA.

Table 1 lists these exercises and the disclosure dates for each of them together with how many banks and which information dates were covered. 10 data time-points start from the first quarter of 2010 and goes all the way to the second quarter of 2015, thus covering the start, rise and fall of the Eurozone crisis. Sovereign bond holdings are reported for each data time-point while private credit exposures (corporate, retail, etc.) can be found for 6 of these. In each disclosure, the full country-breakdown of each bank's debt portfolio for up to 200 countries can be found.[7] However, to focus on the debt reallocation across Europe, only exposures to 30 EEA countries are included in the sample.

[Insert Table 1 near here]

The main banks involved in the exercises mostly stay the same even though some smaller banks are added and subtracted from one exercise to another. All exposures are consolidated at the parent bank level and each exercise involves banks with at least 65% of the total banking assets in Europe and 50% of the banking sector of each EEA member. Some studies have already explored the sovereign bond holdings in the datasets of earlier EBA disclosures (De Marco and Macchiavelli, 2015; Horváth et al., 2015); however, to the best of my knowledge, this is the most comprehensive dataset compiled with all the sovereign and private debt exposures of European banks in all the tests undertaken and made public by the EBA until now. Compared to other studies using proprietary datasets from European Central Bank (Ongena et al., 2016; Altavilla et al., 2016), EBA data cover banks from a

[7] Except the first disclosure undertaken by CEBS in which only exposures to 30 European countries can be found.

wider range of countries (including non-Eurozone) and documents finer granularity in terms of full country-breakdowns of sovereign exposures at bank-level.

I am mainly interested in what portion of a sovereign's total debt is held by a specific bank. Thus the main variable of interest ($SovereignPortion_{b,c,t}$) measures each bank's (b) nominal exposure to a certain country (c) at a certain time-point (t) divided by the total nominal exposure of all the banks for that country at that time. That is;

$$SovereignPortion_{b,c,t} = \frac{NominalExposure_{b,c,t}}{\sum_{b} NominalExposure_{b,c,t}}$$

It is important to note that this measure is independent of the valuation technique used for the bank-level sovereign exposures as long as all the banks apply the same methodology at a given point in time, which is the case in my sample as all disclosures are centrally directed and homogenized by the EBA. This helps me better quantify the relative distribution of sovereign debt across banks. Furthermore, by construction, $SovereignPortion_{b,c,t}$ does not depend on the price changes as these are automatically reflected in all banks' nominal exposures and thus does not change the particular portion that a specific bank holds out of the total debt. Therefore, it constitutes an ideal measure to understand the reallocation of sovereign debt over time.

In line with the mainstream literature on home bias (Ahearne, Griever, and Warnock, 2004; Coeurdacier and Rey, 2013), I also create an alternative variable that takes into account an optimal portion of sovereign debt that should be held by a bank according to a standard Capital Asset Pricing Model (CAPM). This variable ($SovereignPortionBias_{b,c,t}$) takes the difference between our main variable of interest ($SovereignPortion_{b,c,t}$) and the portion that is suggested by the CAPM model ($SovereignPortionCAPM_{b,t}$).[8] As conventional in the literature, this difference is standardized by the share of other banks' portfolios in the global portfolio ($1 - SovereignPortionCAPM_{b,t}$). That is;

$$SovereignPortionBias_{b,c,t} = \frac{SovereignPortion_{b,c,t} - SovereignPortionCAPM_{b,t}}{1 - SovereignPortionCAPM_{b,t}}$$

[8]Notice that CAPM concludes the optimal portion that a bank would hold in an equilibrium setting should depend only on the size of the bank's sovereign portfolio and the size of the global sovereign portfolio. Hence, it does not depend on the specific country of exposure (c).

where

$$SovereignPortionCAPM_{b,t} = \frac{\sum_{c} NominalExposure_{b,c,t}}{\sum_{b,c} NominalExposure_{b,c,t}}$$

If bias variable $SovereignPortionBias_{b,c,t}$ takes the value of 1, it means all of the country's debt is held by the specific bank, thus perfect home bias. If it is zero, that means the bank holds exactly the portion of the debt suggested by the CAPM model, thus no home bias.

For the later section of the study, I create the corresponding variables for retail and corporate ($RetailPortion_{b,c,t}$ & $CorporatePortion_{b,c,t}$) exposures separately (but exactly in the same way as described above) and then merge it with the sovereign exposure variables under a single variable name ($DebtPortion_{d,b,c,t}$) where (d) denotes the type of debt in consideration.

To construct the dummy variable $Crisis_{c,t}$, the daily yields of 10-year maturity bonds of 30 European countries are obtained from Datastream.[9] In the next step, I follow a similar approach to Brutti and Sauré (2016) and categorize a country as "in crisis" ($Crisis_{c,t}$) if a country is a Euro member and its average daily bond spreads (with respect to Germany) for the previous three months was above 400 basis points.[10]

To be able to differentiate between different types of creditors, a measure of sovereign holdings for non-bank agents is needed. Unfortunately, EBA datasets only contain information about banks. Hence, I resort to a country-level dataset compiled from various national sources by Merler and Pisani-Ferry (2012), which lists the portion of a country's total debt held by its resident banks and non-bank residents.[11] Observations cover 11 European countries[12] at quarterly intervals, starting from 1990s. For consistency, I choose the same period covered by the EBA dataset, from 2010-Q1 to 2014-Q4. For the panel estimations with this dataset, I create a dependent variable called $DomesticPortion_{c,k,t}$, which measures the portion of a country's (c) debt held by a certain domestic creditor (*k: ResidentsBanks* or *OtherResidents*) at a certain time-point (t).

[9]Bond yields for two countries (Estonia and Liechtenstein) are not available on Datastream; so these observations are dropped from the sample.

[10]Various robustness checks are conducted later by using different crisis definitions (See Section 4.6).

[11]Importantly for our purposes, other residents category does not include the public agencies or central banks, so we can assume that these are private non-bank residents.

[12]These are Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and United Kingdom. Data for Belgium and Finland can only be found annually; so I linearly interpolated the data to get quarterly values for these two countries.

To control for time-varying bank characteristics, I get the balance-sheet items from Bankscope for the corresponding banks in EBA datasets. In line with the recent literature (De Marco and Macchiavelli, 2015; Horváth et al., 2015; Ongena et al., 2016), I include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All bank-level characteristics are end-of-the-year values and included with a year lag with respect to the observation date (t).

Finally, to proxy the informational linkages across countries, I construct 3 different variables in line with the previous home bias literature (Portes, Rey, and Oh, 2001; Portes and Rey, 2005). First one, $CrossCountryDistance_{l,c}$, measures the geographical distance (in thousand kilometers) between the capital city of the bank's home country (l) and the capital city of the exposure country (c). Second one, $CrossCountryBranches_{l,c}$, represents the total number of bank branches (in thousands) in the exposure country of the bank which ultimately belong to a bank from its home country.[13] Finally, $CrossCountryMergers_{l,c}$ is the total number of bank mergers (in hundreds) that occured between the home country and the exposure country in the years starting from 1985 all the way up to pre-crisis period (2008) in the Europe. Geographical distance information is derived via MapQuest. The snapshot of banks' branch networks as of February, 2016, is acquired from SNL Financial[14] while the merger data come from SDC Platinum.

Table 2 gives summary statistics for these variables. It is important to note that for *SovereignPortion* variable, more than half of the observations contain zero values. However, these are meaningful zeros, implying that the bank does not have any exposure to that sovereign at that certain point in time. When the mean levels across general and domestic samples are compared, one can clearly see the inclination of the banks to hold a higher fraction of the government debt of their own countries. The same can also be said for retail debt (*RetailPortion*). When we compare different debt categories for domestic bank samples, we see that a bank on average holds a higher fraction of its country's retail debt

[13]This variable is created by taking all of the ultimate-parent banks located in 30 EEA countries available in SNL database, independent of whether the bank is included in EBA dataset or not. The purpose here is to capture the non-time-varying banking linkages across countries. Hence, it is important to consider the full sample available rather than only the restricted EBA sample. This data covers 137,284 bank branches in total which is 92% of all bank branches (149,242) in these countries, estimated using World Bank data for 2014 (see http://data.worldbank.org/indicator/FB.CBK.BRCH.P5).

[14]Unfortunately, the branch information is not available historically and SNL Financial only provides the most current data available. However, to the extent that the current data is representative of the non-time-varying cross-country banking linkages, it is reasonable to assume that estimates would not be biased in any particular direction. Additionally, $CrossCountryMergers_{l,c}$ variable overcomes this timing problem by providing pre-crisis picture of cross-country information linkages.

(0.164) than it holds its country's sovereign debt (0.126). This is very much consistent with the information asymmetry theory of home bias, predicting that -in general- informationally more sensitive assets (private debt) should suffer more from home bias than other more standardized assets (public debt) would do.

[Insert Table 2 near here]

4. Methodology & Results

4.1. Sovereign home bias during crisis

The first thing to capture is the effect of the crisis on the sovereign home bias of the European banks. Hence, the first specification is:

$$SovereignPortion_{l,b,c,t} = \beta_1(Crisis_{c,t} \times Domestic_{l,c}) + \beta_0 Domestic_{l,c} + \delta BankFin_{b,t} + \theta_b + \gamma_{c,t} + \lambda_{l,t} + \varepsilon_{l,b,c,t} \quad (1)$$

where (l) denotes the home country of the bank, (b) identifies the specific bank, (c) is for the country of exposure and (t) specifies the time dimension. All variables are constructed as previously explained in the Data Description. Controls include time-varying bank financials as well as various fixed effects at the levels of *Bank, HomeCountry*Time* and *Exposure-Country*Time*. Thus, the model controls for the overall effects of the crisis both at the home country and exposure country levels and *Crisis* dummy can only enter the regression in an interaction term. Additionally, $Domestic_{l,c}$ is a dummy variable which is equal to 1 if the bank's headquarters are located in the country of exposure (i.e, l=c). In this model, B_0 should give us an idea about the general level and significance of the sovereign home bias in European banks and B_1 measures the additional effect of the crisis on this home bias. Same model is also estimated with the alternative dependent variable with the CAPM adjustment ($SovereignPortionBias_{l,b,c,t}$).

Results are presented in in Table 3. Columns I-II confirm the previous literature that banks do have home bias in their sovereign debt holdings. It is economically meaningful as well at a level around 0.126, clearly illustrating that a bank holds a much bigger portion of a country's debt when it comes to its own country. Columns III-IV of the same table ratifies another observation that is compatible with the previous literature: crisis increases the sovereign home bias of domestic banks (Gennaioli et al., 2014a; Brutti and Sauré, 2016). The effect is economically huge: the portion of a country's debt held by a representative domes-

tic bank almost doubles in response to crisis.[15] Bank-level controls are mostly significant at the expected directions: larger banks (LogAssets) hold more sovereign debt; well-capitalised banks (Tier1/RWA) hold less; bank loans (Loan/Deposits) and sovereign debt act as substitutes. More interestingly, even though bank-level controls are no longer significant, main results hold even when we take into account the relative portfolio size of the banks according to a standard CAPM model (see columns V-VIII).

[Insert Table 3 near here]

4.2. Risk-shifting in crisis-country banks

Findings in Table 3 are compatible with information asymmetry, secondary markets or moral suasion stories of the home bias. One may also argue that banks in crisis countries are especially weakly-capitalised, which drives them to invest more in their home country bonds to benefit from shifting the risk onto their creditors (Crosignani, 2015). However, if this is the case, one would expect these banks to also invest in other high-risk countries.

To check for the risk-shifting tendency of banks located in troubled countries, I estimate the following model and separate the home bias phenomenon from the risk-shifting story:

$$\begin{aligned} SovereignPortion_{l,b,c,t} = \beta_2(Domestic_{l,c} \times Crisis_{c,t} \times StressedBank_{l,t}) \\ + \beta_1(Crisis_{c,t} \times StressedBank_{l,t}) + \beta_0 Domestic_{l,c} + \delta BankFin_{b,t} \\ + \theta_b + \gamma_{c,t} + \lambda_{l,t} + \varepsilon_{l,b,c,t} \quad (2) \end{aligned}$$

where $StressedBank_{l,t}$ is a dummy variable representing those observations in which the home country of the bank (l) is considered to be in crisis at a certain time (t). All other variables are constructed as previously explained. Due to time-varying fixed effects at the home country and exposure country levels, *Crisis* and *StressedBank* dummies can only enter the regression in interaction with other variables.[16]

Model 2 checks for risk-shifting behaviour of (potentially weak) banks located in crisis countries, in line with Crosignani (2015). If the rising home bias in crisis countries is mainly due to risk-shifting, one should observe a similar tendency of crisis-country banks to shift their portfolios towards all crisis countries no matter if it is domestic or foreign. This is

[15] This result is also compatible with the recent bank lending literature showing that, during a financial crisis, international banks demonstrate a stronger home bias in terms of syndicated loan issuance (Giannetti and Laeven, 2012) or cut credit less in markets that are geographically close (De Haas and Van Horen, 2013).

[16] For conciseness, additional two-way interactions of *Domestic*Crisis* and *Domestic*StressedBank* are dropped from the estimation since coefficients are both insignificant and their inclusion does not change the results in any meaningful way.

captured by β_1. On the other hand, β_2 measures the additional effect of crisis on domestic exposures that cannot be explained by the general level of risk-shifting in these crisis-country banks.

Columns I-II-V-VI in Table 4 confirm the earlier predictions by showing that crisis-country banks actually expand their relative exposure to all other crisis countries, potentially risk-shifting. However, as illustrated in columns III-IV-VII-VIII, this behaviour is much heavier for the home exposures of these banks, thus indicating that risk-shifting contributes to the rising home bias in crisis countries but is not even nearly a sufficient explanation. The magnitude of response to a crisis in home country is more than tenfold higher than that to a crisis in a foreign country (0.101 vs 0.009). Indeed, banks located in troubled countries have a special preference for their own government bonds which goes much beyond their risk-shifting incentives.

[Insert Table 4 near here]

4.3. Secondary markets and redenomination risk

As discussed previously, secondary markets hypothesis states that the increase in banks' sovereign home bias might be related to the presumption that government bonds would be more valuable (due to governments being less willing to default) when they are held domestically. Thus, in the existence of well-functioning secondary markets, debt would naturally flow from foreign to domestic agents. In addition, if redenomination (Eurozone break-up) risk was particularly high for crisis countries, this may have pushed up the selling pressure especially for the foreign investors since they may risk ending up with a currency mismatch between their assets and liabilities in case of a crisis country declaring its exit from the Eurosystem (Battistini, Pagano, and Simonelli, 2014).

However, neither of these channels is specific to banks and, if they were prominent, one could expect to see a rising home bias not only for domestic banks but also for other types of agents in crisis countries. Hence, I differentiate the effect of the crisis on the home bias of different domestic agents operating in the same economy. For this purpose, I use the Bruegel dataset at country-level and estimate the following model:

$$DomesticPortion_{c,k,t} = \beta_1(ResidentBanks_k \times Crisis_{c,t}) + \lambda_k + \gamma_{c,t} + \varepsilon_{c,k,t} \quad (3)$$

where (c) is for the country, (k) is for the creditor type and (t) is for different quarters of the year. $ResidentBanks_k$ is a dummy variable that is equal to 1 if the creditor (k) of the country is its resident banks and zero if it is other private non-bank residents. All other

variables are constructed as previously explained. Controls also include *Country*Time* fixed effects, which should absorb all the time-varying country characteristics.[17] The coefficient of interest is β_1, which signals whether or not domestic banks behaved somewhat differently compared to other domestic agents.

Table 5 compares the responses of two types of domestic agents during crisis. Although statistically insignificant, Columns I-II indicate that the crisis leads domestic agents to decrease their home bias on average, which is counter-intuitive with respect our earlier finding. However, when I separate the additional effect of being a resident bank, columns III-IV confirm that resident banks in crisis countries are more likely to increase their home bias whereas other non-bank residents seem to have moved in the opposite direction. The conclusion holds even when overall shocks at the *Country*Time* level are controlled for (column V). Hence, this finding goes against the secondary-markets hypothesis arguing that, during crisis times, government debt should flow back to the home country irrespective of the resident type since government would then prefer keeping its promise not to harm the domestic economy. Although it could be argued that governments "care" more about the banking sector and hence it should be more reasonable that sovereign debt flows to resident banks, one would still expect to see a somewhat positive response for other non-bank residents as well, which does not seem to be visible at all in our findings.

[Insert Table 5 near here]

Furthermore, even though the Eurozone could be said to have come to the verge of a break-up in the midst of the crisis, it is not easy to conclude that redenomination risk was instrumental in banks' sovereign exposure behaviour since it does not seem to have affected other types of investors resident in the same troubled countries. On the other hand, it is noteworthy that, since different investors may tend towards different kinds of domestic assets to hedge for the currency risk, the ideal setting to test for the redenomination risk would be the case in which we could see the creditor decomposition (bank vs non-bank) of all asset classes rather than only that of sovereign debt. However, in the absence of a more comprehensive dataset and a legitimate counter-argument for why non-bank residents should especially avoid hedging via government bonds, it is safe to say that redenomination risk was not substantial.

[17] Notice that with the creditor and country-time fixed effects, *ResidentBanks* and *Crisis* dummies can only enter the regression in interaction form.

4.4. Sovereign vs. private debt home bias

Most of the recent literature has focused on the European banks' sovereing home bias although this behaviour might have been just a subobservation of a more general phenomenon. Thus, I would also like to compare the effect of the crisis on home bias across various assets classes held by the European banks. For this purpose, I use a more generalized model as in the following to be able to differentiate the home bias across asset classes in both normal and crisis times:

$$\begin{aligned} DebtPortion_{d,l,b,c,t} = \beta_3(Sovereign_d \times Crisis_{c,t} \times Domestic_{l,c}) + \beta_2(Crisis_{c,t} \times Domestic_{l,c}) \\ + \beta_1(Sovereign_d \times Domestic_{l,c}) + \beta_0(Retail_d \times Domestic_{l,c}) + \delta BankFin_{b,t} \\ + \zeta_d + \theta_b + \gamma_{c,t} + \lambda_{l,t} + \varepsilon_{d,l,b,c,t} \quad (4) \end{aligned}$$

where $Sovereign_d$ and $Retail_d$ are dummy variables indicating the respective asset classes. All other variables are constructed as previously explained.[18] The coefficients B_1 and B_0 should give us an idea about the home bias in these different asset classes in general. B_2 reflects the overall effect of the crisis on the home bias for both asset classes and B_3 should tell us if the increase in home bias was stronger for sovereign debt, as would be suggested by the other competing theories of home bias (moral suasion and secondary market theory).

To get a better sense of whether sovereign debt was the only asset that has suffered from home bias during crisis, Table 6 draws the following comparison. Columns I-II confirm that there is a significant home bias across both assets classes together. When I separate the home bias for different assets, columns III-IV show that the magnitude of general home bias for retail debt (0.171) is more than 30 percent higher than the one for sovereign debt (0.127) and the difference between these two coefficients is statistically significant, which is perfectly in line with the information asymmetry theory of home bias. Compared to standard products such as government securities, informationally more sensitive assets such as retail debt should be held more by the domestic agents who have an advantage in reaching the relevant information for such assets (Portes et al., 2001; Portes and Rey, 2005).

[Insert Table 6 near here]

The remaining columns in Table 6 provide even more interesting results. Columns V-VI show that crisis has a positively significant effect on home bias for both asset classes. Columns VII-VIII shed light on the additional response of the sovereign debt to crisis,

[18] To focus on the main coefficients of interest, the two-way interaction of *Sovereign*Crisis* is dropped from the estimation since the coefficient is statistically insignificant and its inclusion does not change the results in any meaningful way.

but there seems to be none. At best, this additional effect is negative (-0.032, though not statistically significant), meaning that it was the retail debt that suffered more intensely from home bias in times of crisis. Obviously, this finding is again consistent with the expectation that, during crisis episodes that are usually associated with rising informational frictions, informationally sensitive assets should experience a much deeper reallocation from foreign to domestic agents. For robustness, the same analysis is repeated with the corporate debt in Table R.6. Not surprisingly, results are very much in line: in general, European banks have a higher home bias in their corporate exposures and, compared to sovereign debt, this bias rises at least equally in response to a crisis in a country. Overall, it seems that the recent sovereign debt reallocation in Europe could be a part of a more general phenomenon (such as informational frictions) that may have influenced all asset classes simultaneously.

[Insert Table R.6 near here]

4.5. Effect of informational distance on banks' sovereign exposure

It is already well established in the literature that the proximity to the borrower matters for the banks' lending behaviour and it usually determines the amount of soft information that the bank could gather to serve its customers.[19] Of course, one could think that the government bond markets are not necessarily the kind that soft information would matter the most. Indicators (such as tax revenue or fiscal balance) showing the strength of government's ability to pay back its debt are publicly available and easily accessible by market participants. Nevertheless, an interesting feature of the government debt markets is that, while corporate bankruptcy is always about the (in)ability of a company to repay, a sovereign default is -in most cases- a political decision and directly related to the degree of governing party's willingness to cut back government spending or increase tax rates. This crucial difference between corporate and sovereign debt arises due to the lack of a legal mechanism to enforce repayment on sovereigns (Panizza, Sturzenegger, and Zettelmeyer, 2009) and makes it especially important in times of stress to have insider information on government's willingness to honour its promises or country's political capacity to endure further budget cuts. Such soft information could be obtained via domestic banks' local/political connections or simply being more familiar with the country, its daily news and local economic and political climate.[20] In that respect, Butler (2008) illustrates a case in which local investment banks

[19] See, among many others, Mian (2006), Alessandrini, Presbitero, and Zazzaro (2009) and Agarwal and Hauswald (2010).

[20] Here, I interpret familiarity as an accumulated informational advantage rather than a behavioral bias although the previous literature is somewhat ambigious on this (see Huberman, 2001).

underwriting municipal bonds have comparative advantage in accessing and assessing soft information, especially when the bond is risky.

What is then so special about domestic banks over other types of domestic agents? First of all, domestic banks are the main players in the government debt markets. Figure 3 clearly illustrates that even before the crisis in Euro periphery, domestic banks held the highest share of sovereign debt than all other domestic agents combined. This could give the banks a comparative edge in pricing of government securities.[21] Secondly, banks are natural information-gatherers for their economies. They transact with almost every sector of the domestic businesses and gain in-advance information on how well the overall economy may perform over the coming months/quarters, which would have a tremendous effect over government's ability to raise tax revenues and pay back its debt. Lastly, banks are the agents with the greatest access to liquidity (via central banks) in times of financial crises. Hence, in a liquidity crunch, governments may find it easier to signal their intentions/plans to local banks than any other local agent.

[Insert Figure 4 near here]
[Insert Figure 5 near here]

In light of the above discussion, I expect cross-country informational linkages to be important for the European banks' sovereign exposures both at home and abroad. Figure 4 pictures the bank branch network in 30 EEA countries and it seems that Eurozone crisis struck the countries located in the outer sphere of this network, which may have caused these sovereigns to be especially susceptible to informational frictions. Additionally, larger nodes in crisis countries imply that their banking sector is dominated by the domestic banks which might be the reason why debt flew back to these countries in large quantities. Figure 5 with bank merger network tells more or less the same story. Hence, I go on to formally estimate the effect of informational distance on European banks' behaviour towards crisis countries:

$$SovereignPortion_{l,b,c,t} = \beta_1(CrossCountryDistance_{l,c} \times Crisis_{c,t}) + \delta BankFin_{b,t} + \theta_b + \gamma_{c,t} + \lambda_{l,t} + \mu_{l,c} + \varepsilon_{l,b,c,t} \quad (5)$$

where, in addition to the previous ones, I also include fixed effects at the level of interaction between home country and exposure country ($\mu_{l,c}$) so that all non-time-varying structural cross-country linkages can be implicitly controlled. Hence, $CrossCountryDistance_{l,c}$

[21] Home bias might also arise simply due to domestic banks' responsibility to act as primary dealers or market makers in the sovereign debt markets. Ongena et al. (2016) provide contrary evidence that most of the market makers in periphery countries during crisis were foreign banks and this did not have any effect on domestic banks' home bias.

only enters the regression in interaction. Alternatively, I use $CrossCountryBranches_{l,c}$ and $CrossCountryMergers_{l,c}$ as proxies that would capture the informational channel during crisis.

Table 7 presents the effects of informational distance on banks' exposures to crisis countries. First thing to notice is that the explanatory power (adjusted-r-square) of the model massively increases due to the fixed effects at HomeCountry*ExposureCountry level, implying that cross-country linkages matter substantially for the European banks' sovereign portfolios. Although geography could be thought of as a noisy proxy for informational linkages across countries,[22] especially in Europe given the fully open borders and easy transportation, columns I-II illustrate that physical distance has a significant negative effect on bank exposures in times of crisis. One standard deviation increase in distance (0.83) lowers a bank's sovereign portion holding of a crisis country by almost one percent. Given that the sample mean of sovereign portion is 0.012 in the full sample, the effect is quite sizable and economically meaningful. Similarly, branch and merger connections, which are better proxies for information, are also significant and positively associated with the banks' exposures to crisis countries (see columns III-VI).

[Insert Table 7 near here]

However, full sample in these estimations also contain domestic observations, which are highly correlated with information variables; and thus may bias the results if there is a moral suasion or secondary market effect in these domestic observations. Thus, I take a much more conservative approach and drop all the domestic observations from the sample. All remaining observations denote the foreign exposures of the banks, hence -in theory- must be independent of moral suasion or secondary market effects. Notice that this is a very conservative approach in the sense that the informational linkages that this paper argued for so far have mostly emphasised the link between governments and their domestic banks. Furthermore, there is the possibility of "reverse moral suasion" on foreign banks, in which the national regulators may have forced their banks to specifically drop their exposures to the troubled countries (Ongena et al., 2016). In that case, such pressure would be most pronounced for better-connected banks which, even before the crisis, may have had higher exposures to crisis countries. Thus, focusing only on foreign bank observations would severely underestimate the importance of information channel during crisis.

With the above concerns in mind, columns VII-VIII in Table 7 show that the effect of geographical distance becomes statistically indistinguisable from zero when we only consider the

[22] One could also think that distance should be positively associated with asset holdings since more distant countries would offer better diversification benefits due to the lower correlation in business cycles across countries (Portes and Rey, 2005).

exposures of foreign banks, which is not surprising given the noisy nature of this proxy. On the other hand, columns IX-XII confirm that branch and merger variables are still influential in the behaviour of foreign banks towards crisis countries. Although statistical significance goes down in the subsample, magnitude of the coefficients goes up. One standard deviation increase in *CrossCountryBranches* (1.86) shoots up the sovereign portion by more than 0.9 percent, which is sizable given the sample average of 1.2 percent for *SovereignPortion*. Independent of alternative explanations of home bias, this finding constitutes a direct and strong evidence for the role of informational frictions on debt reallocation in times of crisis.

4.6. Further analysis and policy implications

The first thing that comes to mind is whether the estimations are robust to reasonable changes in crisis definition. Table 8 and Table 9 present all the main results with crisis thresholds of 300 and 500 basis points for bond spreads instead of my main definition of 400bps. All the main results still hold although, expectedly, they get weaker with a higher threshold and stronger with a lower threshold.

[Insert Table 8 near here]
[Insert Table 9 near here]

Secondly, it might be the case that a country could get into a crisis faster than a three-month period, which is the rolling window that I use to compute the average spreads for each time period (t). Instead, Table 10 shows that results are also robust to the choice of a shorter rolling period for the average bond spreads.

[Insert Table 10 near here]

Thirdly, by choosing a threshold, the assumption was that sovereign risk must have a non-linear effect on debt reallocation. That is, debt reallocation should occur only at the very peak levels of sovereign stress. However, this condition could be relaxed as well. Therefore, instead of using a crisis definition, Table 11 presents the main results with a continous *Spreads* variable. It seems that all of the interpretations stay the same except the evidence of risk-shifting disappearing in column 4.

[Insert Table 11 near here]

These findings clearly challenge the recent literature of Eurozone studies focusing solely on the home bias in sovereign debt. One might argue that, in the age of technology and well-integrated markets such as in Europe, information must be cheap to attain; so huge

asymmetries in the markets should not arise. However, the theoretical literature illustrates that even initially-small differences in informational standings of domestic and foreign agents may lead them to focus on these differences rather than spending effort to get the information related to foreign assets (Van Nieuwerburgh and Veldkamp, 2009). Furthermore, recent studies on the sovereign credit risk prices in the Eurozone provide evidence that, at the peak of the crisis, there were great discrepancies between bond yields (or CDS spreads) and macro fundamentals of the countries in the Euro periphery, which is interpreted as a sign of market panic (De Grauwe and Ji, 2013; Saka et al., 2015). In such circumstances, it is not unreasonable to expect domestic or government-related banks to benefit from their superior informational position and collect sovereign bonds while foreign banks were leaving the debt market in rush. In fact, some studies already show that banks that loaded up periphery country bonds during crisis benefited from this as the crisis pressures eased (Acharya, Eisert, Eufinger, and Hirsch, 2016b).

Another counter-argument might be that there is a growing literature on how increasing sovereign exposures had negative spillovers on private lending of the European banks, which may signal that sovereign exposure behaviour was partly involuntary for these banks (Acharya et al., 2016a; Altavilla et al., 2016; Popov and Van Horen, 2015). Still, Broner, Erce, Martin, and Ventura (2014) clearly illustrate that, in the existence of frictions in financial markets, sovereign exposures may crowd out private lending without necessarily implying an involuntary or forced behaviour on the part of banks. Additionally, some recent studies that argue in favor of moral suasion do not even find any negative effect of sovereign exposures on private lending (Ongena et al., 2016).

As a key policy conclusion: if information channel gets active between governments and their domestic banks in the midst of a crisis, this may be considered as a stabilizing force compared to a situation where even domestic banks would rush out of the market and governments would find it impossible to rollover their debt. Then further policy discussions may also focus on increasing transparency in the sovereign debt market, especially in times of crisis, rather than merely shifting the regulatory power from national to supranational institutions or coming up with various innovations of debt issuance in order to cut off the diabolic loop between sovereigns and their banks (see Brunnermeier, Garicano, Lane, Pagano, Reis, Santos, Thesmar, Van Nieuwerburgh, and Vayanos, 2016).

5. Conclusion

In this paper, deviating from the recent literature on rising sovereign debt home bias across European banks, it is argued that this is not a surprising phenomenon if one takes into

account one of the most conventional (albeit lately-forgotten) theories of the home bias in asset markets: informational frictions.

By taking a global portfolio approach and using a novel bank-level dataset compiled from various stress-tests, transparency and capital exercises of the European Banking Authority (EBA), I show that home bias increased and sovereign debt was indeed reallocated from foreign to domestic banks at the peak of the crisis. Though it cannot fully explain the rising home bias in response to crisis, risk-shifting tendency of crisis-country banks seems to have a contribution. In contrast with the secondary market theory of sovereign home bias, this reallocation was not visible at all for the domestic agents other than banks, which is compatible with the information asymmetry theory of home bias given the informational advantages that banks enjoy in comparison to other local agents over sovereign debt of their local governments. Additionally, I demonstrate that, in response to crisis, private forms of debt (retail and corporate) in bank balance sheets have experienced an equally large (if not larger) jump in home bias than the one observed for public debt, which is in sharp contradiction with the moral suasion story unless one assumes retail/corporate borrowers can somehow force the domestic banks to lend to them. On the other hand, this finding is exactly what one would expect from informationally more sensitive assets (such as private debt) if crisis episodes were associated with informational frictions. Finally, I present a clear information channel and demonstrate that foreign banks informationally better-linked to crisis countries have relatively increased their exposures during crisis.

If the information channel was operational, as argued in this paper, it is expected that the reallocation would be concentrated on banks that were closely linked to the government. Hence, the conclusions of the recent studies arguing in favour of moral suasion based on positive correlations between government-relatedness of the banks and their domestic bond holdings might be biased unless they could control for the apparent informational linkages between the two. More research is needed to differentiate these two channels. On the other hand, future policy discussions may benefit from focusing on increasing transparency in the sovereign debt market rather than merely trying to shift the regulatory mechanisms from national to supranational institutions or coming up with various innovations of debt issuance in order to overcome the so-called doom loop between sovereigns and banks.

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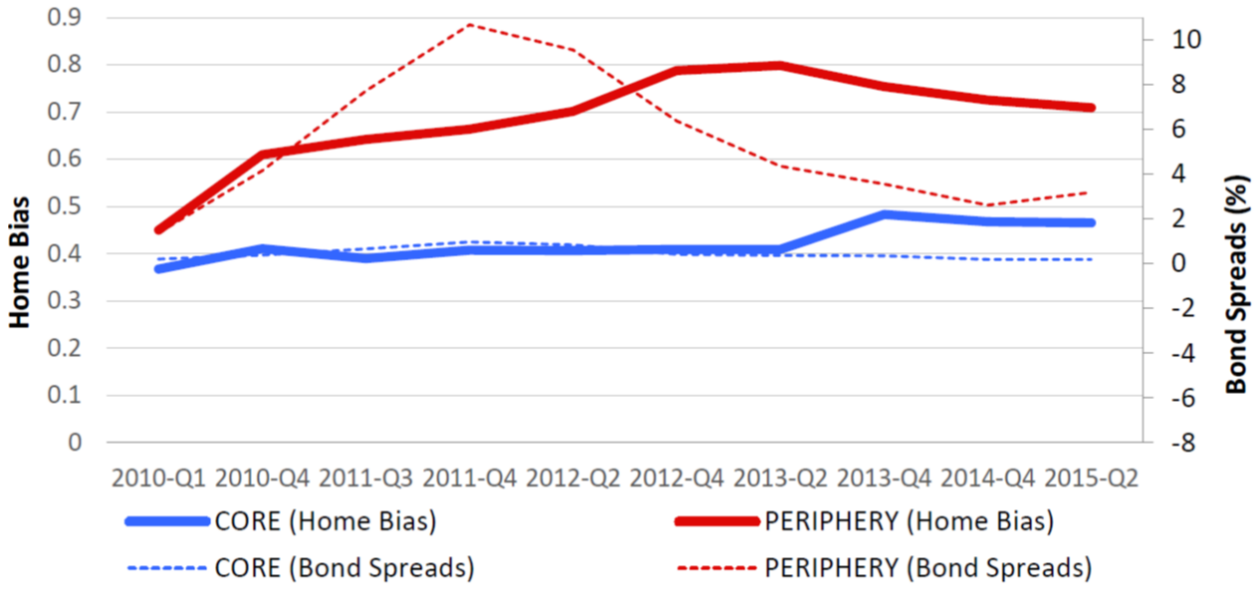

Fig. 1. **Home bias in core and periphery Euro countries during crisis.** The graph shows simple country averages of home bias and bond spreads for each country group. Home Bias is defined as the portion of the total sovereign debt of a country held by its domestic banks. Bond Spreads are computed as the average daily bond spreads for a country (with respect to Germany) over the 3-month period before each observation date. Sovereign bond exposure data come from various stress-tests, transparency and recapitalization exercises undertaken by the European Banking Authority (EBA) and include 10 observation dates from 2010-Quarter1 to 2015-Quarter2 (see Table 1). Bond yields are obtained from Datastream. Core (non-crisis) countries: Austria, Belgium, Finland, France, Germany and Netherlands. Periphery (crisis) countries: Greece, Ireland, Italy, Portugal, Spain.

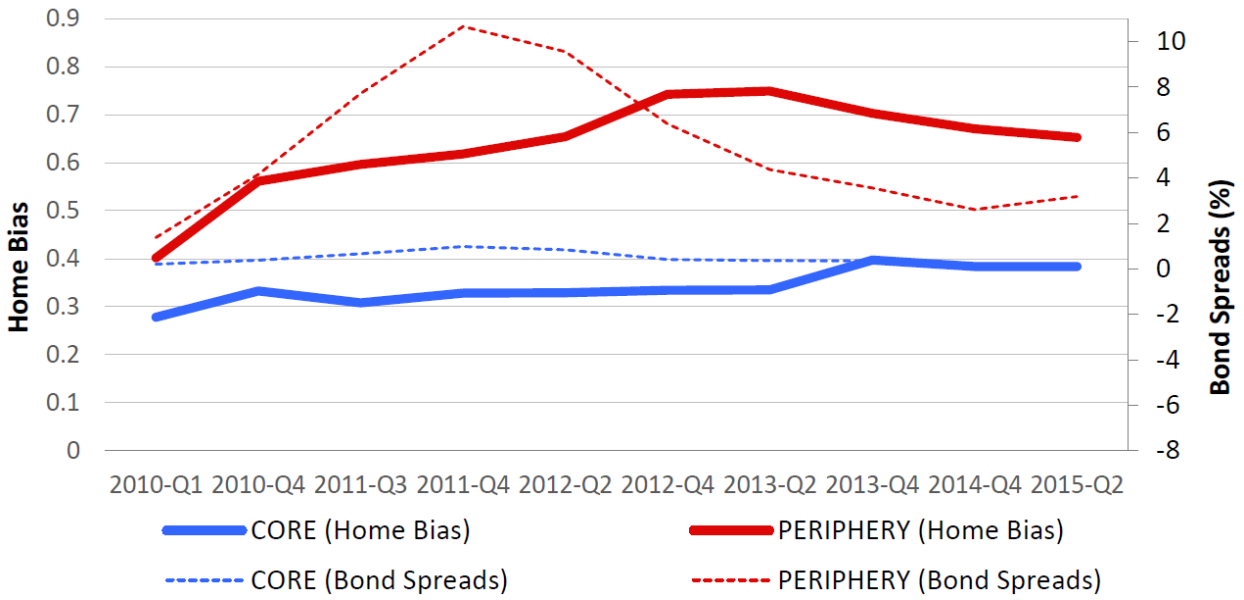

Fig. 2. **Home bias (CAPM-adjusted) in core and periphery Euro countries during crisis.** The graph shows simple country averages of home bias and bond spreads for each country group. Home Bias is defined as the portion of the total sovereign debt of a country held by its domestic banks, after taking into account the portfolio size of these domestic banks according to a standard portfolio (CAPM) model (see the Data Description). Bond Spreads are computed as the average daily bond spreads for a country (with respect to Germany) over the 3-month period before each observation date. Sovereign bond exposure data come from various stress-tests, transparency and recapitalization exercises undertaken by the European Banking Authority (EBA) and include 10 observation dates from 2010-Quarter1 to 2015-Quarter2 (see Table 1). Bond yields are obtained from Datastream. Core (non-crisis) countries: Austria, Belgium, Finland, France, Germany and Netherlands. Periphery (crisis) countries: Greece, Ireland, Italy, Portugal, Spain.

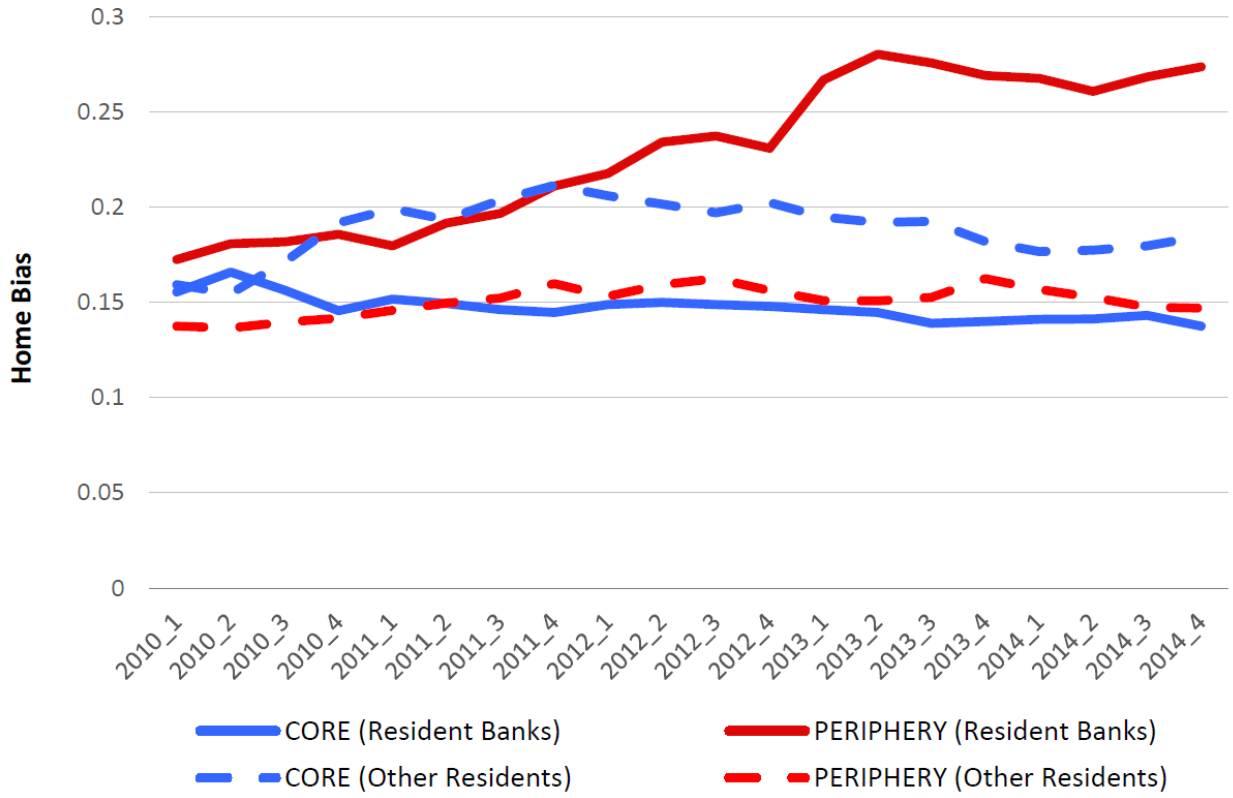

Fig. 3. **Home bias for resident banks and non-bank residents during crisis.** The graph shows simple country averages of home bias separately for resident banks and non-bank residents of each country in the group (core vs. periphery). Home Bias is defined as the portion of the total sovereign debt of a country held by a particular resident group. Sovereign debt exposures come from the dataset compiled from various national sources by Merler and Pisani-Ferry (2012) and include quarterly observations from 2010-Quarter1 to 2014-Quarter4. Core (non-crisis) countries: Belgium, Finland, France, Germany and Netherlands. Periphery (crisis) countries: Greece, Ireland, Italy, Portugal, Spain. Data for Belgium and Finland can only be found annually; so these data are linearly interpolated in order to obtain quarterly values.

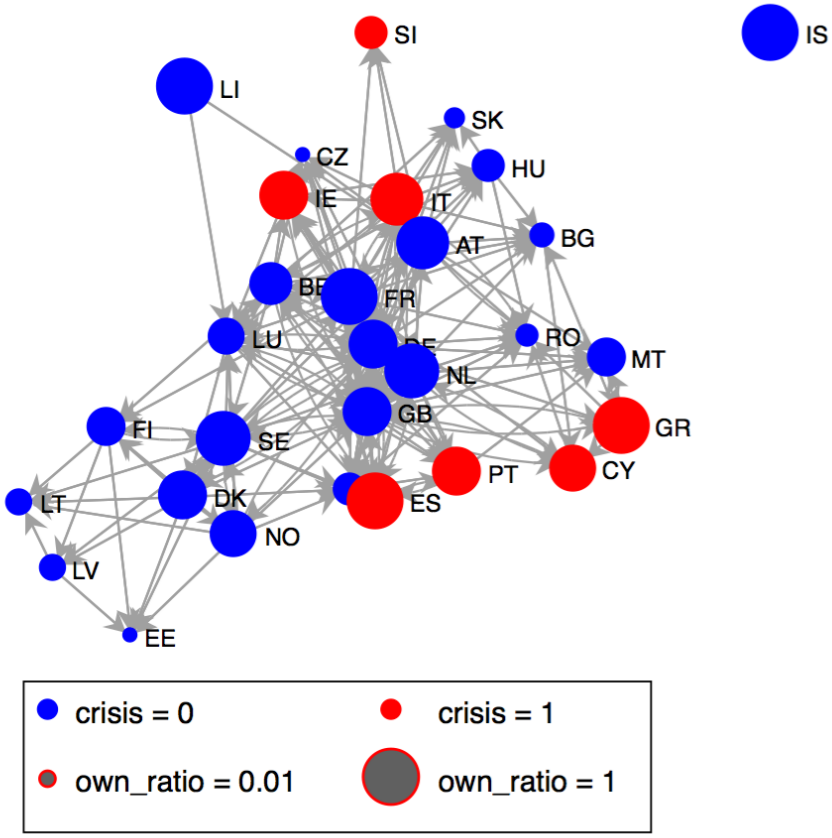

Fig. 4. **Bank branch network across European countries.** The graph shows a simple network map for all the bank branch connections across 30 EEA countries. *Crisis* countries (Greece, Cyprus, Ireland, Portugal, Italy, Slovenia and Spain) are in red and others are in blue. Each arrow represents a connection between two countries with the direction of the arrow pointing from home country towards the host. Nodes are placed via multidimensional scaling procedure with a random component and the size of the nodes (*own_ratio*) represents the percantage of the total branches in a country that belongs to domestic banks. Bank branch data come from SNL Financial as of February, 2016.

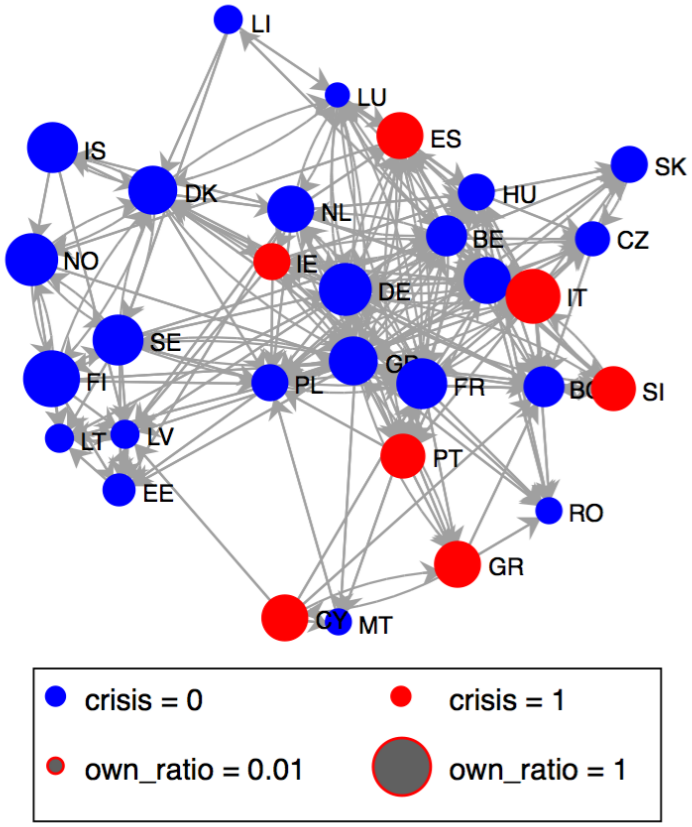

Fig. 5. **Bank merger network across European countries.** The graph shows a simple network map for all the bank merger connections across 30 EEA countries. *Crisis* countries (Greece, Cyprus, Ireland, Portugal, Italy, Slovenia and Spain) are in red and others are in blue. Each arrow represents a connection between two countries with the direction of the arrow pointing from home country towards the host. Nodes are placed via multidimensional scaling procedure with a random component and the size of the nodes (*own_ratio*) represents the percantage of the total mergers in a country that belongs to domestic banks. Bank merger data come from SDC Platinum and cover the years between 1985 and 2008.

Disclosure date	*Disclosure name*	*Information date*	*Number of banks covered*	*Type of credit disclosure*
23/07/2010	2010 EU-wide stress testing exercise (CEBS)	2010-Q1	91	Sovereign
15/07/2011	2011 EU-wide stress testing exercise (EBA)	2010-Q4	90	Sovereign & Private
08/12/2011	EU Capital exercise 2011 (EBA)	2011-Q3	65	Sovereign
03/10/2012	EU Capital exercise 2012 (EBA)	2011-Q4 & 2012-Q2	62	Sovereign
16/12/2013	2013 EU-wide transparency exercise (EBA)	2012-Q4 & 2013-Q2	64	Sovereign & Private
26/10/2014	2014 EU-wide stress testing exercise (EBA)	2013-Q4	123	Sovereign & Private
24/11/2015	2015 EU-wide transparency exercise (EBA)	2014-Q4 & 2015-Q2	105	Sovereign & Private

Table 1: **Data disclosure details from European Banking Authority (EBA).** The table lists the disclosures of various exercise results as announced by the European Banking Authority (EBA). CEBS refers to the Committee of European Banking Supervisors, which was comprised of senior representatives of bank supervisory authorities and central banks of the European Union and later succeeded by the EBA. 2010 EU-wide stress testing exercise was conducted by the CEBS and made public by national regulators; however EBA does not provide the related data. Hence, this dataset was obtained from the Peterson Institute for International Economics while all other datasets were acquired from EBA. Private credit refers to the corporate and retail credit exposure of the banks covered in the respective datasets. Information date refers to the data time-points in each disclosure for which the values of bank credit positions can be found.

Variables	*Mean*	*Median*	*Std. Deviation*	*Min*	*Max*	*Observations*	*Source*
SovereignPortion	0.012	0	0.047	0	0.973	23,268	EBA
SovereignPortionBias	0	-0.004	0.047	-0.076	0.972	23,268	EBA
RetailPortion	0.012	0	0.070	0	1	13,665	EBA
SovereignPortion (Domestic)	0.126	0.092	0.128	0	0.841	831	EBA
SovereignPortionBias (Domestic)	0.115	0.072	0.128	-0.014	0.841	831	EBA
RetailPortion (Domestic)	0.164	0.075	0.208	0	1	497	EBA
DomesticPortion (ResidentBanks)	0.179	0.164	0.098	0.008	0.451	207	Bruegel
DomesticPortion (OtherResidents)	0.194	0.212	0.121	0.002	0.415	207	Bruegel
Bond Spreads (in basis points)	2.54	1.44	3.35	-0.96	28.70	280	Datastream
Crisis (Spread > 400bps)	0.12	0	0.33	0	1	280	Datastream
CrossCountryDistance (in thousand kms)	1.45	1.36	0.83	0	4.88	616	MapQuest
CrossCountryBranches (in thousand branches)	0.22	0	1.86	0	28.72	616	SNL Financial
CrossCountryMergers (in hundred announcements)	0.05	0	0.34	0	6.10	616	SDC Platinum
LogAssets	11.83	11.79	1.41	8.33	14.59	480	Bankscope
Tier1/RWA (percentage)	12.27	11.60	4.42	-6.10	44.02	480	Bankscope
Loans/Deposits (percentage)	92.91	89.10	34.38	21.13	269.84	480	Bankscope

Table 2: **Summary statistics for main variables.** The table lists the variables used in the main regressions. *SovereignPortion* is the portion of the total sovereign debt of a country held by a specific bank. *SovereignPortionBias* is the portion of total sovereign debt of a country held by a specific bank, after adjusting for a standard CAPM model (see the Data Description). *RetailPortion* is the portion of the total retail debt in a country held by a specific bank. Domestic in parantheses denotes the observations where the country of exposure is the same as the home country of the bank. *DomesticPortion* is the portion of the overall sovereign debt of a country held by domestic agents, seperately for *ResidentBanks* and *OtherResidents*. *Bond Spreads* are the spreads (in basis points) on 10-year maturity bond for each country in the sample (with respect to 10-year German bond) averaged over three-months daily values before each observation date. *Crisis* is a dummy variable which is equal to 1 if a Euro country's bond spread (with respect to Germany) is above 400 basis points at an observation date. *CrossCountryDistance* is the geographical distance (in thousand kilometers) between the capital city of the bank's home country and the capital city of the bank's exposure country. *CrossCountryBranches* is the total number of bank branches (in thousands) in the exposure country of the bank which ultimately belong to a bank from its home country. *CrossCountryMergers* is the total number of completed bank merger announcements (in hundreds) over the years 1985-2008 in which the acquiror is from the bank's home country and the target is from the bank's exposure country. *LogAssets* is the logarithm of the bank's total assets (originally in million Euros). *Tier1/RWA* is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets. *Loans/Deposits* is the net loans divided by bank's customer deposits. All bank-level characteristics from Bankscope are reported with a year lag with respect to the observation date. The last column shows the source of the related data used for computations of each variable.

Dependent Variable:	*SovereignPortion*				*SovereignPortionBias*			
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
*Domestic*Crisis*			0.110***	0.108***			0.110***	0.108***
			[3.72]	[3.56]			[3.71]	[3.55]
Domestic	0.126***	0.126***	0.113***	0.112***	0.127***	0.128***	0.114***	0.114***
	[10.39]	[10.06]	[9.31]	[8.84]	[10.47]	[10.14]	[9.39]	[8.91]
LogAssets		0.011***		0.011***		-0.000		-0.000
		[2.98]		[2.98]		[-0.03]		[-0.03]
Tier1/RWA		-0.001**		-0.001**		-0.000**		-0.000**
		[-2.26]		[-2.26]		[-1.99]		[-1.99]
Loans/Deposits		-0.000**		-0.000**		-0.000		-0.000
		[-2.13]		[-2.13]		[-0.10]		[-0.10]
Fixed Effects								
Bank	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Adj-R-sq	0.26	0.25	0.28	0.27	0.26	0.25	0.27	0.27
N	23268	20552	23268	20552	23268	20552	23268	20552

Table 3: **Sovereign debt reallocation across European banks during crisis.** The table summarizes the results of the equation (1) with dependent variables *SovereignPortion* (I-IV) and *SovereignPortionBias* (V-VIII) estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. *SovereignPortion* is the portion of the total bank-debt of a sovereign held by a specific bank. *SovereignPortionBias* is the portion of total bank-debt of a sovereign held by a specific bank, after adjusting for a standard CAPM model (see the Data Description). *Domestic* is a dummy variable equal to 1 only if the country of exposure is the same as the home country of the bank. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. Bank-level Controls include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Bank-level Controls come from Bankscope and are used with a year lag. Sovereign bond holding data come from various exercises of the European Banking Authority (EBA) and country exposures are included for 30 members of the European Economic Area (EEA). Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable:	*SovereignPortion*				*SovereignPortionBias*			
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
Domestic	0.123***	0.123***	0.113***	0.112***	0.124***	0.125***	0.114***	0.114***
	[10.30]	[9.95]	[9.31]	[8.83]	[10.38]	[10.03]	[9.38]	[8.90]
*StressedBank*Crisis*	0.029***	0.029***	0.009***	0.009***	0.029***	0.029***	0.009***	0.009***
	[4.13]	[4.12]	[3.20]	[3.37]	[4.12]	[4.11]	[3.12]	[3.29]
*StressedBank*Crisis*Domestic*			0.104***	0.101***			0.104***	0.101***
			[3.58]	[3.40]			[3.57]	[3.38]
Bank-level Controls		*Yes*		*Yes*		*Yes*		*Yes*
Fixed Effects								
Bank	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Adj-R-sq	0.26	0.26	0.28	0.27	0.26	0.25	0.27	0.27
N	23268	20552	23268	20552	23268	20552	23268	20552

Table 4: **Sovereign debt reallocation across European banks during crisis: Stressed Banks.** The table summarizes the results of the equation (2) estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. Dependent variables are *SovereignPortion* (I-IV), which is the portion of the total sovereign debt of a country held by a specific bank, and *SovereignPortionBias* (V-VIII), which is the portion of total sovereign debt of a country held by a specific bank after adjusting for a standard CAPM model (see the Data Description). *Domestic* is a dummy variable equal to 1 only if the country of exposure is the same as the home country of the bank. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. *StressedBank* is a dummy variable indicating those observations in which the home country of the bank is considered to be "in crisis" ($400bps \leq spread$). Bank-level Controls include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Bank-level Controls come from Bankscope and are used with a year lag. Sovereign bond holding data come from various exercises of the European Banking Authority (EBA) and country exposures are included for 30 members of the European Economic Area (EEA). Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable: *DomesticPortion*	*I*	*II*	*III*	*IV*	*V*
Crisis	-0.030	-0.025	-0.099***	-0.094***	
	[-1.24]	[-1.32]	[-3.05]	[-3.15]	
*Crisis*ResidentBanks*			0.139***	0.139***	0.139**
			[2.89]	[2.88]	[2.14]
Country-level Controls		*Yes*		*Yes*	
Fixed Effects					
Country	*Yes*	*Yes*	*Yes*	*Yes*	
Time	*Yes*	*Yes*	*Yes*	*Yes*	
Creditor Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country x Time					*Yes*
Clustering	Country	Country	Country	Country	Country
Adj-R-sq	0.03	0.04	0.13	0.14	0.20
N	414	414	414	414	414

Table 5: **Sovereign debt reallocation during crisis: Resident banks vs non-bank residents.** The table summarizes the results of the equation (3) with dependent variable *DomesticPortion* (I-V), which is the portion of the overall sovereign debt of a country held by a particular domestic agent (either by resident banks or other private residents), estimated over a time period fully spanning the Eurozone crisis on a quarterly basis from early 2010 to the end-of-2014. *ResidentBanks* is a dummy variable equal to one only if the creditor is the resident banks of the country. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. Country-level Controls are the average values for each country's banks computed over the sample period and include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Country-level Controls come from Bankscope and are used with a year lag. Domestic sovereign holding data come from the dataset compiled from various national sources by Merler and Pisani-Ferry (2012). Countries include Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and United Kingdom. Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the country-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable: *DebtPortion*	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
Domestic	0.141***	0.143***						
	[10.12]	[9.74]						
*Domestic*Retail*			0.167***	0.171***	0.154***	0.156***	0.152***	0.154***
			[8.37]	[8.13]	[7.80]	[7.42]	[7.63]	[7.24]
*Domestic*Sovereign*			0.126***	0.127***	0.112***	0.112***	0.113***	0.113***
			[10.42]	[10.09]	[9.14]	[8.56]	[9.36]	[8.85]
*Domestic*Crisis*					0.118***	0.118***	0.135***	0.139***
					[3.67]	[3.55]	[2.66]	[2.68]
*Domestic*Crisis*Sovereign*							-0.026	-0.032
							[-0.59]	[-0.74]
Bank-level Controls		*Yes*		*Yes*		*Yes*		*Yes*
Fixed Effects								
Bank	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Debt Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Adj-R-sq	0.22	0.22	0.22	0.22	0.24	0.24	0.24	0.24
N	36933	32530	36933	32530	36933	32530	36933	32530

Table 6: **Debt reallocation across European banks during crisis: Sovereign vs retail debt.** The table summarizes the results of the equation (4) with dependent variable *DebtPortion* (I-VIII), which measures the portion of a specific type of total debt (sovereign or retail) of a country held by a specific bank, estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. *Sovereign* and *Retail* are dummy variables indicating the respective debt types held by the banks. *Domestic* is a dummy variable equal to 1 only if the country of exposure is the same as the home country of the bank. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. Bank-level Controls include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Bank-level Controls come from Bankscope and are used with a year lag. Sovereign and retail debt data come from various exercises of the European Banking Authority (EBA) and country exposures are included for 30 members of the European Economic Area (EEA). Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable: *DebtPortion*	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
Domestic	0.140***	0.143***						
	[10.09]	[9.70]						
*Domestic*Corporate*			0.164***	0.171***	0.152***	0.158***	0.152***	0.157***
			[8.50]	[8.38]	[7.99]	[7.69]	[7.93]	[7.64]
*Domestic*Sovereign*			0.126***	0.127***	0.113***	0.113***	0.113***	0.113***
			[10.40]	[10.06]	[9.16]	[8.61]	[9.36]	[8.86]
*Domestic*Crisis*					0.110***	0.108***	0.114**	0.112**
					[3.34]	[3.13]	[2.12]	[2.01]
*Domestic*Crisis*Sovereign*							-0.006	-0.006
							[-0.12]	[-0.13]
Bank-level Controls		*Yes*		*Yes*		*Yes*		*Yes*
Fixed Effects								
Bank	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Debt Type	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Adj-R-sq	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.25
N	36933	32530	36933	32530	36933	32530	36933	32530

Table R.6: **Debt reallocation across European banks during crisis: Sovereign vs corporate debt.** The table summarizes the results of the equation (4) with dependent variable *DebtPortion* (I-VIII), which measures the portion of a specific type of total debt (sovereign or corporate) of a country held by a specific bank, estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. *Sovereign* and *Corporate* are dummy variables indicating the respective debt types held by the banks. *Domestic* is a dummy variable equal to 1 only if the country of exposure is the same as the home country of the bank. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. Bank-level Controls include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Bank-level Controls come from Bankscope and are used with a year lag. Sovereign and corporate debt data come from various exercises of the European Banking Authority (EBA) and country exposures are included for 30 members of the European Economic Area (EEA). Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable: *SovereignPortion*	*Full Sample*						*Only Foreign Exposures*					
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*	*XI*	*XII*
*CrossCountryDistance*Crisis*	-0.012***	-0.012***					-0.001	-0.001				
	[-4.47]	[-5.75]					[-1.06]	[-0.72]				
*CrossCountryBranches*Crisis*			0.004***	0.004***					0.006**	0.005*		
			[4.86]	[4.79]					[2.24]	[1.84]		
*CrossCountryMergers*Crisis*					0.014***	0.014***					0.025**	0.018*
					[3.09]	[3.12]					[2.00]	[1.68]
Bank-level Controls		*Yes*		*Yes*		*Yes*		*Yes*		*Yes*		*Yes*
Fixed Effects												
Bank	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
HomeCountry x ExpCountry	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Adj-R-sq	0.53	0.53	0.54	0.54	0.53	0.53	0.26	0.27	0.26	0.27	0.26	0.27
N	23268	20552	23268	20552	23268	20552	22437	19818	22437	19818	22437	19818

Table 7: **Sovereign debt reallocation across European banks during crisis: Effect of informational distance.** The table summarizes the results of the equation (5) with dependent variables *SovereignPortion* in full sample (I-VI) and in foreign sample (VII-XII) estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. *SovereignPortion* is the portion of the total sovereign debt of a country held by a specific bank. *Crisis* is a dummy variable which is equal to 1 only if a Euro country's bond spread (with respect to Germany) is above 400 basis points calculated as the average of daily bond spreads over the 3-month period preceeding the observation date. *CrossCountryDistance* is the geographical distance (in thousand kilometers) between the capital city of the bank's home country and the capital city of the bank's exposure country. *CrossCountryBranches* is the total number of bank branches (in thousands) located in the bank's exposure country which ultimately belong to a bank from its home country. *CrossCountryMergers* is the total number of completed bank merger announcements (in hundreds) over the years 1985-2008 in which the acquiror is from the bank's home country and the target is from the bank's exposure country. Bank-level Controls include *LogAssets* which is the logarithm of the bank's total assets (originally in million Euros); *Tier1/RWA* which is the Tier 1 capital of the bank as a percentage of its risk-weighted-assets; *Loans/Deposits* which is the net loans divided by bank's customer deposits. All Bank-level Controls come from Bankscope and are used with a year lag. Sovereign bond holding data come from various exercises of the European Banking Authority (EBA) and country exposures are included for 30 members of the European Economic Area (EEA). Bond yields for Crisis dummy are obtained from Datastream. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable:	*SovereignPortion*					
Table:	*3*	*4*	*5*	*6*	*7 (Full)*	*7 (Foreign)*
Domestic	0.109***	0.109***				
	[8.26]	[8.25]				
*Domestic*Crisis*	0.096***					
	[3.64]					
*StressedBank*Crisis*		0.009***				
		[2.85]				
*StressedBank*Crisis*Domestic*		0.091***				
		[3.46]				
*Crisis*ResidentBanks*			0.133*			
			[1.87]			
*Domestic*Retail*				0.153***		
				[6.92]		
*Domestic*Sovereign*				0.110***		
				[8.28]		
*Domestic*Crisis*				0.109**		
				[2.46]		
*Domestic*Crisis*Sovereign*				-0.015		
				[-0.41]		
*CrossCountryBranches*Crisis*					0.004***	0.005**
					[4.61]	[2.36]
Bank-level Controls	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
Fixed Effects						
Bank	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x ExpCountry					*Yes*	*Yes*
Debt Type				*Yes*		
Country			*Yes*			
Creditor Type			*Yes*			
Country x Time			*Yes*			
Clustering	Bank	Bank	Country	Bank	Bank	Bank
Adj-R-sq	0.27	0.27	0.21	0.23	0.54	0.27
N	20552	20552	414	32530	20552	19818

Table 8: **Main results with crisis threshold of 300 basis points.** The table summarizes the results of the equations (1), (2), (3), (4) and (5) with dependent variables *Sovereign-Portion* estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. For the definitions of variables, see Table 3, 4, 5, 6 and 7. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable:	*SovereignPortion*					
Table:	*3*	*4*	*5*	*6*	*7 (Full)*	*7 (Foreign)*
Domestic	0.117***	0.117***				
	[9.53]	[9.52]				
*Domestic*Crisis*	0.122***					
	[2.90]					
*StressedBank*Crisis*		0.017***				
		[4.03]				
*StressedBank*Crisis*Domestic*		0.107***				
		[2.64]				
*Crisis*ResidentBanks*			0.157**			
			[2.34]			
*Domestic*Retail*				0.164***		
				[7.64]		
*Domestic*Sovereign*				0.118***		
				[9.55]		
*Domestic*Crisis*				0.104*		
				[1.68]		
*Domestic*Crisis*Sovereign*				0.015		
				[0.29]		
*CrossCountryBranches*Crisis*					0.011**	0.016*
					[2.16]	[1.67]
Bank-level Controls	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
Fixed Effects						
Bank	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x ExpCountry					*Yes*	*Yes*
Debt Type				*Yes*		
Country			*Yes*			
Creditor Type			*Yes*			
Country x Time			*Yes*			
Clustering	Bank	Bank	Country	Bank	Bank	Bank
Adj-R-sq	0.27	0.27	0.20	0.23	0.53	0.27
N	20552	20552	414	32530	20552	19818

Table 9: **Main results with crisis threshold of 500 basis points.** The table summarizes the results of the equations (1), (2), (3), (4) and (5) with dependent variables *Sovereign-Portion* estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. For the definitions of variables, see Table 3, 4, 5, 6 and 7. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable:	*SovereignPortion*					
Table:	*3*	*4*	*5*	*6*	*7 (Full)*	*7 (Foreign)*
Domestic	0.113***	0.113***				
	[8.96]	[8.95]				
*Domestic*Crisis*	0.106***					
	[3.31]					
*StressedBank*Crisis*		0.010***				
		[3.38]				
*StressedBank*Crisis*Domestic*		0.099***				
		[3.15]				
*Crisis*ResidentBanks*			0.141**			
			[2.16]			
*Domestic*Retail*				0.158***		
				[7.40]		
*Domestic*Sovereign*				0.114***		
				[8.98]		
*Domestic*Crisis*				0.125**		
				[2.22]		
*Domestic*Crisis*Sovereign*				-0.020		
				[-0.44]		
*CrossCountryBranches*Crisis*					0.004***	0.004*
					[4.41]	[1.78]
Bank-level Controls	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
Fixed Effects						
Bank	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x ExpCountry					*Yes*	*Yes*
Debt Type				*Yes*		
Country			*Yes*			
Creditor Type			*Yes*			
Country x Time			*Yes*			
Clustering	Bank	Bank	Country	Bank	Bank	Bank
Adj-R-sq	0.27	0.27	0.20	0.23	0.53	0.27
N	20552	20552	414	32530	20552	19818

Table 10: **Main results with crisis dummy defined with one-month-rolling bond spreads.** The table summarizes the results of the equations (1), (2), (3), (4) and (5) with dependent variables *SovereignPortion* estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. For the definitions of variables, see Table 3, 4, 5, 6 and 7. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.

Dependent Variable:	*SovereignPortion*					
Table:	*3*	*4*	*5*	*6*	*7 (Full)*	*7 (Foreign)*
Domestic	0.097***	0.114***				
	[7.54]	[9.19]				
*Domestic*Spread*	0.017***					
	[3.72]					
*HomeSpread*ExpSpread*		0.000				
		[1.46]				
*HomeSpread*ExpSpread*Domestic*		0.001***				
		[2.80]				
*Spread*ResidentBanks*			0.012**			
			[2.04]			
*Domestic*Retail*				0.134***		
				[6.79]		
*Domestic*Sovereign*				0.099***		
				[7.59]		
*Domestic*Spread*				0.023***		
				[3.01]		
*Domestic*Spread*Sovereign*				-0.006		
				[-0.92]		
*CrossCountryBranches*Spread*					0.002***	0.006***
					[5.34]	[2.71]
Bank-level Controls	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
Fixed Effects						
Bank	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
ExpCountry x Time	*Yes*	*Yes*		*Yes*	*Yes*	*Yes*
HomeCountry x ExpCountry					*Yes*	*Yes*
Debt Type				*Yes*		
Country			*Yes*			
Creditor Type			*Yes*			
Country x Time			*Yes*			
Clustering	Bank	Bank	Country	Bank	Bank	Bank
Adj-R-sq	0.28	0.27	0.20	0.24	0.54	0.27
N	20552	20552	414	32530	20552	19818

Table 11: **Main results with crisis dummy replaced with bond spreads.** The table summarizes the results of the equations (1), (2), (3), (4) and (5) with dependent variables *SovereignPortion* estimated over a time period fully spanning the Eurozone crisis on a biannual basis from early 2010 to mid-2015. For the definitions of variables, see Table 3, 4, 5, 6 and 7. Robust standard errors are clustered at the bank-level and t-statistics are reported in brackets. $*p \leq 0.1, **p \leq 0.05, ***p \leq 0.01$.