

What Drives the Relationship between Bank and Sovereign Credit Risk?

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Abstract

The positive relationship between bank and sovereign credit risk in the Eurozone, the so-called *sovereign-bank nexus*, is seen as a major threat for the stability of the Eurozone. This paper explores potential bank-level and country-level drivers of this relationship. We find that banks' home bias in their sovereign exposures and their low equity ratios as well as countries' high debt-to-GDP ratios and low perceived government effectiveness are positively related to the sovereign-bank nexus. While these results do not necessarily reflect causal relationships, they suggest that promoting banks' diversification of sovereign exposures could be an effective measure to mitigate the sovereign-bank nexus.

Keywords: Sovereign-bank nexus; home bias; sovereign exposures; CDS spreads

JEL Classification: G21, G28

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1 Introduction

The strong interconnectedness between bank and sovereign credit risk is said to have aggravated the crisis in the euro area by feeding a vicious circle between banks and their sovereigns. Therefore, mitigating the sovereign-bank nexus has been one of the top priorities of European policy makers over the past years. The most important project meant to reduce the nexus is the European Banking Union, which has shifted responsibilities for banking supervision and resolution at least partly to the European level. Nevertheless, there is a concern that these reforms may not have been sufficient to break the nexus. It is therefore important to get a better understanding of the underlying drivers of this interconnectedness and to identify potential measures to further mitigate mutual dependencies between banks and sovereigns.

This paper empirically explores potential drivers of this relationship: first, banks' home bias in their sovereign exposures, second, bank characteristics such as equity ratios, and third, country characteristics such as debt-to-GDP ratios and country governance indicators. We identify correlations rather than causal relationships because mutual feedback effects between banks' default risks and sovereign default risks cannot be excluded. Nevertheless, our results point towards potentially important relations and help to better understand the sovereign-bank nexus.

We find that banks' home bias in their sovereign exposures and their low equity ratios as well as countries' high debt-to-GDP ratios and low perceived government effectiveness are positively related to the sovereign-bank nexus. Our results suggest that promoting banks' diversification of sovereign exposures could be an effective measure to mitigate the sovereign-bank nexus.

Related studies document a significant positive relationship between bank CDS spreads and sovereign CDS spreads (e.g., Acharya et al., 2014). Beltratti and Stulz (2015) explore the role of bank exposure to domestic sovereign credit risk for bank CDS spreads. Kallestrup et al. (2016) find that foreign asset holdings of banks affect the banks' CDS spreads as well as sovereign CDS spreads of the banks' home countries. Gennaioli et al. (2014) point to negative consequences of the sovereign-bank nexus by showing theoretically and empirically for a large

panel of emerging and developed countries that government defaults affect bank lending. Kirschenmann et al. (2016) investigate consequences of zero risk weights of Euro-denominated sovereign debt for financial stability. De Marco and Macchiavelli (2016), Ongena et al. (2016) and Altavilla et al. (2016) find that a home bias in sovereign exposures is especially pronounced for government-owned banks. Horváth et al. (2015) show that a banks' home bias in sovereign exposures is stronger if the sovereign debt is risky, and that a home bias is positively valued by the stock market. This paper complements the existing literature by exploring potential drivers of the sovereign-bank nexus. We provide new evidence on the role of banks' home bias as well as on the role of other bank-level and country-level characteristics that are related to the the sovereign-bank nexus.

2 Data

The main sample includes 31 banks from Eurozone countries over the period 2010 to 2015. It includes all banks for which consecutive data from the European Banking Authority's (EBA's) stress test exercises, capital exercises or transparency exercises between 2011 (as of December 2010) and 2015 (as of December 2014 and June 2015) as well as CDS data from Markit is available. We also consider results from the EBA's 2016 stress test (as of December 2015), but do not exclude banks that were not part of this stress test.

Table 1 provides an overview of our sample.

- Table 1 about here -

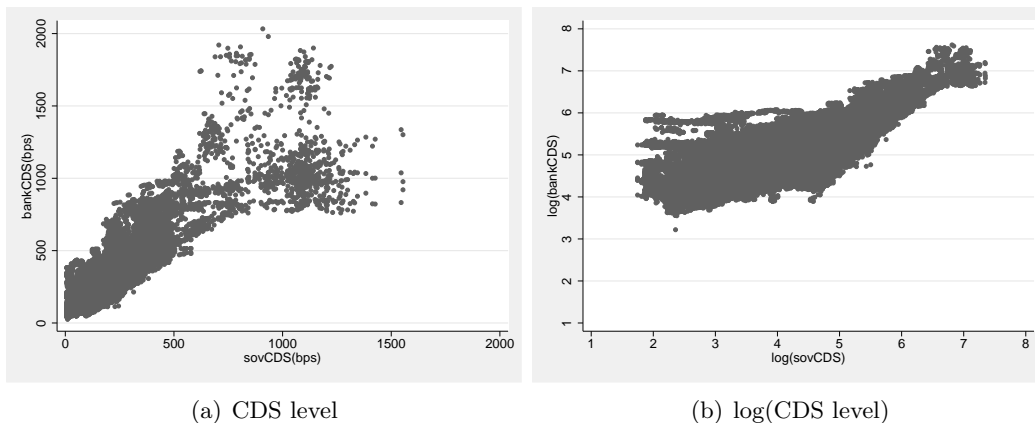
An overview of all variable definitions and data sources is provided in Table 2. The following paragraphs describe the data in more detail.

- Table 2 about here -

CDS data. Data on bank and sovereign CDS spreads with a daily frequency comes from *Markit*. We use the natural log of bank CDS spreads (in basis points), denoted as $\log(\text{bankCDS})$,

and the natural log of sovereign CDS spreads of the bank’s home country (in basis points), denoted as $\log(\text{sovCDS})$. Figure 1 illustrates the relation between sovereign and bank CDS using levels (left panel) and natural logs (right panel).

Figure 1: Relation of bank CDS and sovereign CDS



The left panel illustrates the relation between banks’ daily CDS level and their home-country sovereign CDS level (in basis points) over the period 2010 to 2015. The right panel shows the respective log levels. Source: Markit CDS.

Banks’ sovereign exposures. The *European Banking Authority (EBA)* provides data on systemically important banks based on the Euro-wide stress tests, capital exercises and transparency exercises between 2009 and 2016.¹ Detailed data on banks’ exposures across countries is available since the 2011 stress test. See Table 3 for an overview.²

- Table 3 about here -

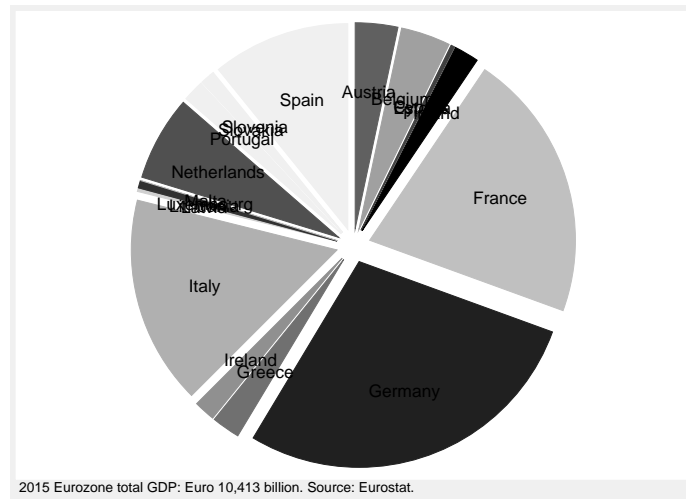
The variable *totalSOV-to-equity* is calculated as the ratio of a bank’s Euro amount of total sovereign exposures and the bank’s Euro common equity amount. The variable *homeSOV-to-totalSOV* is calculated as the ratio of a bank’s Euro amount of sovereign exposures towards its home state and the bank’s Euro amount of total sovereign exposures.

¹Some banks in our sample were included in the EBA exercises until 2015, but not in the 2016 stress test. For these banks, we use the EBA data as of June 2015 from the 2015 transparency exercise also for the second half of 2015. These banks are DZ Bank, HSH Nordbank, LB Berlin (now Erwerbgsellschaft Berlin), SNS Bank, Banco Commercial Português, Banco PBI and Caixa Geral de Depósitos.

²Source: <http://www.eba.europa.eu/risk-analysis-and-data/>.

The variable *home bias* captures the idea that banks' sovereign exposures should be evaluated relative to an *unbiased*, i. e., well-diversified, reference portfolio. For example, a French bank that holds 20% of French sovereign bonds in its sovereign portfolio, which is about France's share of Eurozone GDP, has presumably no home bias in its sovereign exposures, but an Austrian bank that holds 20% of Austrian sovereign bonds in its sovereign portfolio (versus Austria's 3% share of Eurozone GDP) does. Accordingly, the variable *home bias* is calculated as the ratio of a bank's home sovereign exposures and its total sovereign exposures relative to a reference portfolio that is the home country's Eurozone GDP share. Figure 2 illustrates this reference portfolio for the year 2015.

Figure 2: 2015 reference portfolio based on Eurozone GDP



The illustrated values are 3% (Austria), 4% (Belgium), 0.2% (Cyprus), 0.2% (Estonia), 2% (Finland), 21% (France), 29% (Germany), 2% (Greece), 2% (Ireland), 16% (Italy), 0.2% (Latvia), 0.4% (Lithuania), 0.5% (Luxembourg), 0.1% (Malta), 7% (Netherlands), 2% (Portugal), 0.8% (Slovakia), 0.4% (Slovenia), 10% (Spain). Source: Eurostat.

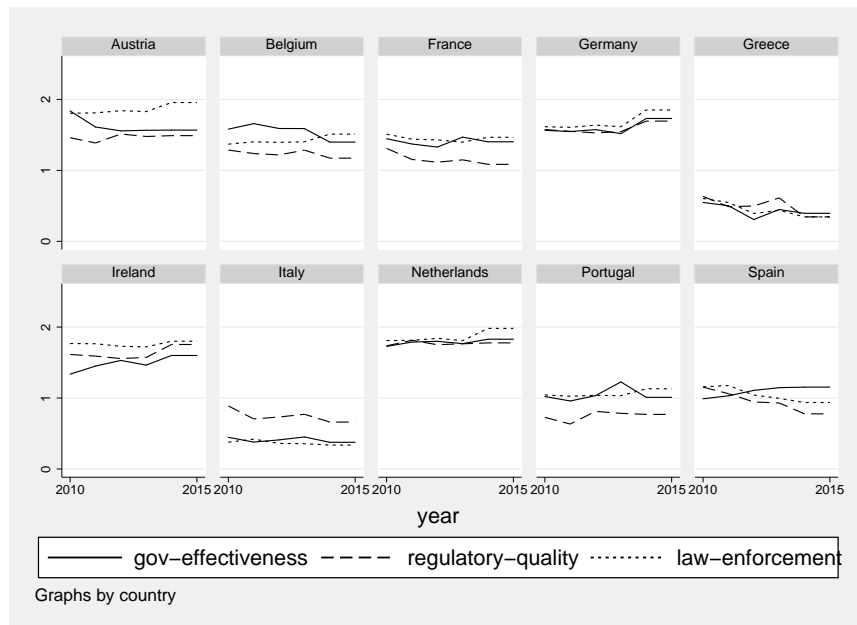
Bank financial data. As a measure for banks' strength we use banks' capital ratios. Data for banks's *equity* (in billion Euro) and *tier-1 capital ratios* also comes from the EBA's exercises.

Country governance indicators. Data on a country's perceived *government effectiveness* is included in the analysis to account for country characteristics that may affect the sovereign-bank risk nexus. The data comes from the *Worldwide Governance Indicators project* and

is provided by the *Word Bank*. In particular, the indicator for government effectiveness captures “perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.” The indicator is based on survey responses from enterprise, citizen and expert respondents and produced by a variety of institutes, international organizations, and private sector firms.³

The indicators are available on a yearly level and generally range from -2.5 (weak governance) to 2.5 (strong governance). For our sample, *gov-effectiveness* ranges from 0.38 (Italy 2015) to 1.84 (Austria 2010). Figure 3 illustrates how these indices developed over the period 2010 to 2015. The figure also shows governance indicators for *regulatory quality* and *enforcement of law*, which are highly correlated with the indicator for governance effectiveness.⁴

Figure 3: Governance indicators for selected Eurozone countries



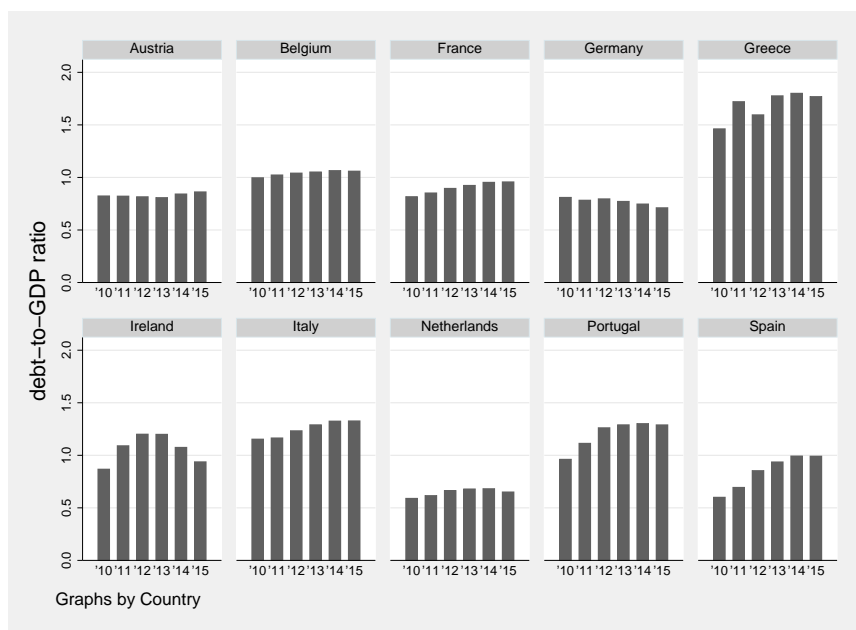
The governance indicators are available on a yearly level and range from -2.5 (low) to +2.5 (high). Source: <http://info.worldbank.org/governance/wgi/#home>.

³Source: www.info.worldbank.org/governance/wgi/. See also Kaufmann et al. (2010) for a description of the data.

⁴The indicator *regulatory quality* captures “perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.” The indicator *enforcement of law (rule of law)* captures “perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.” (Source: www.info.worldbank.org/governance/wgi/).

Macro indicators. Data on GDP and government consolidated gross debt comes from *Eurostat*.⁵ The *debt-to-GDP* ratio is used in the regressions as a potential factor that drives the sovereign-bank nexus. The ratio is illustrated in Figure 4 for selected countries. Further, GDP data is used to calculate a banks' home bias in its sovereign exposures relative to a GDP-weighted reference portfolio (see the paragraphs on banks' sovereign exposures above).

Figure 4: Debt-to-GDP ratio of selected Eurozone countries



The *debt-to-GDP* ratio represents the ratio of “government consolidated gross debt” and “gross domestic product at market prices”. Source: Eurostat.

Summary statistics. See Table 4 for summary statistics. All values are shown before demeaning. Regressions then mostly use demeaned values, which is denoted in the regression tables by “_m” following a variable name.

- Table 4 about here -

⁵Source: <http://ec.europa.eu/eurostat/data/database>; Table “Government deficit/surplus, debt and associated data (gov_10dd_edp1)”.

3 Analysis

The analysis starts with exploring whether a significant relation between bank and sovereign credit risk exists for our sample of Eurozone banks. As we will see, this so-called *sovereign-bank nexus* is present for the entire sample period 2010 to 2015 and for more recent subperiods, at least for former crisis countries.

The analysis then explores potential drivers of this relation: First, banks' sovereign exposures toward their home country, second, bank characteristics such as tier-1 capital ratios, and third, country characteristics such as debt-to-GDP ratios and perceived government effectiveness. For each variable we run regressions with and without country fixed effects. The specification without country fixed effects has the advantage that level differences across countries (e. g., generally high or low governance indicators in one country) are not absorbed by the fixed effects. The specification with country fixed effects has the advantage that it captures all time-invariant unobserved country characteristics and mitigates endogeneity concerns. At the end of this section we also show results for a combined analysis where all considered variables are jointly used as explanatory variables in one regression.

3.1 The sovereign-bank nexus over time

Our first hypothesis addresses the general relation between bank CDS and sovereign CDS.

HYPOTHESIS 1 (*Sovereign-Bank Nexus*). *The relation between bank and sovereign credit risk is positive and significant.*

Regression model. Our regression model is the following:

$$\log(\text{bankCDS})_{i,j,t} = \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} + \epsilon_{i,j,t}, \quad (1)$$

where $\log(\text{bankCDS})_{i,j,t}$ represents the natural logarithms of CDS spreads of bank i in country j at day t , $\log(\text{sovCDS})_{j,t}$ represents the natural logarithms of CDS spreads of the bank's

home country j at day t , τ_y represents year fixed effects and $\epsilon_{i,j,t}$ the error term. We cluster the standard errors at bank level to allow for correlation of errors terms within banks. The coefficient of interest, β_1 , shows the percentage change of *bankCDS* when *sovCDS* is increased by 1 percent, i. e., the elasticity between *bankCDS* and *sovCDS*.

Results. Regression results are shown in Panel A of Table 5. Notably, the sovereign-bank nexus is clearly present for our sample of large and systemically important Eurozone banks over the different time periods explored in Columns (1) to (9). The first column reflects the full sample period 2010 to 2015. The significantly positive coefficient of 0.4087 implies that a 1 percent change in the sovereign CDS spread of a bank’s home country is on average associated with a 0.41 percent change in a bank’s CDS spread. The coefficients of the regressions for different time periods from 2009 in Column (2) to the first half of 2016 in Column (9) suggest that the sovereign-bank nexus has grown from 2009 to 2011 and then diminished until 2015. The first half of 2016, however, has again seen a stronger relation between sovereign and bank CDS levels.

Two events may have contributed to the decrease in the sovereign-bank nexus: the famous “Whatever it takes” statement of Draghi on 26 July 2012, and the introduction of the Single Supervisory Mechanism (SSM) in November 2014. But they do not have seem to have put an end to this relation, as significantly positive coefficients for $\log(\text{sovCDS})$ for the years 2013 to 2015 and the first half of 2016 show.

Next, we explore whether effects are different for non-IIPS and IIPS (i. e., former crisis) countries with the following regression:⁶

$$\begin{aligned} \log(\text{bankCDS})_{i,j,t} = & \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} + \beta_2 \text{iips}_j & (2) \\ & + \beta_3 \log(\text{sovCDS})_{j,t} \times \text{iips}_j + \epsilon_{i,j,t}, \end{aligned}$$

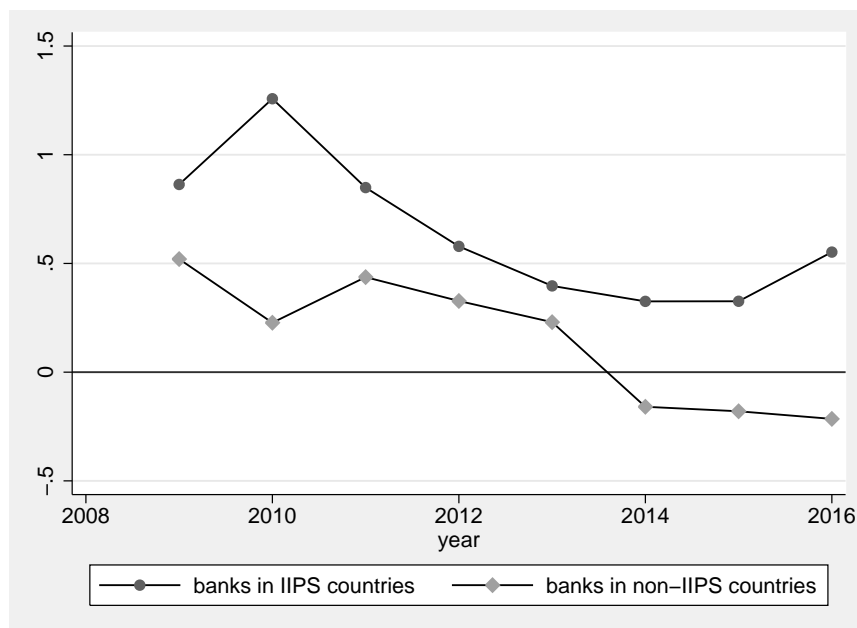
where the previous regression of Equation (1) is extended by a dummy variable *iips* and an interaction term $\log(\text{sovCDS}) \times \text{iips}$. The variable *iips* has a value of 1 for banks from so-

⁶IIPS stands for Ireland, Italy, Portugal, and Spain. Note that banks from Greece are not included in our sample.

called IIPS countries, and zero otherwise. Hence, two banks from Ireland, four banks from Italy, three banks from Portugal and three banks from Spain are classified as banks from IIPS countries.

As shown in Panel B of Table 5 by the coefficients of the interaction term $\log(\text{sovCDS}) \times \text{iips}$ for the different time periods, the relation between sovereign and bank CDS spreads is generally significantly stronger for banks from IIPS countries than for banks from non-IIPS countries (with the exception of an insignificant coefficient for the regressions of year 2013). The total effects for non-IIPS and IIPS countries are shown in the bottom rows of the table. Figure 5 illustrates the development of the sovereign-bank nexus between 2009 and the first half of 2016. Interestingly, the sovereign-bank nexus has become insignificant for banks in non-IIPS countries since 2013. For banks in IIPS countries, the relation has also decreased since 2010, but recently picked up again (in the first half of 2016).

Figure 5: Development of the sovereign-bank nexus over time



The figure illustrates the relation between $\log(\text{bankCDS})$ and $\log(\text{sovCDS})$ for banks in Ireland, Italy, Portugal and Spain (upper line) and all other banks (lower line) between 2009 and the first half of 2016. See Table 5 for the corresponding regression results and further details.

- Table 5 about here -

3.2 The role of banks's sovereign exposures and diversification

In this section we explore the role of a bank's sovereign exposures. Several other studies use the ratio of a bank's home sovereign exposures and its equity for this purpose. Instead, we consider the ratio of a bank's home sovereign exposures and its total sovereign exposures, denoted as *homeSOV-to-totalSOV*, and the ratio of a bank's total sovereign exposures and its equity, denoted as *totalSOV-to-equity*, separately.

In a further set of regressions, we replace *homeSOV-to-totalSOV* with a variable that reflects the ratio of a bank's home sovereign exposures and its total sovereign exposures relative to a benchmark, denoted as *home bias*. Conceptually, this measure is clearly preferable to the alternative one as it better reflects differences in countries' size.

HYPOTHESIS 2 (*Home Bias*). *The relation between bank and sovereign credit risk is stronger for banks with a large home bias in their sovereign exposures.*

Regression model. Our regression model is the following:

$$\begin{aligned} \log(\text{bankCDS})_{i,j,t} = & \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} \\ & + \beta_2 \text{homeSOV-to-totalSOV}_{i,j,t} \\ & + \beta_3 \log(\text{sovCDS})_{j,t} \times \text{homeSOV-to-totalSOV}_{i,j,t} \\ & + \beta_4 \text{totalSOV-to-equity}_{i,j,t} \\ & + \beta_5 \log(\text{sovCDS})_{j,t} \times \text{totalSOV-to-equity}_{i,j,t} \\ & + \epsilon_{i,j,t}, \end{aligned} \tag{3}$$

where the variables *homeSOV-to-totalSOV* and *totalSOV-to-equity* are included as single terms and interaction variable with $\log(\text{sovCDS})$. All other variables are defined as in the previous regression.

Results. The first column of Table 6 shows a significantly positive relation between the dependent variable $\log(\text{bankCDS})$ and *homeSOV-to-totalSOV*, which indicates that the more

risky banks (as measured by higher bank CDS) are those that hold a higher share of home country sovereign debt. The significantly positive coefficient of the interaction term $\log(\text{sovCDS}) \times \text{homeSOV-to-totalSOV}$ shows that a higher home country sovereign debt share is also related to a stronger sovereign-bank nexus. In particular, if the share increases by 10 percentage points, the elasticity between sovereign and bank default risk increases by 3.7 percentage points. This is economically highly relevant. Interestingly, high total sovereign exposures to equity (controlling for $\text{homeSOV-to-totalSOV}$) rather reduce the sovereign-bank nexus, as shown by the significantly negative coefficient of -0.0593. The second column of Table 6 includes country fixed effects. The effect of $\text{homeSOV-to-totalSOV}$ remains largely unchanged. The effect of totalSOV-to-EQ_m becomes insignificant, but the coefficient points in the same direction as before.

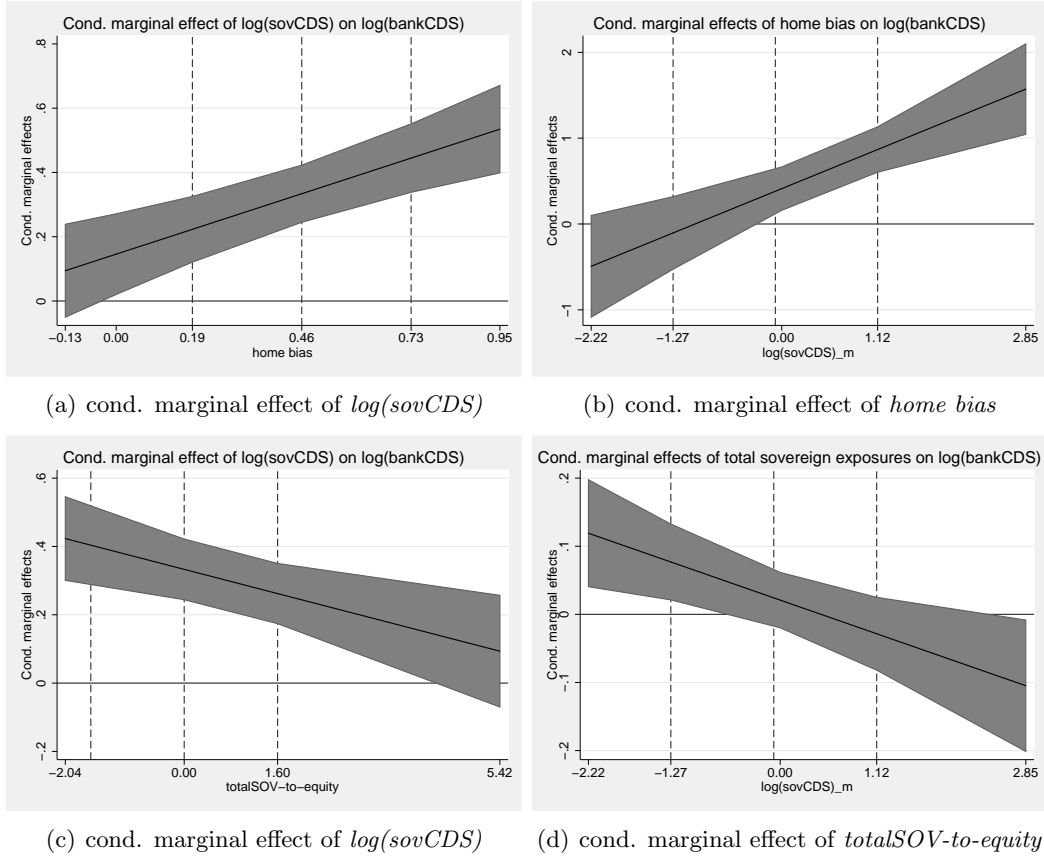
The variable *home bias* then replaces $\text{homeSOV-to-totalSOV}$ in the regressions in Columns (3) and (4), without and with country fixed effects, respectively. As noted before, the variable *home bias* reflects a bank's ratio of banks' home sovereign exposures and its total sovereign exposures relative to a hypothetical reference portfolio based on Eurozone GDP shares. We find significantly positive coefficients for *home bias* both without and with country fixed effects.

Figure 6 illustrates the marginal effects of this regression, corresponding to Column (3) of Table 6. As shown in panel (a), the relation between bank CDS and sovereign CDS level is stronger for banks with a relatively large *home bias*. Panel (b) shows that such a *home bias* is associated with a higher bank CDS level only if the home country's default risk is relatively high (about the mean value across the sample, which is zero on the x-axis, or higher). In other words, high sovereign exposures toward the home country are not a problem for the bank if the home country is considered relatively low risk.

Panel (c) of Figure 6 shows that the relation between bank and sovereign CDS level is decreasing for higher values of the ratio of a bank's total sovereign exposures and equity. Again, this is related to regression results of Column (3) in Table 6, where *home bias* and its interaction with $\log(\text{sovCDS})$ is also included. Finally, panel (d) shows the marginal effects of $\text{totalSOV-to-equity}$ on $\log(\text{bankCDS})$ with regards to different levels of $\log(\text{sovCDS})$.

- Table 6 about here -

Figure 6: Conditional marginal effects of $\log(\text{sovCDS})$, home bias , and $\text{totalSOV-to-equity}$



The estimated regression model is Equation (3). The dashed lines represent the mean minus standard deviation, mean, and mean plus standard deviation of the x-variable.

3.3 The role of bank characteristics

The debate about banking regulation considers bank equity as a key determinant of banks' risk-takings and default risks. In this section we explore banks' tier-1 capital ratios as potential drivers of the sovereign-bank nexus.

HYPOTHESIS 3 (*Bank Characteristics*). *The relation between bank and sovereign credit risk is stronger for banks with low capital ratios.*

Regression model. The regression model is the following:

$$\begin{aligned} \log(\text{bankCDS})_{i,j,t} = & \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} + \beta_2 \text{tier-1 capital ratio}_{i,j,t} \\ & + \beta_3 \log(\text{sovCDS})_{j,t} \times \text{tier-1 capital ratio}_{i,j,t} + \epsilon_{i,j,t}, \end{aligned} \quad (4)$$

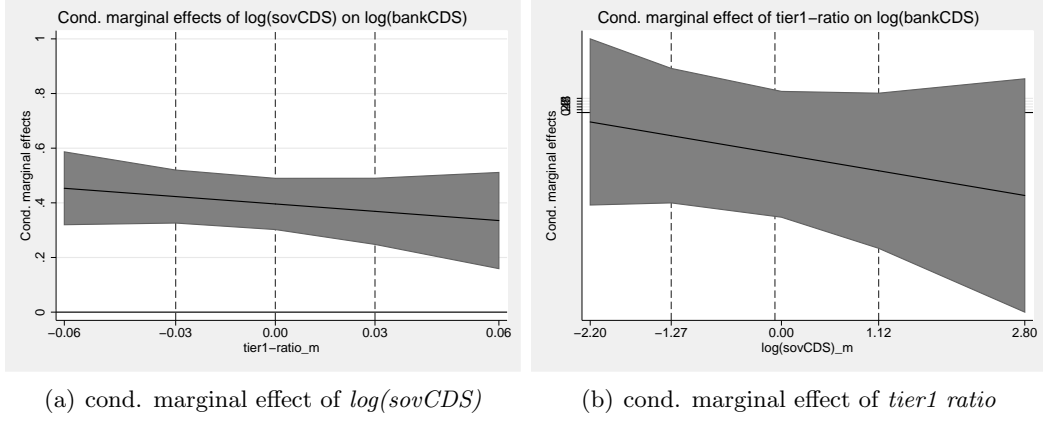
where *tier-1 capital ratio* is now included and all other variables are defined as in the previous regressions.

Results. We find negative but insignificant coefficients for *tier-1 capital ratio* and the interaction term $\log(\text{sovCDS}) \times \text{tier-1 capital ratio}$ when country fixed effects are not included, as shown in Column (1) of Table 7. When country fixed effects are included, as shown in Column (2), both coefficients are significantly negative.

Marginal effects are illustrated in Figure 7, corresponding to regression results in Column (1) of Table 7. As shown in panel (a), the relation between bank and sovereign CDS is slightly weaker for banks with higher tier-1 capital ratios. Nevertheless, as shown in the regression results, this is insignificant when country fixed effects are not included. Panel (b) shows that a higher tier-1 capital ratio is associated with lower CDS spreads, but standard errors are huge and the relation is insignificant. The negative relation becomes stronger, but remains insignificant, for higher values of $\log(\text{sovCDS})$. When country fixed effects are included, however, these relations become statistically significant (see Column (2) of Table 7). Hence, the results indicate a tendency that bank capital is especially relevant for the sovereign-bank nexus in countries with high sovereign risk.

Next, we run regressions where both *home bias* and *tier1-ratio* is included. This allows us to

Figure 7: Conditional marginal effects of $\log(\text{sovCDS})$ and $\text{tier-1 capital ratio}$



The estimated regression model is Equation (5). The dashed lines represent the mean minus standard deviation, mean, and mean plus standard deviation of the x-variable.

control for relations of both variables with bank risk in one regression:

$$\begin{aligned}
 \log(\text{bankCDS})_{i,j,t} = & \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} \\
 & + \beta_2 \text{tier-1 capital ratio}_{i,j,t} \\
 & + \beta_3 \log(\text{sovCDS})_{j,t} \times \text{tier-1 capital ratio}_{i,j,t} \\
 & + \beta_4 \text{home bias}_{i,j,t} \\
 & + \beta_5 \log(\text{sovCDS})_{j,t} \times \text{home bias}_{i,j,t} \\
 & + \beta_6 \text{totalSOV-to-equity}_{i,j,t} \\
 & + \beta_7 \log(\text{sovCDS})_{j,t} \times \text{totalSOV-to-equity}_{i,j,t} \\
 & + \epsilon_{i,j,t}.
 \end{aligned} \tag{5}$$

We find that results for $\text{tier-1 capital ratio}$ are largely unchanged, i.e., the relation is insignificant with negative coefficients when country fixed effects are not included in Column (3), and significantly negative when country fixed effects are included in Column (4) of Table 7. Further, the relation between home bias and the sovereign-bank nexus remains significantly positive, as shown by the coefficients and p-values of the interaction term $\log(\text{sovCDS}) \times \text{home bias}$. Hence, banks' home bias remains important when controlling for $\text{tier-1 capital ratios}$.

- Table 7 about here -

3.4 The role of country characteristics

Several different country characteristics may be a driver of the sovereign-bank nexus. We investigate two of them. First, we consider the role of a country's *debt-to-GDP* ratio, which is linked not only to a country's credit quality but also to its GDP growth (see, e. g., Reinhart and Rogoff, 2010). Second, we consider a country's perceived governance quality, as reflected in the *government effectiveness* indicator provided by the World Bank. Investigating this indicator captures the idea that country governance may be related to government actions during banking crisis, and therefore affect the sovereign-bank nexus.

HYPOTHESIS 4 (*Country Characteristics*). *The relation between bank and sovereign credit risk is stronger for banks in countries with a 1) high debt-to-GDP ratio and, 2) low perceived government effectiveness.*

Regression model. Our regression model is the following:

$$\begin{aligned} \log(\text{bankCDS})_{i,j,t} = & \beta_0 + \tau_y + \beta_1 \log(\text{sovCDS})_{j,t} + \beta_2 X_{j,t} \\ & + \beta_3 \log(\text{sovCDS})_{j,t} \times X_{j,t} + \epsilon_{i,j,t}, \end{aligned} \quad (6)$$

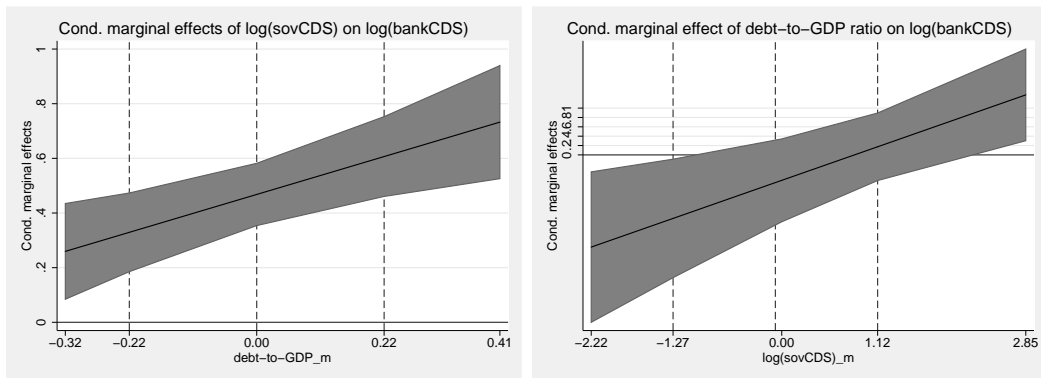
where $X_{j,t}$ stands for *debt-to-GDP* in a first set of regressions, and for perceived *gov-effectiveness* in a second set of regressions. All other variables are defined as in the previous regressions.

Results. As shown by the coefficients of the interaction terms in Columns (1) and (2) of Table 8 without and with country fixed effects, respectively, we find a significantly positive relation between a country's *debt-to-GDP* and the sovereign-bank nexus. Figure 8 illustrates the marginal effects with regards to *debt-to-GDP* corresponding to regression results in Column (1) of Table 8. Panel (a) shows that the relation between bank CDS and sovereign CDS level is stronger for banks in countries with relatively high *debt-to-GDP* ratios. Panel

(b) shows that the relation between *debt-to-GDP* and bank CDS is largely insignificant (for values of $\log(\text{sovCDS})$ equal to the sample mean \pm one standard deviation).

When variables that reflect banks' sovereign exposures are included in the regression, as shown in Columns (3) and (4), the coefficients are smaller and only significant for the specification with country fixed effects in Column (4).

Figure 8: Conditional marginal effects of $\log(\text{sovCDS})$ and *debt-to-GDP*



(a) cond. marginal effect of $\log(\text{sovCDS})$

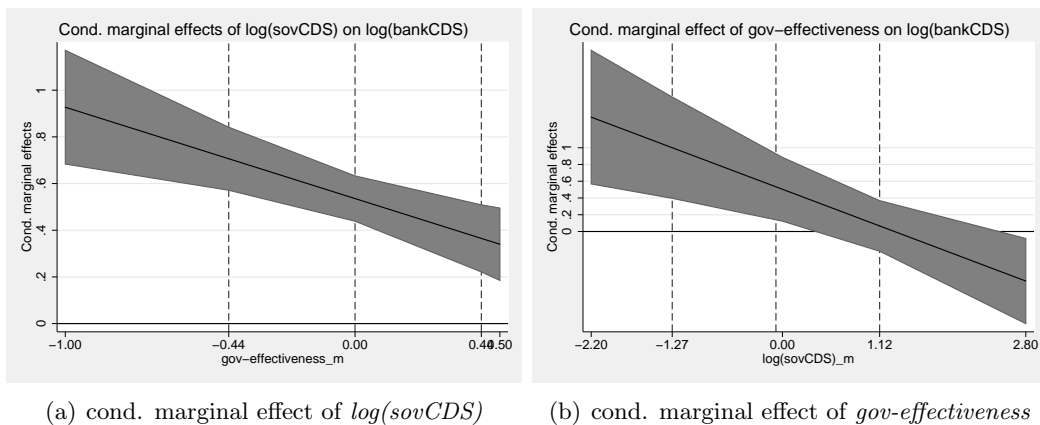
(b) cond. marginal effect of *debt-to-GDP ratio*

The estimated regression model is Equation (6), using *debt-to-equity* as interaction variable. The dashed lines represent the mean minus standard deviation, mean, and mean plus standard deviation of the x-variable.

The interaction term with *gov-effectiveness* is significantly negative in the regressions of Columns (5) and (6) of Table 8, which means that the sovereign-bank nexus is stronger for countries with low perceived government effectiveness. Figure 9 illustrates the marginal effects with regards to *gov-effectiveness* corresponding to regression results of Column (5). As shown in panel (a), the relation between bank CDS and sovereign CDS level is smaller for higher values of *gov-effectiveness*. Panel (b) shows that the relation between *gov-effectiveness* and $\log(\text{bankCDS})$ is positive, which is at first puzzling because higher values of *gov-effectiveness* reflect a higher perceived governance quality. However, two things have to be considered: First, $\log(\text{sovCDS})$ is included in the regression, hence, the positive relation holds for given levels of sovereign default risk. Second, bank CDS also reflect bail-out expectations. One possible interpretation for the positive relation between *gov-effectiveness* and $\log(\text{bankCDS})$ (when $\log(\text{sovCDS})$ is below the sample mean) is that relatively low values of *gov-effectiveness* are associated with higher bail-out probabilities, and hence, lower bank CDS levels.

When the regression equation is extended by variables that reflect banks' sovereign exposures, the coefficients of the interaction term $\log(\text{sovCDS}) \times \text{gov-effectiveness}$ remain significantly negative, as shown in Columns (7) and (8) of Table 8. Further, the coefficients of the interaction term with *home bias* also remain significantly positive.

Figure 9: Conditional marginal effects of $\log(\text{sovCDS})$ and *gov-effectiveness*



The estimated regression model is Equation (6), using *gov-effectiveness* as interaction variable. The dashed lines represent the mean minus standard deviation, mean, and mean plus standard deviation of the x-variable.

- Table 8 about here -

3.5 Combined analysis

So far, we have tested the effect of different potential drivers of the sovereign-bank risk nexus in separate regressions. Next, we run analyses where measures for banks' sovereign exposures, bank characteristics and country characteristics are jointly used as explanatory variables. Note that this specification suffers from multicollinearity, i. e., correlations among the explanatory variables. Nevertheless, results that are in line with our previous results would support the robustness of our findings.

As shown in Columns (1) and (2) of Table 9, with and without country fixed effects, respectively, the coefficient of the single term $\log(\text{sovCDS})$ remains highly significant. A bank's *home bias* is positively related to $\log(\text{bankCDS})$ and increases the relation between $\log(\text{sovCDS})$ and

$\log(\text{bankCDS})$, but the latter is only significant in Column (1) without country fixed effects. The coefficients of *totalSOV-to-equity* are insignificant both for the single term and the interaction term. The coefficients of a bank's *tier-1 capital ratio* are significantly negative in Columns (1) and (2), but insignificant for the interaction term $\log(\text{sovCDS}) \times \text{tier-1 capital ratio}$. The coefficients for debt-to-GDP are insignificant both for the single term and the interaction term. The coefficients for *gov-effectiveness* are significantly positive or insignificant for the single term, and significantly negative for the interaction term $\log(\text{sovCDS}) \times \text{gov-effectiveness}$.

Summing up, several coefficients become less significant or insignificant for the combined analysis relative to our previous results, but this is not unexpected because of multicollinearity. The coefficients mostly point toward the same relations as identified before. In particular, the results of this combined analysis are consistent with our results on the role of banks' home bias in their sovereign exposures and on the role of countries' perceived government effectiveness.

- Table 9 about here -

4 Summary and Conclusion

In this paper we explore several bank and country characteristics that may contribute to the *sovereign-bank nexus*. The characteristics that we consider most relevant and therefore include in the analysis are banks' *home bias* in their sovereign exposures, banks' *equity ratios*, countries' *debt-to-GDP* ratios and countries' perceived *government effectiveness*.

Table 10 provides a compact overview of our regression results and tries to assess the economic significance of the considered interaction variables. Economic effects of each coefficient are evaluated based on the difference between the 25th and 75th percentile of each variable. For example, the first row shows that the variable *home bias* has a mean value of 0.46, a standard deviation of 0.27 and a difference between the 25th and the 75th percentile of 0.40. The coefficient of 0.4072 is taken from the regression in Column (3) of Table 7. The economic

effect is then calculated for a shift of *home bias* from the 25th percentile to the 75th percentile, i. e., $0.4072 \times 0.40 = 0.1629$. The range of this economic effect across the eight specifications shown in the table is from 0.08 to 0.16. Correspondingly, the range is from 0 to -0.08 for *tier-1 capital ratio*, 0 to 0.20 for *debt-to-GDP* and -0.14 to -0.22 for perceived *government effectiveness*.

Overall, we find that *home bias* and *government effectiveness* are most strongly and consistently related to the sovereign-bank nexus. Although we do not identify causal relations in our study, it seems quite plausible that causal effects from banks' *home bias* and from *government effectiveness* on the *sovereign-bank nexus* exist. Consequently, promoting banks' diversification of sovereign exposures could be a relatively simple and effective measure to mitigate the *sovereign-bank nexus*. Strengthening countries' perceived government effectiveness is arguably the more difficult thing to achieve.

- Table 10 about here -

References

- Acharya, V., Drechsler, I., Schnabl, P., 2014. A pyrrhic victory? Bank bailouts and sovereign credit risk. *Journal of Finance* 69 (6), 2689–2739.
- Altavilla, C., Pagano, M., Simonelli, S., 2016. Bank exposures and sovereign stress transmission. CEPR Discussion Paper No. DP11269.
- Beltratti, A., Stulz, R. M., 2015. Bank sovereign bond holdings, sovereign shock spillovers, and moral hazard during the European crisis. NBER Working Paper No. 21150.
- De Marco, F., Macchiavelli, M., 2016. The political origin of home bias: The case of Europe. Working paper.
- Gennaioli, N., Martin, A., Rossi, S., 2014. Sovereign default, domestic banks, and financial institutions. *The Journal of Finance* 69 (2), 819–866.
- Horváth, B., Huizinga, H., Ioannidou, V., 2015. Determinants and valuation effects of the home bias in European banks' sovereign debt portfolios. CEPR Discussion Paper No. DP10661.
- Kallestrup, R., Lando, D., Murgoci, A., 2016. Financial sector linkages and the dynamics of bank and sovereign credit spreads. *Journal of Empirical Finance* 38, 374–393.
- Kaufmann, D., Kraay, A., Mastruzzi, M., 2010. The worldwide governance indicators: Methodology and analytical issues. World Bank Policy Research Working Paper No. 5430.
- Kirschenmann, K., Korte, J., Steffen, S., 2016. The zero risk fallacy - banks' sovereign exposure and sovereign risk spillovers. Working paper.
- Ongena, S., Popov, A. A., Van Horen, N., 2016. The invisible hand of the government: 'moral suasion' during the European sovereign debt crisis. De Nederlandsche Bank Working Paper No. 505.
- Reinhart, C. M., Rogoff, K. S., 2010. Growth in a time of debt. *American Economic Review* 100 (2), 573–578.

Appendix: Tables

Table 1: Overview of bank sample

Country	Banks	Eurozone	# banks
Austria	Erste Group, Raiffeisen Zentralbank	yes	2
Belgium	KBC	yes	1
France	BNP Paribas, Crédit Agricole, Groupe BPCE, Société Générale	yes	4
Germany	Bayern LB, Commerzbank, Deutsche Bank, DZ Bank, HSH Nordbank, LBBW, LB Berlin, NordLB	yes	8
Ireland	Bank of Ireland, Permanent TSB	yes	2
Italy	Intesa Sanpaolo, Monte dei Paschi di Siena, Banco Popolare, Unicredit	yes	4
Netherlands	ABN Amro, ING, Rabobank, SNS Bank	yes	4
Portugal	Banco Comercial Português, Banco BPI, Caixa Geral de Depósitos	yes	3
Spain	BBVA, Banco Popular Español, Banco Santander	yes	3
Total			31

Note: Banks are included in the sample if their CDS data from *Markit CDS* and data on their sovereign exposures from the European Banking Authority's exercises are available over the sample period 2010 to 2015.

Table 2: Variable description

Variable name	Description
<i>Bank and sovereign credit risk (source: MarkitCDS)</i>	
bankCDS	The daily bank credit default swap (CDS) level in basis points.
log(bankCDS)	The natural logarithm of the bank CDS level.
sovCDS	The daily sovereign credit default swap (CDS) level in basis points for the home country where the bank has its headquarter.
log(sovCDS)	The natural logarithm of the sovereign (home country) CDS level.
<i>Banks' sovereign and credit exposures (source: EBA)</i>	
SOVamount(bn)	A bank's sovereign exposures toward its home country (in Euro billion).
totalSOV(bn)	A bank's total sovereign exposures (in Euro billion).
totalSOV-to-equity	Ratio of a bank's total sovereign exposures and its equity.
homeSOV-to-totalSOV	Ratio of a bank's home sovereign exposures and its total sovereign exposures.
home bias	Ratio of a bank's home sovereign exposures and its total sovereign exposures relative to a benchmark, which is the home country's Eurozone GDP share.
<i>Bank characteristics</i>	
equity	A bank's total common equity (in Euro billion). Source: EBA.
tier-1 capital ratio	Ratio of a bank's tier-1 capital and its risk-weighted assets. Source: EBA.
<i>Country characteristics</i>	
GDP	Gross domestic product. Source: Eurostat.
gov-debt	Government consolidated gross debt. Source: Eurostat.
debt-to-GDP	Ratio of government consolidated gross debt and GDP. Source: Eurostat.
gov-effectiveness	Indicator of a country's perceived government effectiveness. Source: World-wide Governance Indicators database provided by the World Bank.
IIPS	A dummy variable that is one for banks with a headquarter in Italy, Ireland, Portugal and Spain, and zero otherwise.

Notes: Daily values are only available for bank and sovereign CDS level. Daily values for other variables are linearly interpolated from the available semiannual or annual data.

Table 3: Overview of EBA’s excercises

EBA exercise	date	bank-country sovereign exposures	bank-country credit exposures
2011 stress test exercise	31 Dec 2010	✓	✓
2011 capital exercise	30 Sep 2011	✓	NA
2012 capital exercise	31 Dec 2011	✓	NA
	30 June 2012	✓	NA
2013 transparency exercise	31 Dec 2012	✓	✓
	30 June 2013	✓	✓
2014 stress test exercise	31 Dec 2013	✓	✓
2015 transparency exercise	31 Dec 2014	✓	✓
	30 June 2015	✓	✓
2016 stress test exercise	31 Dec 2015	✓	✓

Note: The 2012 capital exercise includes banks’ sovereign exposures only toward EEA 30 countries. All other EBA exercises include banks’ sovereign exposures toward countries worldwide, where smaller sovereign exposures toward countries are grouped as ”others“. The 2015 transparency exercise generally includes credit exposures for participating banks, but not for la Caixa (Spain), Banco Popular Español (Spain), Banco Popolare (Italy) and UBI Banca (Italy).

Table 4: Summary statistics

	Obs	Mean	StdDev	Min	5th	50th	95th	Max
<i>Bank and sovereign credit risk</i>								
bankCDS(bps)	46703	228.21	208.10	37.77	65.10	163.04	644.64	2032.86
log(bankCDS)	46703	5.16	0.69	3.63	4.18	5.09	6.47	7.62
sovCDS(bps)	46703	119.15	177.50	5.74	8.65	50.49	426.27	1554.03
log(sovCDS)	46703	4.06	1.19	1.75	2.16	3.92	6.06	7.35
<i>Banks' sovereign and credit exposures</i>								
SOVamount(bn)	46703	22.69	17.48	0.82	3.06	18.05	56.39	83.49
totalSOV(bn)	46703	44.22	35.85	2.51	6.33	37.94	104.33	214.62
totalSOV-to-equity	45674	2.76	1.60	0.59	1.04	2.35	5.81	11.32
homeSOV-to-totalSOV	46703	0.61	0.27	0.07	0.14	0.66	0.98	1.00
home bias	46703	0.46	0.27	-0.15	-0.02	0.49	0.86	0.96
<i>Bank characteristics</i>								
equity(bn)	45674	20.32	18.37	1.25	2.36	10.50	58.71	75.47
tier1-ratio	45674	0.11	0.03	0.05	0.07	0.11	0.16	0.19
<i>Country characteristics</i>								
GDP	46703	1461.52	1004.25	166.16	173.45	1604.48	2915.65	3025.90
gov debt	46703	1275.67	841.84	144.23	201.27	1754.68	2177.83	2193.26
debt-to-GDP	46703	0.91	0.22	0.59	0.62	0.85	1.30	1.33
gov-effectiveness	46703	1.33	0.44	0.38	0.38	1.52	1.83	1.84

Notes: This table shows summary statistics for all variables used in the analysis. The sample includes 31 Eurozone banks over the period 2010 to 2015. See Table 2 for a detailed description of all variables.

Table 5: Relation between bank CDS and sovereign CDS over time

Dep. variable: Year	2010-2015 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)	2016H1 (9)
Panel A: Full sample									
log(sovcDS)	0.4087*** (0.0000)	0.3417*** (0.0012)	0.4274*** (0.0000)	0.5869*** (0.0000)	0.4510*** (0.0000)	0.4276*** (0.0000)	0.2794*** (0.0006)	0.2461*** (0.0017)	0.3950*** (0.0000)
Constant	3.2257*** (0.0000)	3.4436*** (0.0000)	3.1438*** (0.0000)	2.7808*** (0.0000)	3.5840*** (0.0000)	3.5698*** (0.0000)	3.7728*** (0.0000)	3.9576*** (0.0000)	3.6161*** (0.0000)
Year FE	Yes	No	No	No	No	No	No	No	No
Country FE	No	No	No	No	No	No	No	No	No
N. of banks	31	28	29	30	31	31	31	31	31
N. of Obs.	46703	7308	7397	7663	7834	8091	7768	7950	3884
Adj. R2	0.6663	0.1881	0.4984	0.7840	0.7883	0.6740	0.2449	0.2395	0.4284
Panel B: Non-IIPS and IIPS banks									
log(sovcDS)	0.2452*** (0.0003)	0.5202*** (0.0000)	0.2274*** (0.0099)	0.4371*** (0.0000)	0.3275*** (0.0000)	0.2300* (0.0513)	-0.1591 (0.2427)	-0.1799 (0.1753)	-0.2149 (0.2030)
iips=1	-1.4222*** (0.0092)	-2.0618*** (0.0134)	-5.1991*** (0.0000)	-2.1737*** (0.0003)	-1.1981** (0.0381)	-0.3904 (0.6447)	-1.3660 (0.2072)	-1.2545 (0.2757)	-2.2816** (0.0108)
iips=1 × log(sovcDS)	0.3361*** (0.0006)	0.3431* (0.0648)	1.0302*** (0.0000)	0.4118*** (0.0001)	0.2511*** (0.0085)	0.1668 (0.3451)	0.4847* (0.0504)	0.5060* (0.0721)	0.7672*** (0.0015)
Constant	3.8078*** (0.0000)	2.9126*** (0.0000)	3.9428*** (0.0000)	3.4020*** (0.0000)	4.0413*** (0.0000)	4.1581*** (0.0000)	4.9902*** (0.0000)	4.9434*** (0.0000)	5.2314*** (0.0000)
Year FE	Yes	No	No	No	No	No	No	No	No
Country FE	No	No	No	No	No	No	No	No	No
N. of banks	31	28	29	30	31	31	31	31	31
N. of Obs.	46703	7308	7397	7663	7834	8091	7768	7950	3884
Adj. R2	0.7002	0.3955	0.7102	0.8205	0.8042	0.6905	0.3272	0.3579	0.5380
Effects for Non-IIPS and IIPS banks									
log(sovcDS) (iips=0)	0.2452*** (0.0003)	0.5202*** (0.0000)	0.2274*** (0.0099)	0.4371*** (0.0000)	0.3275*** (0.0000)	0.2300* (0.0513)	-0.1591 (0.2427)	-0.1799 (0.1753)	-0.2149 (0.2030)
log(sovcDS) (iips=1)	0.5813*** (0.0000)	0.8633*** (0.0000)	1.2576*** (0.0000)	0.8489*** (0.0000)	0.5787*** (0.0000)	0.3968*** (0.0053)	0.3256 (0.1085)	0.3261 (0.1818)	0.5523*** (0.0007)

Notes: Standard errors are clustered on bank level. We show p-values in parentheses. The ***, ** and * stand for significant coefficients at the 1%, 5%, and 10% levels, respectively.

Table 6: The role of home country sovereign exposures

Dep. variable:	log(bankCDS)			
	(1)	(2)	(3)	(4)
log(sovCDS)_m	0.1389 (0.1556)	0.3043*** (0.0010)	0.1458** (0.0300)	0.3318*** (0.0000)
homeSOV-to-totalSOV	0.3248** (0.0412)	0.3750*** (0.0086)		
log(sovCDS)_m × homeSOV-to-totalSOV	0.3735*** (0.0073)	0.3076** (0.0196)		
totalSOV-to-EQ_m	0.0185 (0.4564)	0.0277 (0.3741)	0.0210 (0.3204)	0.0306 (0.3119)
log(sovCDS)_m × totalSOV-to-EQ_m	-0.0593*** (0.0009)	-0.0263 (0.1274)	-0.0442*** (0.0081)	-0.0218 (0.1722)
home_bias			0.4120*** (0.0032)	0.3779*** (0.0090)
log(sovCDS)_m × home_bias			0.4072*** (0.0004)	0.3226*** (0.0060)
Constant	4.6760*** (0.0000)	4.6350*** (0.0000)	4.6806*** (0.0000)	4.6780*** (0.0000)
Time FE	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes
N. of banks	31	31	31	31
N. of Obs.	45674	45674	45674	45674
Adj. R2	0.7387	0.7819	0.7515	0.7837

Notes: Standard errors are clustered on bank level. We show p-values in parentheses. The ***, ** and * stand for significant coefficients at the 1%, 5%, and 10% levels, respectively.

Table 7: The role of bank equity

Dep. variable:	log(bankCDS)			
	(1)	(2)	(3)	(4)
	est1	est2	est3	est4
log(sovCDS)_m	0.3959*** (0.0000)	0.5401*** (0.0000)	0.1390** (0.0359)	0.3951*** (0.0000)
tier1-ratio_m	-2.9485 (0.2031)	-6.8090*** (0.0011)	-1.3175 (0.4486)	-5.0207*** (0.0081)
log(sovCDS)_m × tier1-ratio_m	-1.0380 (0.3590)	-2.0097** (0.0130)	-0.0427 (0.9642)	-1.3853* (0.0953)
home_bias			0.4223*** (0.0024)	0.3320** (0.0249)
log(sovCDS)_m × home_bias			0.3972*** (0.0004)	0.2340** (0.0251)
totalSOV-to-equity_m			0.0148 (0.4754)	0.0103 (0.7152)
log(sovCDS)_m × totalSOV-to-equity_m			-0.0428** (0.0107)	-0.0142 (0.3544)
Constant	4.8216*** (0.0000)	4.6720*** (0.0000)	4.6474*** (0.0000)	4.5617*** (0.0000)
Time FE	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes
N. of banks	31	31	31	31
N. of Obs.	45674	45674	45674	45674
Adj. R2	0.6959	0.7809	0.7526	0.7945

Notes: Standard errors are clustered on bank level. We show p-values in parentheses. The ***, ** and * stand for significant coefficients at the 1%, 5%, and 10% levels, respectively.

Table 8: The role of country characteristics

Dep. variable:	log(bankCDS)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(sovCDS)_m	0.4679*** (0.0000)	0.5547*** (0.0000)	0.2682*** (0.0009)	0.4261*** (0.0000)	0.5357*** (0.0000)	0.5423*** (0.0000)	0.3348*** (0.0000)	0.4218*** (0.0000)
debt-to-GDP_m	-0.5442 (0.2380)	-1.2167*** (0.0000)	-0.4916 (0.2160)	-1.1619*** (0.0001)				
log(sovCDS)_m × debt-to-GDP_m	0.6417*** (0.0050)	0.4852*** (0.0004)	0.3164 (0.1421)	0.3053** (0.0324)				
home_bias			0.4089*** (0.0052)	0.3775** (0.0111)			0.4065*** (0.0055)	0.3537** (0.0176)
log(sovCDS)_m × home_bias			0.3016** (0.0164)	0.2406* (0.0521)			0.2735** (0.0328)	0.2026* (0.0888)
totalSOV-to-equity_m			0.0250 (0.2994)	0.0395 (0.1710)			0.0321 (0.1626)	0.0365 (0.2325)
log(sovCDS)_m × totalSOV-to-equity_m			-0.0349 (0.1085)	-0.0118 (0.4341)			-0.0307 (0.1411)	-0.0148 (0.3462)
gov-effectiveness_m					0.5043** (0.0145)	0.0893 (0.6931)	0.4245** (0.0128)	0.1178 (0.6020)
log(sovCDS)_m × gov-effectiveness_m					-0.3914*** (0.0022)	-0.3976*** (0.0000)	-0.2387** (0.0322)	-0.3169*** (0.0001)
Constant	4.8359*** (0.0000)	4.7713*** (0.0000)	4.6277*** (0.0000)	4.5711*** (0.0000)	4.8030*** (0.0000)	4.7958*** (0.0000)	4.6187*** (0.0000)	4.6208*** (0.0000)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes	No	Yes
N. of banks	31	31	31	31	31	31	31	31
N. of Obs.	46703	46703	45674	45674	46703	46703	45674	45674
Adj. R2	0.7042	0.7566	0.7622	0.7951	0.7185	0.7633	0.7771	0.7982

Notes: Standard errors are clustered on bank level. We show p-values in parentheses. The ***, ** and * stand for significant coefficients at the 1%, 5%, and 10% levels, respectively.

Table 9: Combined analysis

Dep. variable:	log(bankCDS)	
	(1)	(2)
log(sovCDS)_m	0.3195*** (0.0000)	0.4642*** (0.0000)
home_bias	0.4328*** (0.0014)	0.3544** (0.0194)
log(sovCDS)_m × home_bias	0.2211* (0.0516)	0.1604 (0.1362)
totalSOV-to-equity_m	0.0096 (0.6546)	0.0096 (0.7184)
log(sovCDS)_m × totalSOV-to-equity_m	-0.0248 (0.2174)	-0.0030 (0.8397)
tier1-ratio_m	-4.1288** (0.0191)	-4.6118*** (0.0079)
log(sovCDS)_m × tier1-ratio_m	0.3152 (0.7659)	0.7231 (0.4404)
debt-to-GDP_m	0.5114 (0.2347)	-0.4145 (0.1346)
log(sovCDS)_m × debt-to-GDP_m	-0.1260 (0.6228)	-0.0258 (0.8665)
gov-effectiveness_m	0.6856*** (0.0000)	0.1422 (0.3941)
log(sovCDS)_m × gov-effectiveness_m	-0.3686*** (0.0019)	-0.3154*** (0.0012)
Constant	4.5480*** (0.0000)	4.4926*** (0.0000)
Time FE	Yes	Yes
Country FE	No	Yes
N. of banks	31	31
N. of Obs.	45674	45674
Adj. R2	0.7879	0.8084

Notes: Standard errors are clustered on bank level. We show p-values in parentheses. The ***, ** and * stand for significant coefficients at the 1%, 5%, and 10% levels, respectively.

Table 10: Overview of regression results

covariate of interest	mean	STD	25%-to-75%	Regression	other covariates	time/ country	FE	coefficient	sig.	effect	range
home bias	0.46	0.27	0.40	Tab. 7 Col. (3)		yes/ no		0.4072	***	0.1629	0.08 to 0.16
				Tab. 7 Col. (4)		yes/ yes		0.3226	***	0.1290	
				Tab. 8 Col. (3)	tier1	yes/ no		0.3972	***	0.1589	
				Tab. 8 Col. (4)	tier1	yes/ yes		0.2340	**	0.0936	
				Tab. 9 Col. (3)	debt-to-GDP	yes/ no		0.3016	**	0.1206	
				Tab. 9 Col. (4)	debt-to-GDP	yes/ yes		0.2406	*	0.0962	
				Tab. 9 Col. (7)	gov-eff	yes/ no		0.2736	**	0.1094	
				Tab. 9 Col. (8)	gov-eff	yes/ yes		0.2026	*	0.0810	
tier1-ratio	0.11	0.03	0.04	Tab. 8 Col. (1)		yes/ no		-1.0380	insig.	-0.0415	0 to -0.08
				Tab. 8 Col. (2)		yes/ yes		-2.0097	**	-0.0804	
				Tab. 8 Col. (3)	home bias	yes/ no		-0.0427	insig.	-0.0017	
				Tab. 8 Col. (4)	home bias	yes/ yes		-1.3853	*	-0.0554	
debt-to-GDP	0.91	0.22	0.31	Tab. 9 Col. (1)		yes/ no		0.6417	***	0.1989	0 to 0.20
				Tab. 9 Col. (2)		yes/ yes		0.4852	***	0.1504	
				Tab. 9 Col. (3)	home bias	yes/ no		0.3164	insig.	0.0981	
				Tab. 9 Col. (4)	home bias	yes/ yes		0.3053	**	0.0946	
gov-effectiveness	1.33	0.44	0.57	Tab. 9 Col. (5)		yes/ no		-0.3914	***	-0.2231	-0.14 to -0.22
				Tab. 9 Col. (6)		yes/ yes		-0.3976	***	-0.2266	
				Tab. 9 Col. (7)	home bias	yes/ no		-0.2387	**	-0.1361	
				Tab. 9 Col. (8)	home bias	yes/ yes		-0.3169	***	-0.1806	

Notes: This table provides an overview of regression results. See Tables 7 to 9 for further details about the respective specifications.