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Does the European Financial Stability Facility bail out sovereigns or banks? An event study[1]

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Abstract: On May 9, 2010 euro zone countries announced the creation of the European Financial Stability Facility as a response to the sovereign debt crisis. This paper investigates the impact of this announcement on bank share prices, bank CDS spreads and sovereign CDS spreads. The main private beneficiaries were bank creditors, especially of banks heavily exposed to southern Europe and Ireland. Furthermore, countries with banking systems heavily exposed to southern Europe and Ireland benefited, as evidenced by lower sovereign CDS spreads. The combined gains of bank debt holders and shareholders exceed the increase in the value of their banks' sovereign debt exposures, suggesting that banks saw their contingent claim on the financial safety net increase in value.

Key words: Bailout, Banking, CDS spreads, Sovereign debt
JEL classifications: G21, G28, H63

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1 Introduction

On Sunday May 9 2010, euro zone politicians, the ECB and the IMF laid out a new strategy to deal with the European sovereign debt crisis. Foremost, the euro zone countries announced the creation of the European Financial Stability Facility (EFSF) which was to provide loans to euro zone countries experiencing refinancing problems. The EFSF would have €440 billion at its disposal, with its own debt guaranteed by the set of euro zone countries. At the same time, the IMF and the European Financial Stabilization Mechanism were to make €250 billion and €60 billion available, respectively, for external support to euro zone countries, bringing the total amount earmarked for such support to €750 billion. Simultaneously, the ECB stated that it was willing to start purchasing euro zone debt in the secondary market in an effort to contain the yields on these instruments.

The EFSF can provide loans only to euro zone governments. The immediate effect of its creation should have been to reduce the probability of an imminent default by heavily indebted euro zone countries, possibly at the expense of a somewhat higher probability of default of non-recipient, euro zone countries that guarantee the EFSF debt.

European banks can be materially affected by the creation of the EFSF as well. European banks hold large portfolios of European sovereign debt, and the market value of these debts is impacted immediately by a change in the creditworthiness of euro zone governments. More indirectly, European banks rely on their national governments for bailout support in case they experience financial distress. The existence of the EFSF increases the access to finance for heavily indebted euro zone countries, thereby making it more likely that these countries can support their distressed banks. However, the EFSF reduces the residual fiscal capacity of its guarantor countries, possibly reducing the value of their financial safety nets to their resident banks. This suggests that the impact of the EFSF on euro zone banks depends on the size and composition of their sovereign debt portfolios and also on their country of residence.

The announcement of the EFSF triggered strong reactions in financial markets. European bank share prices rose sharply on the Monday after the announcement, to give back most gains in the following days. CDS spreads on bank liabilities and on sovereign debts, in turn, fell immediately and remained at lower levels in subsequent trading sessions.

This paper presents an event study of the impact of the EFSF announcement on bank share prices, bank CDS spreads, and sovereign CDS spreads. In particular, we relate movements in these market prices to data on bank-level sovereign debt portfolios, as made available by the Committee of European Banking Supervisors (CEBS) following EU-wide bank stress tests in early 2010, to information about bank location and, in the case of bank share price movements, to information on government indebtedness.[2] The bank stock excess return regressions are based on a sample of 48 European banks, while the bank CDS regressions use data for 44 banks. The sample of country-level CDS spreads contains 19 observations.

Our main results are as follows. Bank stock excess returns are positively related to bank exposures to Greece, Ireland, Italy, Portugal, and Spain (the GIIPS countries). This suggests that the EFSF announcement strengthened the creditworthiness of GIIPS countries. In addition, we find evidence that banks located in GIIPS countries benefited from the creation of the EFSF. Banks located in GIIPS countries may have benefited independently of their GIIPS sovereign exposure, as the EFSF increases the ability of GIIPS countries to provide generous bailout support in case of bank distress.

Changes in bank CDS spreads, in turn, are negatively related to banks' GIIPS sovereign exposures, but they are positively related to banks' non-GIIPS euro zone sovereign exposures. This is evidence that the EFSF announcement led to an increased valuation of GIIPS debt as reflected in bank CDS spreads, and to a reduced valuation of non-GIIPS euro zone debt. This may reflect that the creation of EFSF improved the repayment prospects for GIIPS countries, at the expense of reduced repayment prospects for non-GIIPS euro zone countries.

Finally, sovereign CDS spreads declined with a national banking system's exposure to GIIPS sovereign debt, while they increased with a national banking system's exposure to non-GIIPS euro zone debt. Sovereign CDS spreads thus reflect the impact of the EFSF on the stability of national banking system, as affected by their holdings of GIIPS and non-GIIPS euro zone debt. We further find some evidence that the CDS spreads of GIIPS countries declined independently of their banking systems' holdings of GIIPS sovereign debt. A caveat is that these

[2] The CEBS was the precursor of the European Banking Authority that was established on January 1, 2011. Using data provided by the CEBS and the EBA, Acharya and Steffen (2013) analyze the motivations of EU banks to invest in sovereign debt.

results are based on a small sample of only 19 countries. All the same, this paper provides some evidence that the EFSF bailed out GIIPS countries indirectly through its impact on national banking systems that are heavily invested in GIIPS sovereign debt, as well as directly.

Previously, Veronesi and Zingales (2010) examined the costs and benefits of the large-scale US government intervention in the financial sector announced on October 13, 2008, which took the form of a preferred equity infusion in the nine largest US commercial banks joined by a three-year government guarantee on new unsecured bank debt issues. These authors conclude that this intervention created a net benefit between $86 and $109 billion arising from a reduction in the probability of bankruptcy on the implicit assumption of a solvent US government. In the EFSF case, banks do not receive equity injections or credit guarantees, but instead are affected through a repricing of their sovereign debt portfolios and of their implicit claims on national financial safety nets, against a background of sovereigns with varying degrees of creditworthiness. By considering sovereign CDS spreads in this paper, we can infer how the EFSF announcement has changed market perceptions of the creditworthiness of EU sovereigns. In particular, a reduction in a country's CDS spread, signaling a higher valuation of its debt, suggests that national creditworthiness has increased.

Several additional papers have examined market reactions to national bank bailouts. Ejsing and Lemke (2009) show that the decline in banks' CDS spreads upon the announcement of rescue packages by European governments in 2008 were accompanied by sovereign CDS spread rises, as investors may have perceived the bailouts as credit risk transfers from the private to the public sector. They also show that both bank and sovereign credit risk is associated with a common (Europe-wide) macroeconomic factor, to which the sensitivity of bank (sovereign) CDS spreads declined (increased) after the bailout announcements. Attinasi et al. (2009) also document private-to-public credit risk transfers induced by European bank bailout announcements, and they find that the size of the packages is not significantly correlated with changes in risk spreads. They interpret this result as a sign that investors regard the packages as commitments to bail out banks, regardless of the size of the present interventions.

King (2009) carries out an event study of rescue package announcements in six countries, including the United States, after the Lehman default. Comparing abnormal bank share price movements and CDS spreads, he finds that government interventions primarily benefited creditors, whereas stock prices continued to decline after an initial increase in most countries.

The exception is the US, where shareholders saw increased valuations, which the author attributes to more favorable conditions of the US bailout. The BIS (2009) reaches a similar conclusion in its comprehensive analysis of the rescue packages seen between October 2008 and April 2009 in ten countries. These bailouts were associated with declining bank CDS spreads, but stock prices dropped as well. This suggests that the rescue packages were successful at decreasing expected credit losses on bank liabilities. However, the interventions decreased existing shareholders' earning and voting rights, and might have lowered the expected profitability of banks.

Sgherri and Zoli (2009) look into the determinants of European sovereign CDS spreads. They find that spread changes are primarily driven by a common time-varying factor, closely related to global risk appetite, but that since the beginning of 2009 markets have become more concerned about the fiscal consequences of potential bailouts of the domestic financial system and future debt dynamics. Similarly, Gerlach et al. (2010) find that sovereign bond spreads are determined by an aggregate risk factor and its interactions with indicators of the size and structure of national banking sectors. Specifically, when aggregate risk increases countries with large banking sectors and low equity ratios experience a greater widening in yield spreads. Dieckmann and Plank (2011), in turn, find that a country with a larger financial sector faces higher CDS spreads – even after controlling for sovereign leverage, i.e. the government debt to GDP ratio. Furthermore, sovereign CDS spreads move together with the health of the financial system – this is true for local and global shocks to the financial sector.

The two-way feedback between the banking system and the public finances is the focus of Acharya et al. (2011), who provide a theoretical model of how banking and sovereign CDS spreads are interrelated. Bank bailouts lead to a deterioration of the public finances, and they increase the incentives to default on sovereign debt. In the model, a large outstanding amount of government debt lowers a government's ability to undertake a bailout, and at the same time it increases the probability of sovereign default. Panageas (2010a, b) considers bank bailouts in an optimal taxation framework, yielding that a government may wish to bail out a bank to prevent the deadweight losses associated with a bank collapse.

Demirgüç-Kunt and Huizinga (2013) provide empirical evidence that banks may have become too big to save. They find that bank valuation is negatively related to public deficits for systemically large banks, while banks' CDS spreads are positively related to public deficits.

These results suggest that countries are experiencing fiscal constraints in providing a financial safety net to their banks.

The remainder of this paper is as follows. Section 2 discusses the data. Section 3 presents the empirical results as related to the initial announcement of the EFSF on May 9, 2010. In addition, in analogous fashion we consider some of the implications of the announcement of a planned expansion of the funds available to the EFSF from €440 billion to €780 billion on June 24, 2011. Section 4 provides some calculations of the impact of the original creation of the EFSF on the absolute values of bank shares, bank liabilities, and bank sovereign portfolios. Section 5 concludes.

2 The data

We obtain data on banks' exposures to government debts of EU member states from the EU-wide stress tests conducted under the auspices of the Committee of European Banking Supervisors in early 2010. The stress tests covered 91 European banks, representing 65% of the European banking market in terms of assets. Our main exposure data are net of impairment and cover debt held in both the banking book and the trading book.[3] The exposure data and other balance sheet variables used in this study reflect consolidated statements. Table 1 provides information about banks' sovereign exposures aggregated by country of residence. Banks located in Germany have the largest aggregate sovereign exposure of €536 billion, followed by French and UK banks with €230 billion and €216 billion, respectively.

We can divide a bank's sovereign exposure by its total assets to obtain a measure of its relative exposure. As seen in Table 1, banks in Greece, Luxemburg, Malta and Poland have an exposure-to-assets ratio exceeding 15%, while the average sovereign exposure-to-assets ratio is 6.01% for the 20 countries in the table.

In the empirical analysis, we restrict ourselves to banks that are publicly listed, which reduces the sample to 48 banks. Sovereign debt-to-assets ratios for the 48 individual banks in our sample are provided in Table A1 in the Appendix. For these banks, bank stock excess returns are calculated using stock price value data obtained from Datastream for one-day, three-day, and

[3] We use exposure data net of credit risk mitigation, for instance, through hedging. For three banks, in particular KBC Bank, Dexia and Hypo Real Estate, such net figures are not available, and instead we use figures gross of credit risk mitigation.

five-day event windows centered on the event date of May 10, 2010. Specifically, we calculate excess return, er_L^i, of bank *i* for an event window of *L* days using the following formula:

$$er_L^i = \ln\left(P^i_{t+0.5(L-1)} \Big/ P^i_{t-0.5(L+1)}\right) - \beta^i \ln\left(P^{MSCI}_{t+0.5(L-1)} \Big/ P^{MSCI}_{t-0.5(L+1)}\right)$$

where P_s^i is the closing market value of bank *i* on day *s* in euros, and *t* is the event day of May 10, 2010, which is the first trading day following the announcement. In this expression, β^i is the estimated market beta of bank *i* based on a 6-month sample of daily returns in the period from the beginning of October 2009 to the end of March 2010. As a proxy for the market portfolio, we use the MSCI World Index in euros.[4]

As measures of changes in bank and sovereign debt values, we use CDS spread changes over the event windows.[5] We use CDS spreads on senior unsecured bonds for five-year contracts, as these contracts are the most liquid.[6] Also, we restrict the sample to CDS contracts with a modified restructuring (MR) clause in the case of banks following Jorion and Zhang (2007).[7] This yields a sample of 44 bank CDS spread changes, and a sample of 19 sovereign CDS spread changes for EU countries where at least one of the banks included in the stress test conducted by the CEBS is located. All CDS spread data are taken from Datastream.

At the country level, we use the Government debt variable as an index of the state of a country's public finances. This variable is constructed as the consolidated gross debt of the general government as a percentage of GDP at the end of 2009. Government debt data are obtained from Eurostat. Finally, we construct a dummy variable for banks that indicates whether a bank is located in a GIIPS country, and we construct a dummy variable for countries signaling whether a country is a GIIPS country.

Figure 1 plots the average excess returns for banks located in GIIPS countries and other EU countries during the period from 30 trading days before May 10, 2010 to 30 trading days

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[4] We calculate excess returns relative to a worldwide stock market index, as the event had a material effect on national market indices. In the empirical work, we consider bank stock excess returns relative to the MSCI Europe Index and national stock market indices in robustness checks.

[5] We do not to work with abnormal or excess CDS spread changes, as the announcement might have had a significant effect on CDS spread indices.

[6] In the empirical work, we also consider CDS spreads for subordinated bank debt in a robustness check.

[7] Modified restructuring clauses are part of the ISDA documentation since 2001. MR limits the maturity of obligations to be delivered after the credit event.

after this date. Bank share prices declined considerably especially in GIIPS countries prior to the event day. On the event day, bank stocks experienced excess returns of on average 8.4% for the 48 banks in our sample, with bank shares in GIIPS countries rising relatively more. However, bank share prices partially reversed their gains in subsequent days. Over a three-day event window, the average bank stock excess return had declined to 4.1%, while over a five-day event window it only was 1.8%.

The large initial increase in bank stock prices following the EFSF announcement suggests that this announcement was not anticipated by bank stock investors.[8] The decline in the immediate bank share gains following the announcement, in turn, cannot be explained by additional news with severe negative implications for bank valuations, as is evident from a summary of events surrounding the event day of May 10, 2010 provided in Table A2 in the Appendix. Instead, the reversal of some initial bank stock gains appears to reflect a reappraisal of the implications of the announcement itself for bank valuation. Similar patterns of stock price movements after the announcements of national bank rescue packages in the fall of 2008 are noted by King (2009) and the BIS (2009). In all these instances, bank stock investors appear to have concluded that the bailouts primarily are to the benefit of bank creditors.

In analogous fashion, Figure 1 plots the development of average CDS spreads for banks located in GIIPS countries and other EU countries during the period around the EFSF announcement. Throughout this period, banks located in GIIPS countries have significantly higher CDS spreads than banks located in other EU countries. CDS spreads for both groups of banks rose sharply prior to the event day, to decline subsequently. The average one-day decline in average bank CDS spread following the event was 44.8 basis points. Over three-day and five-

[8] Related news articles that appeared in the Financial Times and the Wall Street Journal between May 5, 2010 and May 12, 2010 can be summarized as follows. Prior to the EFSF announcement, articles were dominated by fears of contagion from the Greek sovereign debt crisis. Several articles pointed out that the previously constructed Greek bailout package was insufficient to contain the crisis. While there was speculation about the possible involvement of the ECB to buy sovereign debt of ailing countries, the announcement of a further euro-zone-wide bailout package was not perceived as imminent. There was fear of a lack of political ability to devise a sustainable solution to the crisis. Some observers noted that European policymakers had hoped that renewed economic growth would solve the crisis, making additional interventions unnecessary. Articles on Monday and Tuesday following the EFSF announcement report huge stock market gains all over the world, especially in the financial sector. These articles suggest that investors did not anticipate the creation of euro-zone-wide stability fund prior to the announcement.

day event windows, the declines in average bank CDS spreads were somewhat smaller at 40.1 and 31.3 basis points, respectively.

Figure 1 also displays the average country-level CDS spreads for GIIPS countries and other EU countries before and after the EFSF announcement. As in the case of bank CDS spreads, average country CDS spreads rose sharply before the event day and fell off significantly afterwards, especially for GIIPS countries. In fact, the developments of average bank and country CDS spreads in Figure 1 for GIIPS countries and non-GIIPS countries are remarkably similar, indicating that market operators see the fortunes of banks and their countries of residence as tightly linked.[9] The average decline in country CDS spreads over one-day, three-day, and five-day event windows is rather stable at 52.9, 54.5 and 51.5 basis points, respectively.

Table 2 provides formal tests of whether the mean bank stock excess returns, and changes in bank and country CDS spreads over the various event windows are different from zero. The mean values of the excess returns and CDS spread changes are in all instances seen to be statistically different from zero at the 5% level.[10]

To conclude this section, Figure 2 provides plots of bank excess returns and bank and country CDS spreads around the EFSF announcement for 8 selected EU countries: France, Germany, Greece, Ireland, the Netherlands, Portugal, Spain, and the United Kingdom. Bank stock excess returns, specifically, are measured cumulatively relative to 30 days prior to May 10, 2010. These excess bank stock returns decline for most countries until the EFSF announcement, after which they are relatively stable. The exceptions are Greece and Ireland, where cumulative bank stock excess returns continued to decline after the announcement date. The individual-country pictures confirm that both bank and country CDS spreads increased gradually before the EFSF announcement. Greek sovereign CDS spreads, in particular, increased from an initial 309 basis points on April 1 to 893 basis points on April 27, when Standard & Poor's downgraded Greek debt to junk status. During the same period, the insurance cost of German sovereign risk climbed from 30 basis points to 52 basis points, a remarkable 73% increase. Following initial

[9] See also Sgherri and Zoli (2009) and Dieckmann and Plank (2011) for evidence on the co-movement of bank and country CDS spreads at a time of financial crisis.

[10] Extending the event window forward to six days yields a negative and statistically significant mean cumulative excess stock return of -0.013. Even though this unconditional mean is negative, we find that extending the window to six days does not materially affect our results regarding the impact of bank exposure to sovereign debt on bank stock excess returns in unreported regressions.

declines in bank and country CDS spreads after the EFSF announcement, bank and country CDS spreads generally went up again.

Table 3 provides descriptive statistics and correlation matrices for variables used in the bank stock excess return regressions (in Panel A), the bank CDS spread change regressions (in Panel B), and the sovereign CDS spread change regressions (in Panel C). The table indicates that a bank's exposure to GIIPS sovereign debt is highly correlated with whether or not it is located in a GIIPS country. In particular, in Panel A we see that the correlation between the GIIPS exposure variable for banks and the GIIPS location variable is 0.591.

3 Empirical results

In subsection 3.1, we consider the implications of the initial EFSF announcement of May 9, 2010 for bank stock excess returns. Subsections 3.2 and 3.3 in turn examine the impact of this event on bank CDS spreads and sovereign CDS spreads. Finally, subsection 3.4 presents some results regarding the effects of the announcement of the EFSF enlargement on June 24, 2011 on the same set of financial variables.

3.1 Initial announcement and bank stock excess returns

In Table 4, the dependent variable is the bank stock excess stock return calculated over a five-day event window. Standard errors control for clustering at the country level. In regression 1, the bank stock excess return is related to a bank's total EU sovereign debt exposure relative to bank assets and to the GIIPS location variable that indicates whether a bank is located in a GIIPS country. The total exposure variable is estimated with an insignificant coefficient, while the GIIPS location variable is estimated with a positive coefficient of 0.039 that is significant at 5%. Regression 2 replaces the total exposure variable by separate variables for a bank's sovereign exposures to GIIPS countries, non-GIIPS euro zone countries, and non-euro zone countries, all relative to assets. In this regression, the GIIPS location variable obtains a coefficient of 0.018 that is insignificant. Among the exposure variables, the GIIPS exposure variable obtains a coefficient of 0.225 that is significant at 1%, while the other two exposure variables are estimated with insignificant coefficients. The estimated coefficient of 0.225 for the GIIPS exposure variable implies that an increase in the GIIPS variable by one standard deviation of

0.07 (as seen in Table 3, Panel A) is estimated to increase the bank excess return by 0.016 (=0.225*0.07), which is about a third of the standard deviation of the excess return of 0.05. Thus, the impact of a bank's GIIPS exposure on its excess return is economically significant.

Regression 3 includes the national government debt-to-GDP ratio, starting from regression 2. In this regression, the GIIPS location dummy and the GIIPS exposure variable obtain positive coefficients that are significant at 5% and 1%, respectively. This suggests that the EFSF announcement represented a bail-out of banks located in GIIPS countries as well as of banks heavily exposed to GIIPS debt. The government debt variable receives a negative coefficient of -0.001 that is significant at 10%, perhaps reflecting that bank stock investors in heavily indebted euro zone countries were disappointed by the scale and scope of the EFSF, as they realized that any benefits from EFSF would accrue disproportionately to bank debt holders rather than to bank shareholders.

Regression 4 replaces the GIIPS exposure variable by two separate variables that measure a bank's domestic GIIPS exposure, if it is located in a GIIPS country, and the bank's foreign GIIPS exposure starting from regression 2. Both the domestic and foreign GIIPS exposure variables obtain positive coefficients, but only the former one is statistically significant. The insignificance of the foreign GIIPS exposure variable perhaps reflects that foreign GIIPS exposure is relatively small, with the mean foreign GIIPS variable only being about a fourth of the domestic GIIPS variable as seen in Panel A of Table 3.

Next, Table 4 provides several robustness checks based on regressions 1 and 3 of this table. First, we consider the implications for statistical inference of our rather small sample size of 48 observations. For such a small sample, statistical inference may be importantly affected by the assumed distribution of the disturbances. To check this, we calculate bootstrapped standard errors, with the results presented as regressions 5-6 of Table 4.[11] The GIIPS location variable is seen to be statistically significant at the 5% level in regression 5, and it is statistically significant at 10% in regression 6, very similar to the corresponding results in regressions 1 and 3. The estimated coefficient for the GIIPS exposure variable is positive and significant at 5% in regression 6, while the government debt variable is not significant in this regression.

[11] We applied standard non-parametric bootstrapping where we resampled observations (with replacement) 1000 times to calculate t-statistics.

Next, we compute bank stock excess returns relative to the MSCI Europe Index rather than the MSCI World Index. The MSCI Europe Index offers a more relevant stock market benchmark for computing European bank stock excess returns to the extent that the European stock market is segmented from the world stock market. However, the European index is a worse comparator index insofar as European non-financial firms are impacted by the EFSF announcement as well, for instance through changed credit market conditions. Results for bank stock excess return regressions using the European index analogous are reported as regressions 7 and 8. In regression 7, the overall exposure variable obtains a positive coefficient that is significant at 10%. Otherwise, the results of regressions 7 and 8 are very similar to regression 1 and 3.

Next, we compute bank stock excess returns relative to national stock market indices rather than the MSCI World Index, with the resulting excess return regressions reported as regressions 9 and 10 in Table 4. In these regressions, the estimated coefficients for the GIIPS location variable are statistically insignificant. The GIIPS exposure variable, however, enters regression 10 with a positive coefficient that is significant at 1%, while the government debt variable enters with a negative coefficient that is significant at 1%.

Finally, we acknowledge that banks can hold sovereign debt in their banking book or in their trading book. Assets held in the banking book generally are held long-term and their valuation tends to be close to historical cost. Assets in the trading book, in turn, are available for sale and tend to be valued at fair value. Banks in our sample held 79% of their sovereign debt in their banking books at the time of the EFSF announcement. The excess return regressions 11 and 12 include sovereign exposure variables that only include sovereign debt held in the banking book, thus focusing on assets that are held for the longer term. The estimated coefficients in these regressions are very similar to those in regressions 1 and 3.

Overall, the results of Table 4 provide evidence that the EFSF announcement benefited banks heavily exposed to GIIPS sovereign debt or located in GIIPS countries.

3.2 Initial announcement and bank CDS spread changes

Table 5 shows the results of regressions of 5-year bank CDS spread changes in five-day windows around the announcement. Analogously to regression 1 of Table 4, regression 1 of

Table 5 relates the bank CDS spread change to the total sovereign debt exposure variable and to the GIIPS location variable for a sample of 44 banks. The total exposure variable is estimated with an insignificant coefficient, while the GIIPS location variable is estimated with a negative coefficient that is significant at 5%. The EFSF announcement thus appears to have reduced expected credit losses on the senior debts of banks located in GIIPS countries. In regression 2, the total exposure variable is split into exposures to the GIIPS countries, the non-GIIPS euro zone countries, and the non-euro zone countries. Now the GIIPS location variable enters with an insignificant coefficient. Among the exposure variables, the GIIPS exposure variable obtains a negative coefficient that is insignificant, and the non-GIIPS EMU exposure variable obtains a positive coefficient that is significant at 5%. This suggests that the EFSF initiative has reduced the solidity of non-GIIPS euro zone sovereign debt as the pertinent countries have taken on additional liabilities by joining the EFSF. The GIIPS location and GIIPS exposure variables, as included in regression 2, have a high correlation of 0.741, which makes it difficult to precisely estimate their separate effects on bank CDS spread changes. In regression 3, we exclude the GIIPS location variable, but we retain the GIIPS exposure variable. In this regression, the GIIPS exposure variable is estimated with a negative coefficient that is significant at 1%, and the non-GIIPS EMU exposure variable is estimated with a positive coefficient that is significant at 10%. In regression 4, we split the GIIPS exposure variable into separate domestic GIIPS exposure and foreign GIIPS exposure variables. These two variables obtain negative coefficients of similar magnitude, but only the first one is statistically significant, perhaps reflecting the dominance of domestic GIIPS exposure. In this regression, the non-GIIPS exposure variable obtains a positive coefficient, but it is statistically insignificant.

Next, the table reports the results of several robustness checks as applied to regressions 1 and 2 of Table 5. To start, regressions 5 and 6 report errors obtained by bootstrapping. The GIIPS location variable obtains a coefficient that is negative and significant at 5% in regression 5, while no variable is estimated with significance in regression 6.

In regressions 7 and 8, the dependent variable is the CDS spread change related to subordinated bank debt rather than senior bank debt, which reduces the number of observations from 44 to 35. In regression 7, the GIIPS location variable receives a negative coefficient that is significant at 10%. In regression 8 the GIIPS exposure variable obtains a negative coefficient that is significant at 10%. The latter result provides some evidence that the EFSF initiative

reduced the expected credit losses on bank debt of banks with exposures to GIIPS debt, even if we control for whether or not banks are located in a GIIPS country. Finally, regressions 9 and 10 include exposure variables that only reflect a bank's sovereign exposures as held in the banking book. The results are very similar to those reported in regressions 1 and 2.

Overall, Table 5 provides some evidence that the EFSF announcement caused CDS spreads to decline for banks located in GIIPS countries and with GIIPS exposure, while it caused CDS spreads to increase for banks with non-GIIPS euro zone exposure. This suggests that the EFSF served to transfer creditworthiness from non-GIIPS euro zone countries to GIIPS countries.

3.3 Initial announcement and country CDS spread changes

Table 6 presents the results of regressions of changes in sovereign CDS spreads in five-day windows around the announcement. The sample contains a limited number of 19 countries where at least one of the banks included in the stress test conducted by the CEBS is located. Regressions 1-3 in Table 6 are analogous to regressions 1-3 of Table 5, with the proviso that sovereign CDS spread changes are related to sovereign debt exposures of entire national banking systems relative to GDP – rather than to sovereign debt exposures of individual banks relative to bank assets. In regression 1, the overall exposure variable is insignificant, while the GIIPS country variable obtains a negative coefficient that is significant at 1%. The EFSF initiative thus appears to have reduced expected credit losses on GIIPS sovereign debt. In regression 2, the coefficients for the GIIPS country and GIIPS exposure variables are estimated with negative coefficients that are significant at 5% and 10%, respectively. This suggests that GIIPS countries and countries with banking systems exposed to GIIPS sovereign debt saw their public creditworthiness improve. In regression 3, the GIIPS exposure variable receives a negative coefficient that is significant at 1%, while the non-GIIPS EMU exposure variable receives a positive coefficient that is significant at 5%. Thus, countries with banking systems with exposures to GIIPS countries and non-GIIPS euro zone countries saw their creditworthiness improve and decline, respectively. In regression 4, we split the GIIPS exposure variable into its domestic and foreign components, starting from regression 2. In this regression, the domestic

GIIPS exposure variable obtains a coefficient that is negative and significant, while the foreign GIIPS exposure variable is estimated with a negative and insignificant coefficient.

As a robustness check, columns 5-7 report bootstrapped standard errors for regression 1-3. We see that the GIIPS country variable enters column 5 with a negative coefficient that is significant at 1%, while the non-GIIPS EMU exposure variable enters column 7 with a positive coefficient that is significant at 5%.

Overall, the results reported in Table 6 provide evidence that national creditworthiness improved for GIIPS countries and for countries with banking systems exposed to GIIPS debt following the EFSF announcement, while it declined for countries with banking systems exposed to non-GIIPS euro zone country debt. This evidence, however, is only suggestive as it is based on a small sample of only 19 countries.

3.4 Announcement of the EFSF enlargement

On June 24, 2011, the EU heads of state and government announced an enlargement of the funds available to the EFSF from the original €440 billion to €780, representing a 77% increase. The announcement of an EFSF enlargement per se was not surprising as it was widely recognized that the EFSF, as originally conceived, was too small to fund major euro zone countries such as Spain or Italy for a significant amount of time, if needed. This suggests that the announcement of an EFSF expansion on June 24, 2011 to some extent was already priced into bank share prices and bank and sovereign CDS contracts.[12] All the same, there was considerable uncertainty about the size of any EFSF enlargement, in case euro zone countries would agree that an enlargement was necessary. In this subsection, we present some results on how the

[12] A review of related new articles that appeared in the Financial Times and the Wall Street Journal between June 20, 2011 and June 27, 2011 reveals that plans to extend the effective lending capacity of the EFSF were discussed prior to the announcement in the Financial Times of June 20, 2011. Around the announcement date, several related events occurred. Specifically, changes were planned to the rules of the future European Stability Mechanism (ESM). In addition, on June 23, 2011 officials of Greece, the EU and the IMF agreed on plans for further spending cuts and tax increases. Following the announcement, the euro as well as certain Italian bank stocks plunged, possibly because of fears that the steps taken thus far would not prevent the spread of the debt crisis. These news reports suggest that some effects of the announcement of the EFSF expansion could already have been priced beforehand, and that the impact of the enlargement of the EFSF cannot be fully separated from other related events.

announcement of the EFSF enlargement impacted bank stock excess returns and changes in bank and sovereign CDS spreads in a five-day event window centered around June 24, 2011.

To start, regressions 1-3 of Table 7 present the results of bank stock excess returns regressions analogous to regressions 1-3 of Table 4. In regression 1, we see that the GIIPS location variable obtains a negative coefficient that is significant at 1%. This may reflect that shareholders of banks located in GIIPS countries were disappointed by the announced EFSF enlargement, as they expected it to be bigger. In regression 2, the non-GIIPS EMU exposure variable obtains a positive coefficient that is significant at 10%, suggesting that the enlargement announcement positively affected the valuation of non-GIIPS euro zone sovereign debt (as the small size of the announced enlargement contained the implied reduction of the creditworthiness of non-GIIPS euro zone sovereigns).

Next, we report the results of bank CDS spread change regressions analogous to regressions 1 and 2 of Table 5 as regressions 4 and 5 of Table 7. In regression 4, the GIIPS location variable is estimated with a positive coefficient that is significant at 1%, indicating a reduced creditworthiness of banks located in GIIPS countries. This is consistent with the view that the announced enlargement of the EFSF was smaller than previously expected.

Finally, the corresponding regressions for sovereign CDS spread changes are represented as regressions 6 and 7. In regressions 6 and 7, the GIIPS country variable enters with positive coefficients that are significant at 1% and 10%, respectively. Furthermore, in regression 7 the banking-system GIIPS exposure variable obtains a positive coefficient that is significant at 10%. These results, and the findings in Table 7 generally, are consistent with an announced enlargement of the EFSF that fell short of expectations.

4 The overall valuation effects of the initial EFSF announcement

In this section we use the regression results and actual market movements to quantify the effects of the initial EFSF announcement for the market values of bank shares, bank liabilities and bank portfolios of sovereign debts.

Changes in stock valuations are obtained in a standard way: excess returns over the five-day event window are multiplied by the market value of shares at the beginning of the event window.

Changes in the market values of bank liabilities and sovereign debt portfolios are calculated in a somewhat more involved way by capitalizing changes in CDS spreads analogously to Veronesi and Zingales (2010). Specifically, we take the change in the market value of a debt instrument to be the change in the presented discounted value of the cost of insuring the principal against default up to the maturity of the instrument using the CDS market as follows[13]

$$\Delta E = -\Delta I, \tag{1}$$

where E is the market value of a debt exposure and I is the market value of insuring against default.

The present value of the insurance cost is

$$I = \sum_{t=0}^{T} \frac{CDS(t)}{10000} D(t)Q(t)Z(t), \tag{2}$$

where $D(t)$ is the amount of existing debt that will not have matured by time t, $Z(t)$ is the risk free discount factor, $Q(t)$ is the probability of not defaulting up to time t, and T is the maximum maturity of the debt. Note that a division by 10 000 is necessary, because CDS spreads are in basis points. Equations 1 and 2 imply

$$\Delta E = -\left|\sum_{t=0}^{T} \frac{CDS_1(t)}{10000} D(t)Q_1(t)Z(t) - \sum_{t=0}^{T} \frac{CDS_0(t)}{10000} D(t)Q_0(t)Z(t)\right| \tag{3}$$

where subscript 1 denotes values after the event, and subscript 0 denotes values before the event.

We assume that the instantaneous probability of default is constant. In this case, we obtain $Q(t)$ from the formula $Q(t) = e^{-t\frac{CDS(t)}{10000(1-\delta)}}$, where δ is the recovery rate in the event of default (see the Appendix of Veronesi and Zingales (2010)). The recovery rate is set to 0.6, which is a standard assumption in CDS markets. For simplicity, we assume a constant risk-free interest rate equal to 2% per annum. The discount factor is then $Z(t) = \exp(-0.02t)$, where t denotes time. We assume that the average maturity of bank liabilities is 5 years for all banks, while that of government bonds is 4 years for all countries.[14] Further, we assume that in each

[13] We ignore that over the event window the market value of a debt instrument may alternatively have changed due to a change in the risk-free interest rate.

[14] On average these figures seem to be reasonable, see, for example, The Economist, Cutting it fine, May 7, 2011.

year the same nominal amount of debt matures, or one fifth of the initial nominal stock of bank liabilities and one quarter of the initial stock of government bonds.

We first consider the changes in the market value of bank portfolios of GIIPS debt and its implication for the market valuation of bank shares and bank liabilities. Specifically, column 1 of Panel A of Table 8 provides the changes in the market value of banks' GIIPS debt – aggregated by country of bank location – using the above methodology. The total change in the market value of GIIPS debt for the 35 banks in our sample, for which we also have CDS spread data, is around €12.7 billion.

Column 2 shows our estimates of the changes in the market value of bank liabilities due to banks' exposure to GIIPS sovereign debt. These figures are obtained as follows. Using regression 2 in Table 5 we predict banks' CDS spread changes associated with their GIIPS exposure (as the product of the coefficient on the GIIPS exposure variable, estimated at -261.485, and each bank's exposure to this set of countries). We then use equation 3 to obtain an approximation of the change in the market value of bank liabilities. The bank liabilities used in this calculation exclude customer deposits, as the valuation of these liabilities is not expected to change substantially on account of explicit deposit insurance and a high seniority. In the table, we see that the calculated change in the market value of bank liabilities associated with their GIIPS exposure is €10.2 billion.

Unfortunately, this estimate of the change in the value of bank liabilities on account of banks' GIIPS exposure is rather imprecise, as the coefficient of -261.485 in regression 2 of Table 5, on which this estimate is based, is not statistically significant. The corresponding estimated coefficient of -545.399 in regression 3 of Table 5, however, is significant at 1%. As a check, we redo the calculations of the presumed changes in the market value of bank liabilities due to banks' GIIPS exposure using this alternative estimate of the relevant coefficient, with the results reported in column 3. This yields an estimated increase in the value of bank liabilities of €21.3 billion. This amount can be interpreted as a high estimate.

Next, column 4 shows estimates of the change in the market value of bank shares associated with their GIIPS exposure, which is calculated as follows. Using regression 2 in Table 4, we predict the excess returns associated with banks' exposure to GIIPS government debt. The product of these figures and the market values of banks before the event window gives the

predicted changes in banks' stock market value. For the entire sample of banks, we calculate the change in market value associated with GIIPS debt to be €3.9 billion.

Columns 5 and 6 provide two alternative estimates of the changes in the total valuations of investor claims on banks - as related to their GIIPS exposure at the time of the EFSF announcement. Column 5, specifically, adds up the calculated changes in the market values of bank liabilities in column 2 and the changes in the market values of shares in column 4. Alternatively, column 6 provides the sum of the calculated changes in the market value of bank liabilities in column 3 and the changes in market values of shares in column 4. As seen in the table, column 5 provides a low estimate of the change in the total value of debt and equity claims on banks of €14.1 billion, while column 6 provides a corresponding high estimate of €25.2 billion. Either estimate is higher than the calculated change in the market value of their GIIPS itself exposure (at €12.7 billion in column 1). Some of this difference may be due to lower expected bankruptcy costs for banks as borne by bank shareholders and liability holders. This would represent an efficiency gain due to the announcement. Alternatively, combined bank liability holder and shareholder gains may be relatively high, as the event increased the fiscal capacity of distressed countries within the euro zone, thereby increasing the value of the contingent claim that banks in these countries have on their financial safety nets.

Next, we present some calculations of the changes in the valuation of overall sovereign debt portfolios, overall bank liabilities, and overall bank share prices over the five-day event window using only market data. Specifically, column 1 of Panel B of Table 8 provides calculations of the changes in the overall values of banks' sovereign debt portfolios – again aggregated at the level of the country of bank location. The change in the total value of bank sovereign exposures is calculated to be €14.5 billion, slightly more than the increase in the value of GIIPS exposures of €12.7 billion in column 1 of Panel A. In column 2, we see that the change in the value of overall bank liabilities is calculated to be €32.8 billion. In column 3, the change in the market values of the 35 banks is calculated to be €9.7 billion. In column 4, we see that the sum of the changes in bank liabilities and bank shares adds up to €42.5 billion. This total change in the valuation of the claims of bank liability and shareholders is about three times the change in the calculated value of sovereign exposures. The difference can again be due to reduced expected bankruptcy costs for the banks themselves or a higher value of contingent bank claims on national financial safety nets. The final column in the table provides information on the book

values of total bank assets for the banks in our sample. Total assets of these 35 banks amount to €23.1 trillion.[15] The calculated change in the total market valuation of bank liabilities and bank shares of €42.5 billion amounts to about 0.18% of the book value of total assets. All the same, for a badly capitalized bank the change in the market value of its sovereign exposure could be material.

5 Conclusion

This paper examines the impact of the announcement of the EFSF on bank share prices, bank CDS spreads and sovereign CDS spreads in the EU using an event study methodology.

Bank shareholders experienced positive excess returns to the extent that their banks held the sovereign debts of GIIPS countries. Bank liability holders of banks invested in GIIPS sovereign debt similarly gained, as reflected in lower bank CDS spreads. At the country level, we find that sovereign CDS spreads declined with the magnitude of national banking systems' exposure to GIIPS debt. This all suggests that the EFSF served to bail out banks that were invested in GIIPS debt.

In addition, we find that bank shareholders of banks located in GIIPS countries experienced more positive returns, even after we control for banks' holdings of GIIPS public debt. This may reflect that the EFSF increased the reliability of the financial safety net in GIIPS countries, as it increased the capacity of GIIPS countries to finance bank bailouts. Regarding sovereign CDS spreads, along similar lines we find that the CDS spreads of GIIPS sovereigns declined, independently of their national banking systems' exposure to GIIPS sovereign debt. Hence, the creation of the EFSF appears to have bailed out GIIPS sovereigns indirectly, through its impact on national banking systems, as well as directly. A caveat is that this paper's results are based on rather small samples of banks and countries.

Calculations of the quantitative impact of the EFSF announcement on the valuation of bank shares and liabilities shows that most of the gains accrued to bank liability holders rather than to bank shareholders. Interestingly, the computed combined gains to bank shareholders and

[15] The total assets of all banks located in the EU amounted to €76.1 trillion in 2009 based on Bankscope data. This suggests that our sample of 35 banks represents 30.3% of the entire EU banking market. Therefore, a rough approximation of the valuation effects of the EFSF announcement for all EU banks can be obtained by scaling up our estimates by the factor 3.30 (= 76.1/23.1).

bank liability holders considerably exceed the direct increase in the valuation of GIIPS sovereign debt on the books of the banks. This probably reflects that the creation of the EFSF strengthened the perceived reliability of the financial safety net in the euro zone. This is not surprising as the EFSF was designed as a general vehicle for intra-euro zone sovereign lending to less creditworthy euro zone governments, rather than simply as some implicit mutual guarantee of previously issued GIIPS sovereign debt.

While the EFSF announcement benefited bank shareholders and bank liability holders to the extent that their banks held GIIPS sovereign debt, it was no free lunch. This is made clear by the fact that bank CDS spreads increased for banks with considerable exposures to non-GIIPS euro zone sovereign debt, while similarly country CDS spreads increased with the size of national banking system exposure to this type of sovereign debt. This is consistent with the view that the EFSF reduced the quality of non-GIIPS euro zone sovereign debt, and in fact transferred some creditworthiness from the non-GIIPS euro zone countries to the GIIPS countries. The fact that the EFSF effectively transfers creditworthiness among euro zone countries implies that there is a limit to how far the EFSF or similar institutions can be scaled up and still be effective.

The existence of a limited potential to expand the EFSF was illustrated by the announced enlargement of the EFSF on June 24, 2011, from an initial size of €440 billion to €780 billion. We find evidence that the size of this expansion was smaller than expected, as shown by negative returns for bank shareholders and higher CDS spreads for banks located in GIIPS countries, as well as higher sovereign CDS spreads in these countries.

The EFSF was created as a temporary rescue fund. In October 2010, the euro zone countries decided to create a permanent rescue mechanism, the European Stability Mechanism (ESM). The ESM entered into force on 8 October 2012. In parallel to the ESM, however, the EFSF continues to provide loans as part of the ongoing programs for Greece, Portugal and Ireland.[16]

Intending to limit future bail-outs of banks in the EU, in June 2013 the European Commission published a draft European directive on a framework for the recovery and resolution of credit institutions and investment firms. This directive severely restricts the

[16] See http://www.efsf.europa.eu/about/index.htm.

potential for national authorities and for the ESM to provide bail-out moneys in future bank resolutions, and instead provides for a mandated bail-in of bank creditors. The publication of this draft directive follows the bail-in of Cypriot banks in 2013, which caused bank creditors, including the owners of deposits in excess of 100,000 euros, to lose part of their claims.

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Appendix

Table A1. Sovereign exposure to total assets ratios for individual banks in percent.

The 48 banks in this table correspond to the sample for bank excess return regressions presented in Table 4.

Country	Bank	Sovereign debt exposure to assets in percent
Austria	Erste Group Bank AG	12.46
	Raiffeisen Zentralbank Oesterreich AG - RZB	7.64
Belgium	Dexia	9.82
	KBC Group	14.72
Cyprus	Marfin Popular Bank Public Co Ltd	9.15
	Bank Of Cyprus Public Co Ltd	8.95
Denmark	Danske Bank	5.90
	Jyske Bank	2.35
	Sydbank	0.97
Finland	Op-Pohjola Group	1.31
France	BNP Paribas	4.17
	Crédit Agricole-Crédit Agricole Group	3.28
	Société Générale	3.49
Germany	Deutsche Bank AG	1.90
	Commerzbank AG	8.04
	Landesbank Berlin AG	13.62
	Deutsche Postbank AG	7.66
Greece	EFG Eurobank Ergasias SA	12.00
	National Bank of Greece SA	18.52
	Alpha Bank AE	7.57
	Piraeus Bank SA	16.63
	Agricultural Bank of Greece	34.54
	TT Hellenic Postbank S.A	33.07
Hungary	FHB Jelzálogbank Nyilvánosan Működő Rt	11.37
	OTP Bank Plc	14.41
Ireland	Allied Irish Banks Plc	5.33
	Bank of Ireland	0.71
Italy	Intesa Sanpaolo S.p.a.	10.65
	UniCredit S.p.a.	8.30
	Banca Monte Dei Paschi Di Siena S.p.a.	4.22

	Banco Popolare	7.02
	Unione Di Banche Italiane Scpa (UBI Banca)	5.30
Malta	Bank of Valletta Plc	16.01
Netherlands	ING Bank NV	3.82
Poland	Powszechna Kasa Oszczednosci Bank Polski SA - PKO BP SA	20.12
Portugal	Banco Comercial Português, SA-Millennium bcp	4.18
	Banco Espirito Santo SA	2.76
	Banco BPI SA	14.38
Spain	Banco Santander SA	5.57
	Banco Bilbao Vizcaya Argentaria SA	9.74
Sweden	Nordea Bank AB (publ)	4.30
	Skandinaviska Enskilda Banken AB	6.24
	Svenska Handelsbanken	3.49
	Swedbank AB	0.20
United Kingdom	Royal Bank of Scotland Group Plc (The)	4.77
	HSBC Holdings Plc	3.34
	Barclays Plc	2.63
	Lloyds Banking Group Plc	0.75

Table A2. Timeline of events surrounding the creation of the EFSF

Source: Reuters

Date	News item
April 11	Euro zone finance ministers approve a €30 billion aid mechanism for Greece, which Athens declines to activate.
April 22	Eurostat says Greece's 2009 budget deficit was 13.6% of GDP, not the 12.7% it had reported.
April 23	Papandreou asks for activation of EU/IMF aid.
April 27	Standard & Poor's downgrades Greece's credit rating to junk status. The next day it downgrades Spain's rating because of poor growth prospects.
	Germany approves a €22.4 billion ($30 billion) share.
	The package amounts to €110 billion over three years and is the first rescue of a member of the 16-nation Euro zone.
May 2	Papandreou says Greece has done a deal with the EU and IMF opening the door to a bailout in exchange for extra budget cuts of €30 billion over three years, on top of measures already set.
May 4/5	Public workers in Greece stage a 48-hour strike. Up to 50,000 protest in Athens. Three people are killed when a bank is set on fire.
May 6	Greek parliament approves latest austerity bill.
May 9	The IMF unanimously approves its part of the rescue loans, and provides €5.5 billion immediately.
	The package consists of €440 billion in guarantees from euro zone states, plus €60 billion in a European debt instrument. The IMF will contribute €250 billion, taking the total to €750 billion, or around $1 trillion.
May 10	Global policymakers install an emergency financial safety net worth €750 billion to bolster financial markets and shore up the euro against contagion from the Greek crisis.
May 11	Germany's cabinet approves the biggest national contribution -- €123 billion in loan guarantees -- to the safety net.
May 12	Spanish Prime Minister Jose Luis Rodriguez Zapatero sets fresh spending cuts of €15 billion in 2010 and 2011.
May 13	Portuguese Prime Minister Jose Socrates and opposition leader Pedro Passos Coelho draw up steps to slash the country's deficit, including public sector pay cuts. The deficit, which hit 9.4% of GDP in 2009, is targeted to fall to 7.3% in 2010 and 4.6% in 2011.
May 18	Germany, in an attack on the financial speculation it blames for the debt crisis, announces a unilateral ban on naked short selling of shares in the country's top 10 financial institutions, on Euro government bonds and on related transactions in credit default swaps (CDS).

May 25	Italy's cabinet approves a €24 billion austerity package with the aim of cutting the deficit to 2.7% of GDP in 2012 from 5.3% in 2009.
May 27	Spain wins parliamentary approval for its €15 billion ($18.4 billion) austerity package by just one vote.
May 28	Fitch cuts Spain's credit rating by one notch to AA+ from AAA after record levels of household and corporate debt in Spain, as well as mounting public debt.

Table A3. Description of variables

Variable	Description	Source
Exposure (B)	Bank's consolidated net exposure to EU sovereign debt relative to assets	CEBS stress test and Bankscope
GIIPS (B)	Bank's consolidated net exposure to GIIPS sovereign debt relative to assets	CEBS stress test and Bankscope
Domestic GIIPS (B)	Bank's consolidated net exposure to domestic sovereign debt relative to assets if located in a GIIPS country and zero otherwise	CEBS stress test and Bankscope
Foreign GIIPS (B)	Bank's consolidated net exposure to foreign GIIPS sovereign debt relative to assets	CEBS stress test and Bankscope
non-GIIPS EMU (B)	Bank's consolidated net exposure to sovereign debt issued by non-GIIPS euro zone countries relative to assets	CEBS stress test and Bankscope
non-EMU (B)	Bank's consolidated net exposure to sovereign debt issued by EU member states outside the euro zone relative to assets	CEBS stress test and Bankscope
Exposure (C)	Banks' consolidated net exposure to EU sovereign debt at the country level relative to GDP	CEBS stress test and Bankscope
GIIPS (C)	Banks' consolidated net exposure to GIIPS sovereign debt at the country level relative to GDP	CEBS stress test and Bankscope
Domestic GIIPS (C)	Banks' consolidated net exposure to domestic sovereign debt at the country level relative to GDP if located in a GIIPS country and zero otherwise	CEBS stress test and Bankscope
Foreign GIIPS (C)	Banks' consolidated net exposure to sovereign debt issued by foreign GIIPS countries at the country level relative to GDP	CEBS stress test and Bankscope
non-GIIPS EMU (C)	Banks' consolidated net exposure to sovereign debt issued by non-GIIPS euro zone countries at the country level relative to GDP	CEBS stress test and Bankscope
non-EMU (C)	Banks' consolidated net exposure to sovereign debt issued by EU member states outside the euro zone at the country level relative to GDP	CEBS stress test and Bankscope
Excess return	Five-day stock return minus bank beta times return on MSCI world index	Datastream
Bank CDS change	Five-day change in the bank's 5-year CDS spread in basis points	Datastream
Sovereign CDS change	Five-day change in the sovereign's 5-year CDS spread in basis points	Datastream
Government debt	General government outstanding debt at the end of 2009 as a percentage of GDP	Eurostat
GIIPS location	Dummy variable that equals one if a bank is located in one of the GIIPS countries, and zero otherwise.	
GIIPS country	Dummy variable that equals one if a country is a GIIPS country, and zero otherwise.	

Table 1. Exposure to sovereign debt issued by GIIPS, non-GIIPS and non-euro zone countries

This table provides information on exposures to sovereign debts of banks aggregated at the level of EU member states in billions of euros and as a percentage of bank assets. All 63 banks are included for which exposure and balance sheet data are available.

Country	In billions of euros				As a percentage of total assets			
	EMU				EMU			
	GIIPS	non-GIIPS	Non EMU	Total	GIIPS	non-GIIPS	Non EMU	Total
Austria	2.8	18.5	16.0	37.3	0.79	5.14	4.44	10.37
Belgium	37.0	51.1	20.8	108.9	3.94	5.46	2.22	11.62
Cyprus	5.3	1.7	0.2	7.2	6.67	2.11	0.28	9.05
Denmark	1.4	6.3	18.9	26.6	0.29	1.29	3.88	5.46
Finland	0.1	0.9	0.1	1.0	0.09	1.10	0.12	1.31
France	66.4	144.2	19.8	230.4	1.10	2.39	0.33	3.82
Germany	144.2	350.1	41.5	535.9	2.60	6.32	0.75	9.67
Greece	56.2	0.9	3.7	60.8	15.24	0.25	1.00	16.49
Hungary	0.0	0.3	5.2	5.5	0.00	0.72	13.46	14.18
Ireland	6.7	1.8	2.3	10.9	1.84	0.50	0.64	2.99
Italy	129.2	34.1	13.2	176.6	6.22	1.64	0.64	8.50
Luxemburg	3.0	2.4	0.1	5.5	8.35	6.68	0.40	15.42
Malta	0.0	0.9	0.0	1.0	0.31	15.13	0.57	16.01
Netherlands	16.5	66.3	9.3	92.1	0.85	3.43	0.48	4.77
Poland	0.0	0.0	6.4	6.4	0.00	0.00	20.12	20.12
Portugal	17.8	1.5	2.0	21.3	5.29	0.45	0.60	6.33
Slovenia	0.3	2.3	0.0	2.6	1.50	12.15	0.04	13.69
Spain	104.0	4.4	4.8	113.2	6.40	0.27	0.29	6.97
Sweden	1.5	15.5	24.4	41.4	0.14	1.46	2.30	3.91
United Kingdom	28.1	122.6	65.1	215.8	0.41	1.78	0.94	3.13
Total	620.7	825.6	254.0	1700.3	2.19	2.92	0.90	6.01

Table 2. Mean tests of bank excess returns and changes in bank and sovereign CDS spreads

This table provides tests of whether mean bank excess returns, bank CDS spread changes and sovereign CDS spread changes as calculated over one-day, three-day and five-day event windows are different from zero. Bank excess return is the bank stock excess stock return. Bank CDS change is the change in the 5-year bank CDS spread. Sovereign CDS change is the change in the 5-year sovereign CDS spread.

	Event window	Sample mean	Standard deviation	t- statistic	p-value
Bank excess returns	One day	0.0839	0.0059	14.15	0.000
	Three days	0.0411	0.0051	8.11	0.000
	Five days	0.0184	0.0068	2.70	0.010
Bank CDS changes	One day	-44.8083	9.4514	-4.74	0.000
	Three days	-40.0513	13.1564	-3.04	0.004
	Five days	-31.3088	7.0050	-4.47	0.000
Sovereign CDS changes	One day	-52.8554	22.0969	-2.39	0.028
	Three days	-54.4940	22.8162	-2.39	0.028
	Five days	-51.4932	22.7354	-2.26	0.036

Table 3. Descriptive statistics and correlation matrices

This table provides descriptive statistics and correlation matrices for variables used in the bank stock excess return regressions (in Panel A), the bank CDS change regressions (in Panel B), and the sovereign CDS change regressions (in Panel C). Bank excess return is the bank stock excess return over a five-day event window. Bank CDS change is the change in the bank CDS spread over a five-day event window. Sovereign CDS change is the change in the 5-year sovereign CDS spread over a five-day event window. Exposure (B), GIIPS (B), non-GIIPS EMU (B) and non-EMU (B) are a bank's net sovereign debt exposure relative to assets to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries. Domestic GIIPS (B) is a bank's consolidated net exposure to domestic sovereign debt relative to assets if located in a GIIPS country and zero otherwise. Foreign GIIPS (B) is a bank's consolidated net exposure to foreign GIIPS sovereign debt relative to assets. Government debt is general government debt at the end of 2009 as a percentage of GDP. GIIPS location is a dummy variable that equals one if a bank is located in one of the GIIPS countries and zero otherwise. GIIPS country is a dummy variable that equals one if a country is a GIIPS country, and zero otherwise. Exposure (C), GIIPS (C), non-GIIPS EMU (C) and non-EMU (C) are banks' net sovereign debt exposures to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries aggregated to the country level and relative to GDP. Domestic GIIPS (C) is banks' consolidated net exposure to domestic sovereign debt at the country level relative to GDP if located in a GIIPS country and zero otherwise. Foreign GIIPS (C) is banks' consolidated net exposure to sovereign debt issued by foreign GIIPS countries at the country level relative to GDP. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

Panel A. Sample for bank stock excess return regressions

Descriptive statistics	Obs	Mean	Std. Dev.	Min	Max
Excess return	48	0.02	0.05	-0.12	0.15
Exposure (B)	48	0.08	0.07	0.00	0.35
GIIPS (B)	48	0.05	0.07	0.00	0.34
Domestic GIIPS (B)	48	0.04	0.08	0.00	0.34
Foreign GIIPS (B)	48	0.01	0.02	0.00	0.07
non-GIIPS EMU (B)	48	0.02	0.03	0.00	0.15
non-EMU (B)	48	0.02	0.04	0.00	0.20
Government debt	48	78.68	28.35	40.60	129.30
GIIPS location	48	0.38	0.49	0.00	1.00

Correlation matrix	Excess return	Exposure (B)	GIIPS (B)	Domestic GIIPS (B)	Foreign GIIPS (B)	non-GIIPS EMU (B)	non-EMU (B)	Government debt	GIIPS location
Excess return	1								
Exposure (B)	0.318**	1							
GIIPS (B)	0.493***	0.798***	1						
Domestic GIIPS (B)	0.473***	0.779***	0.977***	1					
Foreign GIIPS (B)	0.063	0.040	0.045	-0.169	1				
non-GIIPS EMU (B)	-0.325**	0.131	-0.250*	-0.285**	0.181	1			
non-EMU (B)	-0.097	0.252*	-0.230	-0.193	-0.157	-0.065	1		
Government debt	0.21	0.521***	0.646***	0.662***	-0.114	-0.123	-0.170	1	
GIIPS location	0.452***	0.283*	0.591***	0.626***	-0.199	-0.419***	-0.281*	0.651***	1

Panel B. Sample for bank CDS spread change regressions

Descriptive statistics	Obs	Mean	Std. Dev.	Min	Max
Bank CDS	44	-31.31	46.47	-166.06	11.77
Exposure (B)	44	0.07	0.05	0.00	0.19
GIIPS (B)	44	0.03	0.04	0.00	0.18
Domestic GIIPS (B)	44	0.03	0.04	0.00	0.18
Foreign GIIPS (B)	44	0.01	0.01	0.00	0.05
non-GIIPS EMU (B)	44	0.03	0.04	0.00	0.14
non-EMU (B)	44	0.01	0.01	0.00	0.06
GIIPS location	44	0.36	0.49	0.00	1.00

Correlation matrix	Bank CDS	Exposure (B)	GIIPS (B)	Domestic GIIPS (B)	Foreign GIIPS (B)	non-GIIPS EMU (B)	non-EMU (B)	GIIPS location
Bank CDS	1							
Exposure (B)	-0.215	1						
GIIPS (B)	-0.593***	0.627***	1					
Domestic GIIPS (B)	-0.605***	0.529***	0.968***	1				
Foreign GIIPS (B)	0.056	0.382**	0.112	-0.139	1			
non-GIIPS EMU (B)	0.429***	0.451***	-0.359**	-0.445***	0.348**	1		
non-EMU (B)	0.084	0.162	-0.199	-0.202	0.016	0.078	1	
GIIPS location	-0.660***	0.220	0.741***	0.782***	-0.173	-0.548***	-0.237	1

Panel C. Sample for sovereign CDS spread change regressions

Descriptive statistics	Obs	Mean	Std. Dev.	Min	Max
Sovereign CDS change	19	-51.49	99.10	-387.43	0.03
Exposure (C)	19	0.16	0.10	0.01	0.43
GIIPS (C)	19	0.06	0.09	0.00	0.31
Domestic GIIPS (C)	19	0.03	0.06	0.00	0.24
Foreign GIIPS (C)	19	0.03	0.07	0.00	0.31
non-GIIPS EMU (C)	19	0.06	0.06	0.00	0.16
non-EMU (C)	19	0.03	0.03	0.00	0.12
GIIPS country	19	0.26	0.45	0.00	1.00

Correlation matrix	Sovereign CDS change	Exposure (C)	GIIPS (C)	Domestic GIIPS (C)	Foreign GIIPS (C)	non-GIIPS EMU (C)	non-EMU (C)	GIIPS country
Sovereign CDS change	1							
Exposure (C)	-0.125	1						
GIIPS (C)	-0.520**	0.765***	1					
Domestic GIIPS (C)	-0.927***	0.136	0.560**	1				
Foreign GIIPS (C)	0.174	0.791***	0.708***	-0.189	1			
non-GIIPS EMU (C)	0.439*	0.575**	0.012	-0.448*	0.395*	1		
non-EMU (C)	0.22	0.1	-0.274	-0.277	-0.088	0.023	1	
GIIPS country	-0.741***	-0.053	0.411*	0.816***	-0.209	-0.516**	-0.355	1

Table 4. Determinants of bank excess returns

The dependent variable is the bank stock excess return over a five-day event window. Exposure (B), GIIPS (B), non-GIIPS EMU (B) and non-EMU (B) are a bank's net sovereign debt exposure relative to assets to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries. Domestic GIIPS (B) is a bank's consolidated net exposure to domestic sovereign debt relative to assets if located in a GIIPS country and zero otherwise. Foreign GIIPS (B) is a bank's consolidated net exposure to foreign GIIPS sovereign debt relative to assets. Government debt is general government debt at the end of 2009 as a percentage of GDP in the country where the bank is headquartered. GIIPS location is a dummy variable that equals one if a bank is located in one of the GIIPS countries and zero otherwise. Robust standard errors clustered at the country level are in parentheses, with the exception that standard errors are bootstrapped in columns 5-6. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

	Baseline regressions				Bootstrapped standard errors		MSCI Europe		Domestic stock market benchmark		Banking book exposures	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Exposure (B)	0.135				0.135		0.152*		0.071		0.149	
	(0.100)				(0.144)		(0.092)		(0.117)		(0.097)	
GIIPS location	0.039**	0.018	0.036**	0.023	0.039**	0.036*	0.034**	0.033**	0.016	0.019	0.039**	0.039**
	(0.017)	(0.020)	(0.017)	(0.020)	(0.017)	(0.021)	(0.017)	(0.017)	(0.015)	(0.017)	(0.017)	(0.016)
GIIPS (B)		0.225***	0.316***			0.316**		0.330***		0.262***		0.325***
		(0.069)	(0.067)			(0.153)		(0.062)		(0.089)		(0.064)
Domestic GIIPS (B)				0.205**								
				(0.073)								
Foreign GIIPS (B)				0.601								
				(0.378)								
non-GIIPS EMU (B)		-0.246	-0.137	-0.262		-0.137		-0.052		-0.051		-0.12
		(0.260)	(0.250)	(0.260)		(0.343)		(0.236)		(0.215)		(0.237)
non-EMU (B)		0.032	0.069	0.067		0.069		0.063		-0.037		0.099
		(0.132)	(0.121)	(0.147)		(0.345)		(0.112)		(0.099)		(0.126)
Government debt			-0.001*			-0.001		-0.001**		-0.001**		-0.001**
			(0.000)			(0.000)		(0.000)		(0.000)		(0.000)
Constant	-0.007	0.006	0.039	0.001	-0.007	0.039	-0.017	0.028	-0.011	0.039	-0.007	0.037
	(0.011)	(0.014)	(0.026)	(0.015)	(0.013)	(0.034)	(0.010)	(0.025)	(0.010)	(0.027)	(0.010)	(0.024)
R2	0.243	0.305	0.358	0.321	0.243	0.358	0.235	0.346	0.066	0.229	0.249	0.361
N	48	48	48	48	48	48	48	48	48	48	48	48

Table 5. Determinants of bank CDS spread changes

The dependent variable is the change in the bank CDS spread over a five-day event window. Exposure (B), GIIPS (B), non-GIIPS EMU (B) and non-EMU (B) are a bank's net sovereign debt exposure relative to assets to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries. Domestic GIIPS (B) is a bank's consolidated net exposure to domestic sovereign debt relative to assets if located in a GIIPS country and zero otherwise. Foreign GIIPS (B) is a bank's consolidated net exposure to foreign GIIPS sovereign debt relative to assets. GIIPS location is a dummy variable that equals one if a bank is located in one of the GIIPS countries, and zero otherwise. Robust standard errors are clustered at the country level and provided in parentheses, with the exception that standard errors are bootstrapped in columns 5-6. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

	Baseline regressions				Bootstrapped standard error		Subordinated debt CDS spreads		Bank book exposures	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Exposure (B)	-74.883				-74.883		-227.278		-132.816	
	(133.704)				(140.704)		(218.241)		(169.899)	
GIIPS location	-61.527**	-41.886			-61.527**	-41.886	-72.957*	-39.563	-60.785**	-38.499
	(26.865)	(34.852)			(27.115)	(35.728)	(38.459)	(32.873)	(26.235)	(36.168)
GIIPS (B)		-261.485	-545.399***			-261.485		-571.581*		-374.068
		(198.495)	(114.653)			(220.093)		(342.567)		(274.163)
Domestic GIIPS (B)				-555.3702***						
				(137.667)						
Foreign GIIPS (B)				-413.6135						
				(407.370)						
non-GIIPS EMU (B)		140.843**	328.663*	308.873		140.843		165.646		158.056**
		(60.258)	(175.586)	(174.575)		(232.926)		(212.191)		(68.099)
non-EMU (B)		-268.448	-128.551	-132.8626		-268.448		130.175		-425.117
		(287.490)	(285.782)	(289.437)		(61.523)		(371.005)		(414.630)
Constant	-3.373	-8.507	-21.012	-21.27993	-3.373	-8.507	-10.38	-25.101***	-0.721	-6.765
	(9.001)	(7.290)	(14.345)	(14.896)	(9.283)	(8.263)	(12.905)	(7.883)	(9.579)	(7.421)
R^2	0.441	0.474	0.406	0.407	0.441	0.474	0.317	0.35	0.451	0.503
N	44	44	44	44	44	44	35	35	44	44

Table 6. Determinants of sovereign CDS spread changes

The dependent variable is the change in the 5-year sovereign CDS spread over a five-day event window. Exposure (C), GIIPS (C), non-GIIPS EMU (C) and non-EMU (C) are banks' net sovereign debt exposures to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries aggregated to the country level and relative to GDP. Domestic GIIPS (C) is banks' consolidated net exposure to domestic sovereign debt at the country level relative to GDP if located in a GIIPS country and zero otherwise. Foreign GIIPS (C) is banks' consolidated net exposure to sovereign debt issued by foreign GIIPS countries at the country level relative to GDP. GIIPS country is a dummy variable that equals one if a country is a GIIPS country, and zero otherwise. Standard errors are in parentheses. Standard errors in columns 5-7 are bootstrapped. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

	Baseline regressions				Bootstrapped standard errors		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exposure (C)	-159.882				-159.882		
	(157.966)				(199.429)		
GIIPS country	-164.283***	-121.558**		11.186	-164.283***	-121.558	
	(35.684)	(50.289)		(42.382)	(58.935)	(85.878)	
GIIPS (C)		-357.482*	-579.638***			-357.482	-579.638
		(214.784)	(223.276)			(565.866)	(487.384)
Domestic GIIPS (C)				-1532.306***			
				(283.459)			
Foreign GIIPS (C)				-21.963			
				(152.906)			
non-GIIPS EMU (C)		274.611	770.596**	72.522		274.611	770.596**
		(349.897)	(325.972)	(224.626)		(261.440)	(360.699)
non-EMU (C)		-199.822	217.583	-93.314		-199.822	217.583
		(542.975)	(592.081)	(342.924)		(334.059)	(451.565)
Constant	16.533	-7.201	-67.630*	-10.007	16.533	-7.201	-67.630*
	(30.965)	(40.595)	(36.787)	(25.590)	(29.673)	(17.844)	(37.367)
R^2	0.577	0.628	0.473	0.863	0.577	0.628	0.473
N	19	19	19	19	19	19	19

Table 7. Determinants of excess returns and bank and sovereign CDS spread changes around the announcement of the enlargement of the EFSF

In columns 1-3 the dependent variable is the bank stock excess return over a five-day event window centered on 24 June 2011. In columns 4-5 the dependent variable is the change in the bank CDS spread, while in columns 6-7 the dependent variable is the change in the 5-year sovereign CDS spread over the same five-day event window. Exposure (B), GIIPS (B), non-GIIPS EMU (B) and non-EMU (B) are a bank's net sovereign debt exposure relative to assets to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries. Government debt is general government debt at the end of 2009 as a percentage of GDP in the country where the bank is headquartered. Exposure (C), GIIPS (C), non-GIIPS EMU (C) and non-EMU (C) are banks' net sovereign debt exposures to all EU countries, GIIPS countries, non-GIIPS, EMU countries and non-EMU countries aggregated to the country level and relative to GDP. GIIPS location is a dummy variable that equals one if a bank is located in one of the GIIPS countries, and zero otherwise. GIIPS country is a dummy variable that equals one if a country is a GIIPS country, and zero otherwise. Standard errors are in parentheses. In regressions 1-5 robust standard errors clustered at the country level are estimated. *, ** and *** denote significance at 10%, 5% and 1%, respectively.

	Bank stock excess returns			Bank CDS changes		Sovereign CDS changes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exposure (B)	0.094			8.331			
	(0.090)			(43.421)			
GIIPS location	-0.031***	-0.000	0.001	36.468***	33.750		
	(0.012)	(0.023)	(0.025)	(11.800)	(20.590)		
GIIPS (B)		-0.320	-0.306		43.640		
		(0.401)	(0.416)		(224.313)		
non-GIIPS EMU (B)		0.204*	0.213		0.769		
		(0.114)	(0.131)		(44.199)		
non-EMU (B)		0.170	0.170		0.076		
		(0.111)	(0.116)		(433.667)		
Exposure (C)						46.126	
						(38.615)	
GIIPS country						35.137***	23.776*
						(9.391)	(12.611)
GIIPS (C)							100.079*
							(57.325)
non-GIIPS EMU (C)							-18.966
							(71.881)
non-EMU (C)							-27.383
							(119.605)
Government debt			-0.000				
			(0.000)				
Constant	-0.048***	-0.050***	-0.046**	10.358***	10.588***	1.934	8.133
	(0.008)	(0.008)	(0.022)	(3.596)	(3.185)	(7.253)	(8.617)
R^2	0.182	0.251	0.253	0.503	0.504	0.490	0.551
N	39	39	39	38	38	19	19

Table 8. Estimated changes in valuation of bank sovereign debt holdings, shares and liabilities following initial EFSF announcement

This table provides estimates of change in the values of sovereign exposures, bank liabilities and bank shares related to changes in values of GIIPS debts (in Panel A) and to changes in values of all EU sovereign debts (in Panel B). Figures are calculated for 35 banks that we have both CDS and stock market data for and are aggregated to the country level. Figures are based on market movements in the five-day event window.
Column 1 of Panel A shows the change in the market value of banks' GIIPS government bonds based on actual CDS spread changes. Column 2 shows the predicted change in the market value of banks' liabilities due to GIIPS sovereign debt exposure based on regression 2 in Table 5. Column 3 is the same as column 2 except that now regression 3 in Table 5 is used. Column 4 contains the predicted change in banks' stock market value due to GIIPS sovereign debt exposure based on regression 2 in Table 4.
Column 1 of Panel B shows the change in the market value of banks' European government bonds, based on actual CDS spread changes. Column 2 of the same panel shows the change in the market value of banks' liabilities based on actual bank CDS spread changes. Column 3 shows the change in banks' stock market value based on actual stock market movements. Total assets of banks in sample is the sum of total assets of the 35 banks in the sample.

Panel A. Valuation changes on account of banks' holdings of GIIPS debt in millions of euros

Country	GIIPS sovereign debt held by banks	Bank liabilities – low estimate	Bank liabilities – high estimate	Bank stock market value	(2) + (4)	(3) + (4)
	(1)	(2)	(3)	(4)	(5)	(6)
Austria	95	24	51	34	59	85
Belgium	961	1,009	2,113	169	1,178	2,282
Denmark	23	44	91	8	52	100
France	1,620	1,332	2,781	282	1,614	3,063
Germany	749	633	1,323	75	709	1,398
Netherlands	389	190	397	50	240	446
Sweden	48	39	81	18	57	99
United Kingdom	809	502	1,047	220	721	1,266
Greece	2,664	312	658	412	724	1,070
Ireland	113	101	212	8	109	220
Italy	2,162	3,630	7,627	1,098	4,728	8,725
Portugal	517	229	482	82	311	564
Spain	2,579	2,130	4,468	1,455	3,584	5,922
Total non-GIIPS	4,694	3,773	7,882	857	4,630	8,739
Total GIIPS	8,036	6,403	13,447	3,054	9,457	16,501
Total	12,729	10,176	21,329	3,911	14,087	25,240

Panel B. Valuation changes on account of banks' holdings of all EU sovereign debt

Country	Total EU sovereign debt held by banks (million EUR)	Bank liabilities (million EUR)	Bank stock market value (million EUR)	(2) + (3) (million EUR)	Total bank assets (billion EUR)
	(1)	(2)	(3)	(4)	(5)
Austria	203	232	867	1,099	360
Belgium	1,224	716	-1,739	-1,023	937
Denmark	74	222	-303	-82	435
France	2,012	12,678	4,218	16,896	4,954
Germany	966	3,408	292	3,701	2,795
Netherlands	503	-944	1,255	312	1,188
Sweden	121	764	-621	143	1,061
United Kingdom	1,202	985	-4,294	-3,309	6,901
Greece	2,689	1,329	612	1,941	323
Ireland	126	629	8	637	180
Italy	2,293	1,772	1,828	3,601	2,076
Portugal	528	2,081	553	2,634	219
Spain	2,601	8,917	7,017	15,934	1,625
Total non-GIIPS	6,306	18,062	-325	17,736	18,630
Total GIIPS	8,237	14,728	10,019	24,747	4,423
Total	14,544	32,790	9,693	42,483	23,053

Figure 1. Mean cumulative excess returns and 5-year bank and sovereign CDS spreads by region from 30 days before to 30 days after the event date

Bank stock cumulative excess returns are weighted by total assets in 2009. Bank CDS spreads are weighted by total assets in 2009. Sovereign CDS spreads are weighted by general government debts at the end of 2009.

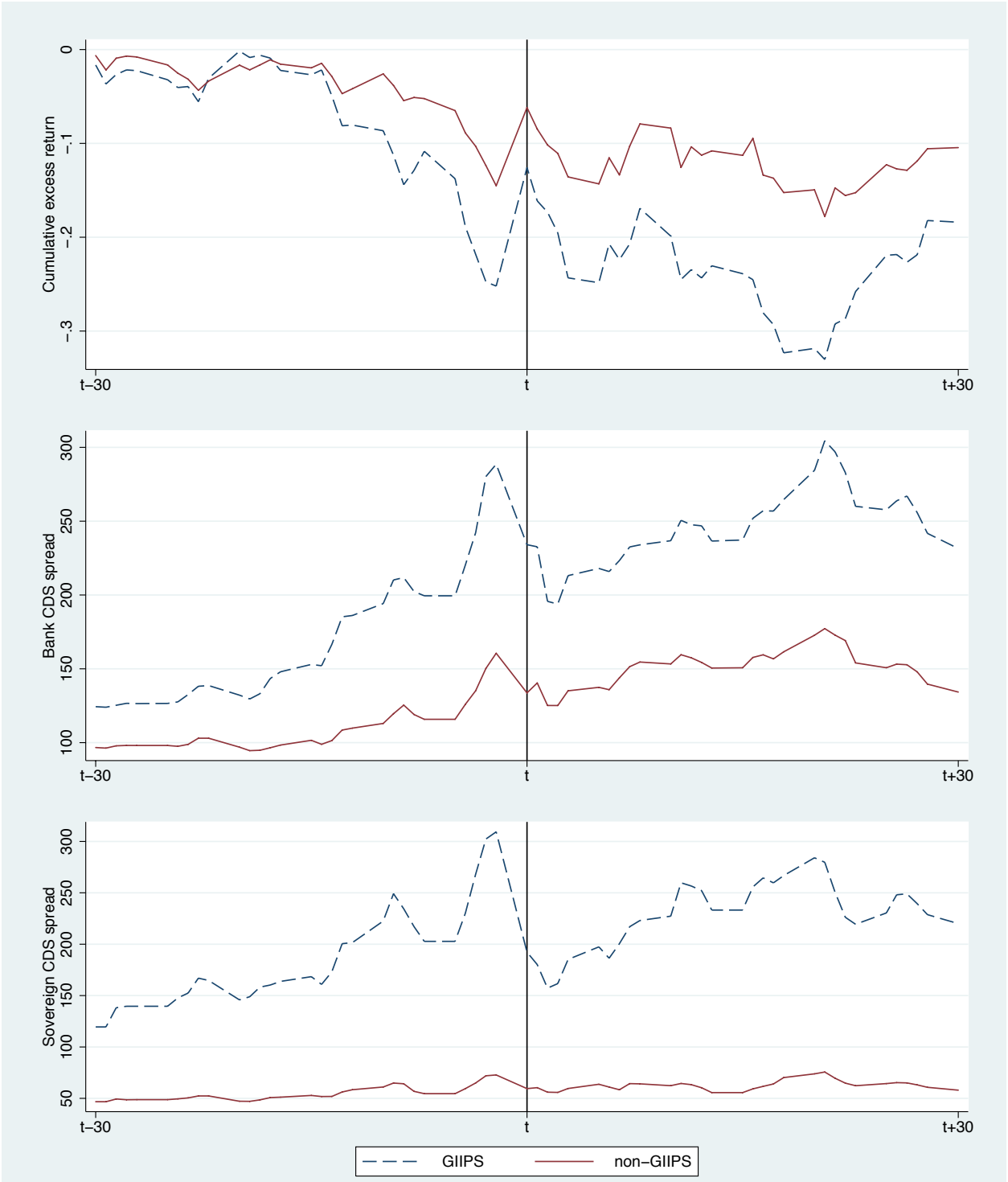

Figure 2. Mean bank stock cumulative excess returns, bank CDS spreads, and sovereign CDS spreads by country from 30 days before to 30 days after the event date

Bank stock cumulative excess returns are weighted by total assets in 2009. Bank CDS spreads are weighted by total assets in 2009.