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Bank Reactions to Sovereign Credit News :

An Analysis of the Credit Default Swap Market[1]

Alexandre Jeanneret

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Abstract

This paper looks at the impact of sovereign credit news on bank credit risk in Europe. We use both an event study and a panel data analysis to determine how banks react to negative and positive credit news over the period 2008-2014. We show that sovereign rating downgrades and negative financial news widen bank CDS spreads by more than 1% over two days. The reaction of the financial sector is about three times larger than for non-banks. In comparison, upgrades narrow CDS spreads by 0.85%, whereas bailout announcements have no impact, on average. Overall, the market reaction is asymmetric, as CDS spreads are more responsive to negative news than to positive news. Further, the quality of the information varies across agencies. Bank CDS react most to sovereign rating changes from Standard and Poor's. Moody's is only relevant for downgrades, whereas Fitch has no market impact.

Keywords: Credit Default Swap, International Markets, Sovereign Ratings, Financial News

JEL Classification Codes: F34, G12, G13, G15, G32

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Introduction

Sovereign credit risk has become the dominant driver of risk in European financial markets, as most countries have lost their risk-free status over the recent years. Understanding the consequences of sovereign default risk for the banking sector in Europe has now become a primary concern for investors and policy makers. Financial institutions attract particular attention because they are the major holders of government debts and act as a transmission belt between the health of public finances and the real economy. Surprisingly, we still poorly understand how sovereign credit news affect banks and which type of news have the greatest impact. We address these issues in this paper.

We propose to examine how news related to the European sovereign credit crisis could affect banks, through an analysis of their Credit Default Swap (CDS) spreads. We study different sets of key events throughout the sovereign crisis, such as rating downgrades, upgrades, financial and political news, and bailout announcements. We concentrate our analysis on news that are expected to affect banks exposed to sovereign credit risk.

As a preliminary analysis, we rely on a standard event study methodology based on Campbell et al. (1997) and an adaptation of Elton et al. (1995)'s bond returns' model. The analysis consists of 105 events and 40 banks for which we have, at the same time CDS data and information on their fundamentals and debt holdings. We use a market model to compute the cumulative abnormal returns (CAR) on CDS spreads over the 5 days that follow the announcement date, where the market index is the BofA Merrill Lynch Euro High Yield Index Option-Adjusted Spread as. We focus on sovereign rating changes to capture unexpected shocks on bank credit risk, rather than analyzing the relation between sovereign and bank CDS (or bond) spreads. An issue is that sovereign and bank CDS spreads tend to be endogenously driven by common variations in global market conditions and changes in risk premia. By considering a set of exogenous events, our approach thus allows us identifying the causal effect of sovereign credit news on bank and non-bank CDS spreads. We examine how bank characteristics, related to riskiness and exposure to distressed government debts, influence the sensitivity of banks to such sovereign news. This analysis is made possible thanks to the newly available data from the European Banking Authority (EBA)'s stress tests.

We find that rating downgrades are associated with positive abnormal CDS spread returns. Our results indicate that banks' sovereign debt holdings are an important determinant of their reaction to sovereign credit rating downgrades. Therefore, the fear of direct losses on their sovereign debt holdings is a key determinant of banks' sensitivity to sovereign credit risk. We also find that a bank's size, as proxied by its Risk-Weighted-Assets (RWA), has an impact on a bank's reaction to sovereign credit rating news, with bigger banks being more affected than smaller ones. In addition, banks in distress exhibit a particularly strong reaction to sovereign credit downgrades.

We then turn our attention to a panel data analysis. This methodology allows us controlling for variations in firm fundamentals, as well as for changes in market economic and financial conditions. We include bank fixed effects to remove any bank characteristics that are time invariant. The results indicate that sovereign rating downgrades widen bank CDS spreads by 1.17%. Noteworthy, the reaction of banks to downgrades is about three times larger than for non-banks. In comparison, upgrades narrow CDS spreads by 0.85%.

The impact of rating changes on bank CDS spreads also varies significantly across agencies. CDS market prices mostly react to sovereign rating changes from Standard and Poor's. Moody's decisions are only relevant for downgrades, whereas CDS spreads are insensitive to announcements by Fitch.

We also look at the impact of sovereign bailout announcements on bank and firm credit risk. We find that such positive news lead to a decrease in CDS spreads but only for non-banks. Overall, we see that banks do not appear to benefit from such events. Therefore, sovereign bailouts do not seem to improve banks' financial health. In contrast, negative financial news yield to a similar increase in CDS spreads as do rating downgrades. The impact is twice greater for banks than for non-banks. These results provide evidence that the financial sector is the most sensitive industry to changes in global conditions and sovereign credit risk. Finally, the market reaction for banks is asymmetric, as CDS spreads are more responsive to negative than to positive news.

The remainder of our paper is as follows: Section 1 reviews the existing literature, Section 2 presents the data, Section 3 describes the empirical methodology, Section 4 discusses our main results, and Section 5 concludes.

1.1 Literature review

The literature on the relation between sovereigns and banks can be decomposed into three main axes, based on the direction of causality. The first strand looks at the transmission of banks' credit problems to sovereign governments. The second strand studies the impact of sovereign credit risk on financial institutions. The last body of literature explores how the direction of causality can evolve in both directions.

1.1.1 From banks to sovereigns

Reinhart and Rogoff (2008) show, based on the last 200 years of financial crises, that a banking crisis weakens public finances considerably, with public debt being on average 86% higher three years after the crisis compared to before the crisis. Hence, periods of high banking crisis occurrence tend to be prone to sovereign debt crises. The link between public finances and financial institutions is also highlighted in Baglioni and Cherubini (2013). The authors look at the cost that governments would incur if they had to mark-to-market their implicit guarantee of financial institutions and find that implicit liability from potential bank bailouts is large for peripheral Europe countries, such as Portugal, Ireland, Greece and Spain. Dieckmann and Plank (2012) come to a similar conclusion about a private-to-public risk transfer when a sovereign bails out its banking system. The paper also looks at the effects of being in a monetary union, and finds that sovereign credit risk of countries in unions, such as the euro zone, display a higher degree of correlation than countries outside unions. They also point out that member countries are more sensitive than non-members to the health of the financial system as a whole. Esjing and Lemke (2009) investigate the impact of bank bailouts on both banks and sovereigns early in the crisis (2008-2009). As in the previously mentioned papers, they find a

transfer of risk from banks to public finances after a bank bailout, but find it to be only a short term effect, with both banks and sovereign CDS rising in the long run.

1.1.2 From sovereigns to banks

Several studies analyze the impact of sovereign credit problems on the banking sector. In particular, BIS (2011) identifies the main transmission channels used to transfer sovereign credit risk to the banking system, which are: i) direct losses on banks' sovereign debt holdings; ii) rise in the haircuts imposed on sovereign bonds to access central banks' liquidity facilities; iii) drop in value of implicit and explicit state guarantee of banks; and iv) the fact that sovereign downgrades often leads to banks rating downgrades. The study finds an increase in the co-movement of banks and sovereign credit risk during the recent financial crisis.

Banks also act as intermediary between the state of government finances and the real economy. The intermediary role of banks in the transmission of public problems to the economy is, for example, studied in Gennaioli et al (2012). The authors build a model to test the impact of a public default on private credit, and find that such a default would weaken the balance sheet of banks, ultimately causing a decline in private credit. They argue that, although the contraction of private credit is bigger when banks holds more public debt, a bigger public debt holding by banks reduces the probability of public default. The reason is that the potential large consequences of a default discipline the government.

The impact of a sovereign default on its domestic banking system has been also studied in Borensztein and Panizza (2008). The authors show that banking crises do not seem to be an important cause of sovereign defaults, although sovereign defaults often lead to a banking crisis. Using a large sample of international data from 1975 to 2000, they also find that a sovereign default has an important negative impact on the country's domestic banking system, especially if banks have large holdings of the defaulted debt. Sandleris (2014) further argues that a sovereign default sends such a negative message about the prospects of the economy that it would cause a credit crunch in the real economy, even if domestic banks do not actually hold any of its sovereign debt. Demirgüç-Kunt and Huizinga (2013) also look at the impact of

government's deficit on bank share prices and CDS spreads. They find that a bank's CDS spread is negatively related to the size of its home government's deficit.

Arzeki et al. (2011) focus on specific sovereign events, and analyze their impacts on financial institutions. Using an event study technique, they look at the consequences of sovereign credit rating downgrades on banks and find their effects to be significant. The magnitude depends on the type of announcement, the country being downgraded, and the rating agency issuing the downgrade.

1.1.3 Causality in both directions

Another body of literature explores the evolution of the link between banks and their sovereign governments, which can go both ways. Looking as far as the 13th century, Alessandri and Haldane (2001) show that sovereign default is the single most important cause of bank failures, and describe the direction of causality between banks and states as a « pendulum », with specific turning points in history. They argue that prior to the 1930s the direction of causality was mostly from sovereign to banks, as states were financing wars and the defeated countries often defaulted on war-loans. Since the Great Depression, states became lenders of last resort for banks, thus reversing the direction of causality. They suggest that a new reversal is taking place with the European sovereign crisis. Alter and Schüler (2012) come to a similar conclusion by studying the relationship between default risk of European states and banks' credit risk. Looking at the effects of government's bank bailout schemes, they find that the direction of causality was mostly from banks to sovereign before the bailouts. The causality has reversed after the bailouts and banks are now sensitive to sovereign credit risk. Further, banks receiving the biggest state help are the most sensitive to sovereign problems. Kallestrup el al. (2016) also look at the relation between banks and their sovereign as a two-way street. They put together data on foreign public and private sector exposures of banks with CDS data to construct risk-weighted measures of banks cross-country exposures. They find these cross-border exposures to be highly significant in explaining banks CDS behavior. To investigate the reciprocal effect from banks to sovereigns, they build a measure of the size of the implicit and explicit government guarantees of their banking sector. Their measure is useful to explain the dynamics of sovereign credit risk.

On the theoretical front, Acharya et al. (2014) build a model to analyze the impact of a government's decision to bail out its banking sector. They argue that governments can finance those bailouts by emitting new debt, therefore diluting existing bondholders and raising sovereign credit risk. This rise in sovereign risk then feeds back to the banking sector by reducing the value of their sovereign bonds as well as lowering the value of the government implicit or explicit guarantee of its banking sector. They also point out that this new debt must sooner or later be reimbursed through higher taxation, leading to under-investment problems in the economy. They test this two-way feedback using European banks CDS during the financial crisis and find that a bank bailout transfer risk from the private sector to its government in the short term, but causes both banks and sovereign risk to rise in the long run.

Overall, the existing literature suggests that the fate of banks and their sovereign are interrelated, with both actors impacting each other through various channels. Therefore, a standard regression analysis with the aim of exploring the impacts on each other would severely suffer from an endogeneity problem. To overcome this issue, we propose to consider an event study technique to investigate the impact of exogenous sovereign credit events on banks' credit risk. We thus focus explicitly on one direction of causality, namely the impact of changes in sovereign credit risk on financial institutions.

2. Data

We analyze bank reactions to European sovereign credit risk using their Credit Default Swap (CDS) spreads. The choice of CDS rather than bond spreads to measure credit risk follows a recent strand of literature.[2] Even though both types of data can proxy for default risk, bond spreads integrate a bigger funding liquidity component than CDS, which could affect our results. In addition, CDS contracts are easier to compare across banks, as they are standardized contracts. We follow Jorion and Zhang (2007) and take 5-year CDS spreads, which are the most traded and liquid contracts in the CDS market. We use the entire collection of daily European CDS spreads available from Markit for the period ranging from January 1, 2008 to December 31,

[2] See Augustin et al. (2014) for a comprehensive literature review on the CDS market.

2014. We manually merge the dataset with firm fundamentals retrieved from Worldscope/Thompson Reuters. We drop entities for which we do not have information on their size (log of assets in USD), financial leverage (total debt to asset), and return on assets.

We also use bank-level data on sovereign exposures coming from the European Banking Authority (EBA)'s 2011 Stress Test results, covering 90 European banks (around 70% of the European banking market).[3] These stress tests were published on July 15, 2011, but the information they provide is accurate as of December 31, 2010.

The final sample consists of 40 banks and 265 non-banks. We also consider market-wide indices from the Federal Reserve Bank of St. Louis. Table 1 provides the descriptive statistics of the data.

<Table 1 about here>

Figure 1 shows the evolution of the average bank CDS spreads. This credit risk measure appears largely countercyclical. This figure also displays the BofA Merrill Lynch Euro High Yield Index Option-Adjusted Spread, measuring the aggregate market's level of credit risk in Europe, which appears to correlate strongly with the average bank CDS spreads.

<Figure 1 goes about here>

2.1 Sovereign credit events and news

We focus on three main types of events, namely credit rating changes (downgrades and upgrades) by one of the three major rating agencies (Standard & Poor's, Moody's, and Fitch), sovereign bailout announcements, and negative financial news. We choose to focus our study on these events since they are both directly related to sovereign credit risk. Moreover, the sign of their impact on sovereign credit risk can be clearly anticipated (although the event itself cannot). `

[3] The 2011 stress-tests results available on EBA's website at http://www.eba.europa.eu/EU-wide-stress-testing/2011/2011-EU-wide-stress-test-results.aspx

Sovereign rating downgrades should negatively affect banks, as a change in credit quality can cause direct losses on their debt holdings and diminish their value as collateral to access ECB's liquidity. Sovereign rating upgrades should have the opposite effect and will be treated as positive events. Sovereign bailouts are also treated as positive events for banks since they lower the possibility of default by the bailed-out entity, potentially increasing both its bonds' value as well as their collateral value for banks, improving their financial position and, therefore, lowering their default risk.

We also consider bank reactions to negative financial news. Financial news are varied, ranging from new financial regulations to banks getting fined record amounts for their misconduct. Such news are viewed as negative for banks and should then increase their CDS spreads. Finally, we also include political events, which mostly capture government changes and referendum results. In contrast to previous news, the expected impact of political news is uncertain.

We construct the final list of events as follows. First, we consider all positive and negative sovereign events between January 1, 2008 and December 31, 2014. Some events are only a few days or less apart, which would make it hard to separate the impacts of each individual event. To avoid the problem of contaminated events, we avoid to have similar events that are less than 4 days apart. Our final sample includes 106 events: 62 downgrades, 16 upgrades, 9 bailouts, 12 financial news, and 7 political events. Table 2 reports the list of events.

<Table 2 about here>

3. Empirical approach

This section describes the empirical methodology that we consider to explore the effect of sovereign and financial news on European bank credit risk. We first consider an event study applied to CDS spreads and then a regression analysis based on panel data. Both approaches, based on a set of exogenous events, help minimize the endogeneity problem that would arise when studying the relation between bank and sovereign CDS prices.

3.1 Event study

We first use a standard event study method, as described in Campbell et al. (1997) and MacKinlay (1997), to analyze how sovereign news impact bank credit risk. This method consists in quantifying and testing abnormal returns of a security during a given period of time (event window) around specific events.

Normal returns

To compute the normal returns, we propose to use a restricted form of the model developed by Elton et al. (1995),[4] which is as follows:

$$R_{Bond_t} - R_{f,t} = \alpha + \beta * R_{Bond,M_t} + \varepsilon_t \quad (1)$$

where R_{Bond_t} is the tested bond's return at time *t*, $R_{f,t}$ is the risk-free rate at time t and R_{Bond,M_t} is a proxy of the general bond market's return at time *t*.

Based on Hull et al. (2004)'s observation, holding a long position in a bond as well as purchasing a corresponding CDS is very similar to holding a risk-free bond. Therefore, we can assume that

$$CDS_t \cong R_{Bond_t} + R_{f,t} \quad (2)$$

where CDS_t is the spread of a 5-year CDS at time *t.* Substituting Equation 2 in Equation 2 gives us:

$$CDS_t = \alpha + \beta * \left(M_t + R_{f,t}\right) + \varepsilon_t \quad (3)$$

where M_t is the market proxy for credit conditions at time *t*. In practice, the German bund rate is the main proxy for the European risk-free rate. Because this rate has been hovering at record

[4] Elton et al. (1995) call this version of the model « index-1 ». Their unrestricted model uses 5 other factors on top of general bond market risk, including a country's gross domestic product, general stock market's returns as well as unexpected changes in the country's consumer price index. This being said, when they used all 6 factors, general bond market returns alone still explained almost 72% of their tested bonds' returns. Also, as Campbell and al. (1997) noted, this simple (market) model provides good results, and they find limited gains from using more elaborate, multifactor models.

low levels during the recent crisis, we decide to set the risk-free rate at 0. The model then becomes similar to Campbell et al. (1997)'s market model used for stock returns.

We also propose to use the return on CDS spreads instead of the CDS spread itself, due to the high persistence observed in levels (see Figure 1). Although we hereafter refer to the *CDS return* for convenience, this measure is not equal to the rate of return achieved by holding a position in the CDS contract.

Finally, our market model for the bank CDS market is given by, for each event *e* and bank *i*,

$$\begin{aligned} R_{i,t} &= \alpha_{i,e} + \beta_{i,e} * R_{M,t} + \varepsilon_{i,t,e} \\ E\left[\varepsilon_{i,t,e}\right] = 0 \qquad & Var\left[\varepsilon_{i,t,e}\right] = \sigma_{i,e}^2 \end{aligned} \tag{4}$$

where $R_{i,t}$ is bank *i's* observed CDS return at time *t* and $R_{M,t}$ is return on the market at time *t*. We select the BofA Merrill Lynch Euro High Yield Index Option-Adjusted Spread to be the market proxy because it is a widely available credit index.[5]

We then use the estimates of $\alpha_{i,e}$ and $\beta_{i,e}$ to calculate the normal returns $E\left(R_{i,t} \middle| R_{M,t}\right)$ during the event window, which are given by

$$E\left(R_{i,t} \middle| R_{M,t}\right) = \hat{\alpha}_i + \hat{\beta}_i * R_{M,t} \tag{5}$$

where $E\left(R_{i,t} \middle| R_{M,t}\right)$ is the expected return at time *t*, assuming that no events had taken place during that period.

Cumulative abnormal returns

Combining observed bank CDS returns and the normal bank CDS returns (Equation 5), we can compute the abnormal return $AR_{i,t}$ of bank *i* at time *t*

$$AR_{i,t} = R_{i,t} - E\left(R_{i,t} \middle| R_{M,t}\right) \tag{6}$$

[5] Our market model assumes a linear relationship between bank CDS returns and the market index returns. Alternative market indices include the iTraxx Europe Main 5-year Index (see Berndt and Obreja, 2010) or the iTraxx Europe 5-year non-financial CDS sub-index (iTraxx Non-Financial), as in Ejsing and Lemke (2011).

When aggregating these abnormal returns through time, across the event window $[t_1, t_2]$, we obtain bank i's cumulative abnormal returns $CAR_i[t_1, t_2]$ as follows

$$CAR_i[t_1, t_2] = \sum_{t_1}^{t_2} AR_{i,t} \quad (7)$$

For each event, we then average the cumulative abnormal returns $CAR_i[t_1, t_2]$ across banks and obtain the cumulative average abnormal returns $CAAR_i[t_1, t_2]$

$$CAAR_i[t_1, t_2] = \frac{1}{N} \sum_{i=1}^{N} CAR_i[t_1, t_2] \quad (8)$$

Estimation

We estimate the market model over a period of 120 days, which ends 10 days before our event window [-131,-11], following Campbell et al. (1997). We consider a 10-day buffer length to reduce contamination risk.

We look at daily CDS returns over a window that varies between 1 day (t_1=-1, t_1=0) and 6 days (t_1=-1, t_2=5), where the event under study happens at time 0. We use relatively short event windows to minimize contamination from other confounding news that could affect bank CDS.

This model will turn insightful to provide a first idea of how bank credit risk reacts to various sovereign events. We also separate banks according to their key characteristics, with the aim of identifying those banks that are the most sensitive to changes in European sovereign credit risk.

3.2 Panel analysis

To more formally test the effect of sovereign and financial news on bank CDS spreads, we will use the following model:

$$R_{i,t-1,t+1} = \alpha + \theta \text{Event}_t + \delta \text{controls}_{i,t} + \varepsilon_{i,t.} \quad (9)$$

where the dependent variable, $R_{i,t-1,t+1}$, is the log return of the CDS spread of bank *i's* observed between time *t-1* and *t+1*. We are primarily interested in the marginal impact of a sovereign credit event at time *t* on CDS spread returns (θ).

The analysis is based on a panel data estimation that combines cross-sectional and temporal dimensions in a single regression. The vector controls includes variables that capture other direct and indirect sources that may correlate with CDS spread returns. These variables control for bank fundamentals and global financial conditions. At the firm level, we include measures of profitability (return on assets), size (log of assets in USD), and financial leverage (debt-to-asset ratio). At the market level, we consider the 1m Libor rate in EUR to capture global liquidity conditions, the BofA Merrill Lynch Euro High Yield Index Option-Adjusted Spread as a proxy for global credit risk conditions, and the OECD recession indicator to control for global economic activity. We include bank fixed effects to remove any time invariant characteristics. Finally, standard errors are clustered at the bank level (Petersen, 2009) and corrected for heteroskedasticity.

4. Results

We first analyze how sovereign rating downgrades and upgrades impact bank credit risk based on the event study. We determine how bank characteristics, related to riskiness and exposure to distressed government debts, influence the sensitivity of banks to such sovereign news.

4.1 Event study analysis of rating changes

Figure 2 illustrates the average cumulative abnormal returns (CAAR) of bank CDS surrounding sovereign rating downgrades by one of the three main credit rating agencies. Overall, bank CDS increase at and after the event date. This reaction suggests that banks are, on average, more affected by negative news on sovereign creditworthiness than is the aggregate European market, as measured by the BofA Merrill Lynch Euro High Yield Index (comprising financial and non-financial firms). The effect of rating upgrades is of the expected sign but the magnitude is much weaker.

<Figure 2 goes about here>

Figure 3 explores the results in greater details by separating banks in quartiles using various bank-level characteristics available from the Stress Test results. Specifically, we examine whether the sensitivity of banks to sovereign rating downgrades depends on their holdings of sovereign debt issued by distressed countries, the importance of the risky assets held in their balance sheets, and their level of financial health.

<Figure 3 goes about here>

PIIGS sovereign debt exposure relative to Tier-1 capital

We first rank banks using their aggregated PIIGS sovereign debt exposure relative to their Tier-1 capital.[6] Banks from the 1st quartile are those with the lowest exposure, while banks from the 4th are those with the highest one.[7] This ratio measures the impact of a potential default by one of the PIIGS countries on a bank's financial stability. Banks with a low ratio should not see their stability threatened by direct losses following a PIIGS debt write-down. In contrast, banks with a high ratio should exhibit a strong and significant reaction the downgrade.

We compare the average CAR of banks from the 1st and 4th quartiles. As expected, the CAR is greater for banks with the highest relative PIIGS exposure, as a percentage of their Tier-1 capital. A surprising result is that banks with the lowest exposure to such risky debt also show a strong abnormal reaction to downgrades. This finding suggests that banks that do not hold government debt issued by one of the distressed countries also experience a rise in the perceived level of credit risk, and thus of their borrowing costs.

PIIGS sovereign debt exposure relative to total sovereign debt exposure

We now rank banks based on their relative PIIGS-debt exposure as a proportion of their total sovereign exposure. This ratio measures the importance of PIIGS's debt in each bank's global sovereign debt portfolio. This ratio is important because banks usually use their sovereign debt holdings as collateral to access central banks' liquidity. Considering that the ECB applies a

[6] Tier-1 capital is the core capital used by banks to support their operations. It is mostly comprised of equity and retained earnings and is used by regulatory authorities to verify the financial health of a bank. A complete definition of Tier-1 capital is available at www.bis.org.

[7] The first three quartiles are comprised of 10 banks each and the 4th quartile is comprised of 9 banks.

haircut to sovereign debt given as collateral by banks based on the creditworthiness of the issuer, banks holding a higher proportion of PIIGS debt, as a percentage of their total sovereign debt portfolio, could see an important reduction in their access to central bank's funds following a PIIGS rating downgrade. This ratio should therefore help us see whether the reduction of access to central bank's liquidity has an impact on banks' reaction to sovereign credit rating downgrades.

We see strong effect of sovereign downgrades on banks with the highest and the lowest relative PIIGS exposure, in line with the previous results. Hence, banks that not (or least) exposed to risky PIIGS also appear to experience wider CDS spreads as sovereign credit risk increases in Europe.

Size of bank's risky assets

We now turn our attention to bank size. Considering that bigger banks usually have a larger share of their operations in foreign countries than smaller ones, they could be more affected than smaller banks by the fate of their neighbors. We now look at the impact of a bank's size, as proxied by the level of its risk-weighted assets (RWA), on the bank's sensitivity to sovereign credit news.[8]

Results show that both small and big banks have a strong reaction to sovereign credit rating downgrades in the short-term. Yet bigger banks exhibit a greater response that also lasts longer. Overall, the effect of sovereign credit risk downgrades is concentrated in large banks, with more important systematic exposure.

Bank financial health

Finally, we examine whether banks in distress are more sensitive to sovereign downgrades than relatively healthy banks. We now rank banks according to their credit risk level, as measured by a bank's median CDS spread over the sample period. The results indicate that the effect of sovereign credit news is most important for the banks that have a greater risk of default, as

[8] Risk-weighted-assets is a measure of a bank's assets weighted by their relative risk. It is used by regulatory authorities and banks to calculate various capital adequacy ratios.

losses on their sovereign debt holdings can have particularly severe consequences on their survival probability. Similarly, banks with lower Tier 1 capital ratio are more sensitive to sovereign downgrades.

Taken together, the previous results show that banks with higher relative PIIGS debt holdings do not have stronger reactions to sovereign credit downgrades than the least exposed banks. In contrast, larger banks exhibit a higher sensitivity to sovereign credit risk, which is quite surprising given that those banks have the greater ability to hedge their sovereign debt exposure with sovereign CDS contracts. Therefore, banks seem to react to downgrades of other countries' debt, thus fearing a contagion of negative news related to sovereign credit risk spreading internationally.

4.2 Panel analysis

This section considers a panel estimation to quantify the sensitivity of CDS spreads to news. We compare the results with and without controls, for banks vs non-banks, by rating agencies, and finally contrast the impact of rating changes with bailout announcements, negative financial news, and political events.

4.2.1 Main results

Table 3 shows the main results. The first column displays a positive relation between a bank's credit spread return and a dummy indicating a rating downgrade. The relation is highly significant with and without bank-level and market-wide controls. This result supports the hypothesis that an increase in sovereign credit risk makes the financial sector more risky, as a whole. The statistical significance of the rating downgrades suggests that these events tend to be largely unanticipated.

<Table 3 goes about here>

The coefficient estimate based on the specification with all controls ($\theta = 1.17$) has strong economic importance. Over the sample period, we have seen 62 downgrades over 6 years. That

is, an average of 10 downgrades per year is associated with a decrease in the bank CDS spreads of 11.7% over 20 trading days.

Sovereign rating upgrades are viewed as good news by market participants, as CDS spreads decrease by 0.85% over a two-day period, on average. Notably, when comparing the results with non-banks in Europe, we find that the reaction is about three times lower than for the banking sector. Financial firms are thus the most sensitive to sovereign credit risk, even after controlling for key fundamentals. Table 4 shows that all these findings remain very similar when we use CDS spreads denominated in USD instead of those in EUR.

<Table 4 goes about here>

4.2.2 Impact by rating agency

We now analyze each rating agency separately. The goal is to determine whether banks react differently to a rating change announced by Standard & Poors (S&P), Fitch, or Moody's.

Table 5 shows that S&P sovereign rating downgrades trigger the most important response by bank CDS, with a statistically significant negative average return of 1.59%. Downgrades by Moody's are also significant, although weaker in magnitude, whereas bank CDS appear to be insensitive to Fitch announcements.

<Table 5 goes about here>

We reach the same conclusion based on the event study. Figure 4 shows the cumulative abnormal returns of banks CDS around downgrades by rating agencies. The instantaneous market reaction is greater for S&P downgrades than for Moody's downgrades, but the size of the effect converges after two days. In contrast, the cumulative abnormal return is close to zero for Fitch.

<Figure 4 goes about here>

In terms of upgrades, only S&P decisions seem to be informative and, therefore, to exert an influence on bank CDS. The impact of Fitch and Moody's rating upgrades are indeed not statistically significant.

The fact that S&P's rating news have the greatest impact for both downgrades and upgrades is striking. Noteworthy, S&P are not systematically the first (or last) to issue a downgrade/upgrade, and thus do not necessarily benefit from a first mover advantage. The market thus views S&P's rating decisions as very informative on a sovereign's creditworthiness. The strong market reaction indicates that their rating decisions appear to be largely unanticipated.

The weak impact of Fitch's rating decisions is in line with the results of Norden and Weber (2004) and Arzeki et al. (2011), who also find that Fitch sovereign rating changes did not spillover on financial institutions. This finding could be due to the fact that Fitch is much smaller than the other two agencies, with around 15% of the market, compared to a combined market shares of 80% for the other 2 agencies. S&P and Moody's thus attract most of investor attention.

4.2.3 Other types of news

This section considers alternative types of news to better understand how bank CDS spreads react to changes in the global financial environment.

We first study bailout announcements by countries or supranational agencies (e.g., EU, IMF, ECB). This set of events that can be viewed as positive news, as they tend to reduce a country's sovereign credit risk. Sovereign rating changes are decided unilaterally by private corporations (the rating agencies). Therefore, there is always the possibility that information about a possible future downgrade could leak a few days prior to the actual rating announcements (see Michaelides et al., 2015). Sovereign bailouts, on the other hand, are usually decided behind closed doors, in scheduled meetings by officials from various governments and supra-national agencies. These meetings are usually followed fairly quickly by a press conference announcing the results. Although the market can guess the results of these meetings before hearing the actual press conferences, it is unlikely that actual bailout information would leak in the days

before their official announcements. However, bailouts are also expected to respond to changes in financial conditions, which would make such decisions partially anticipated by the market. The overall impact is thus not clear.

Table 6 shows that bailout announcements do not impact bank CDS spreads. The estimate (0.03) is neither economically, not statistically significant. The most probable explanation is thus that the decision to announce a bailout is itself a response by policy makers to a worsening of economic conditions in the banking system. As a result, these bailouts can be viewed as an indirect help to the financial institutions, which are the main sovereign debt holders. Indeed, saving their own banks is certainly one of the main motivations of foreign countries for participating in the bailout of their neighbors. This type of event is thus clearly anticipated by the market when pricing bank CDS. However, it is interesting to note that those bailout announcements actually do statistically and economically reduce CDS spreads in the non-banking sector.

<Table 6 goes about here>

We now turn our attention to financial events that are expected to capture negative news. These events include bankruptcy filings, fines on banks, or fiscal news. We find that bank CDS strongly increase in times of bad news, even after controlling for changes in market-wide economic and financial conditions. Bank CDS returns exhibit a strong asymmetry, as the impact of negative news is highly significant but the effect of positive news (bailouts) is not. The average reaction of the non-banking sector is similar, although weaker and symmetric across positive and negative news.

Finally, we explore the consequences of political events on bank credit risk. The results show that bank CDS greatly increase following political news, which include election outcome, referendum announcements, and resignations. This finding suggests that uncertainty tends to increase rather than to decrease upon such news. In contrast, non-banks do not react at the 5% level.

5. Conclusion

This paper uses an event study and panel data analysis to investigate the response of bank CDS to various sovereign and financial news. The results show that, on average, sovereign credit rating downgrades increase bank default risk, even after controlling for market-wide conditions. Our conclusion holds when we exploit a set of negative news related to the recent European sovereign debt crisis. The CDS reaction to such news is much greater for banks than for non-banks, thereby indicating that the financial sector is the most vulnerable part of the economy when sovereign credit risk increases. We also look at the impact of sovereign bailouts by supranational agencies but, surprisingly, find that they do not help lower bank credit risk. One possible explanation is that market participants can anticipate bailouts, as such decisions typically follow a sharp and severe deterioration of financial conditions, in a country or as a whole.

We also exploit European Banking Authority (EBA)'s stress tests and separate banks based on their holdings of PIIGS sovereign debt. We find that the relative size of such holdings do not substantially increase their reaction to sovereign downgrades. This finding complements the recent literature (e.g., Gennaioli et al., 2012), which concludes that bank direct holding of sovereign debt is one of the main transmission channels of sovereign credit risk to banks. Banks are then exposed to variations in sovereign credit risk beyond their direct holdings of risky sovereign debt. Identifying the alternative channels that link bank credit risk to sovereign credit risk is certainly a fruitful agenda for future research.

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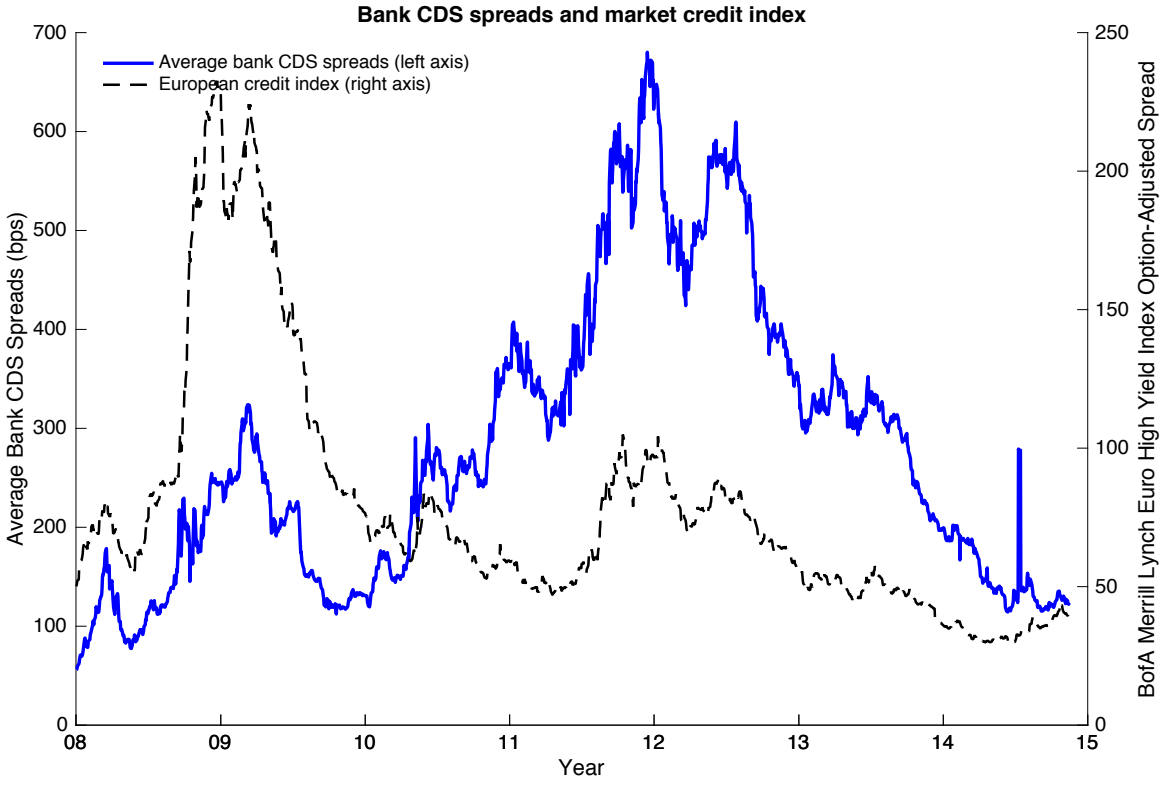

Figure 1. Banks CDS spreads and global credit index, 2008-2014. This figure compares the evolution of the average bank CDS spreads in Europe with the level of global credit quality, given by the BofA Merrill Lynch Euro High Yield Index Option-Adjusted Spread. CDS data are from Markit and the High Yield Index is from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.

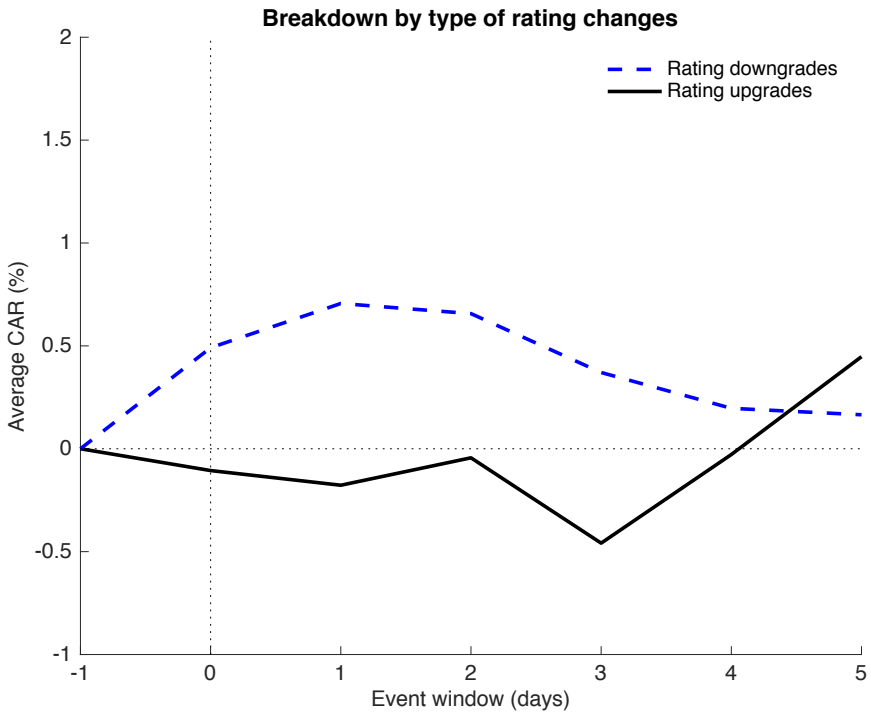

Figure 2. Bank reactions to sovereign rating changes. This figure shows the bank reactions to sovereign credit news with an analysis of the cumulative abnormal CDS returns. The figure separates rating downgrades and upgrades. We consider the three major rating agencies, which are Standard & Poor's, Moody's, and Fitch. The sample consists of 40 European banks over the period January 1, 2008 to December 31, 2014.

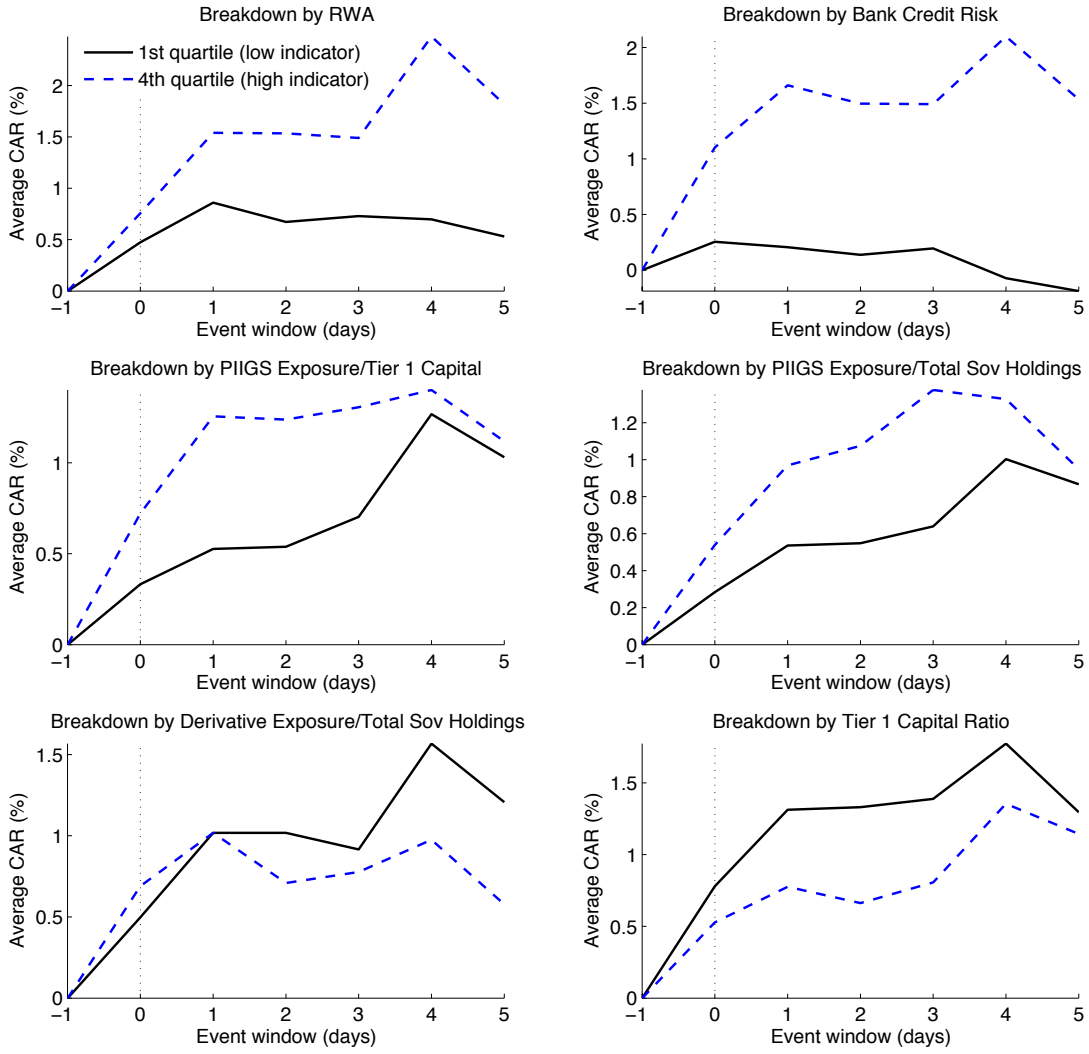

Figure 3. Bank reactions to sovereign rating downgrades by characteristics. This figure shows the bank reactions to sovereign credit news with an analysis of the cumulative abnormal CDS returns. The figure separates banks in quartiles based on different debt exposures and risk level, as available from the European Banking Authority (EBA)'s stress tests. We consider the three major rating agencies, which are Standard & Poor's, Moody's, and Fitch. The sample consists of 40 European banks over the period January 1, 2008 to December 31, 2014.

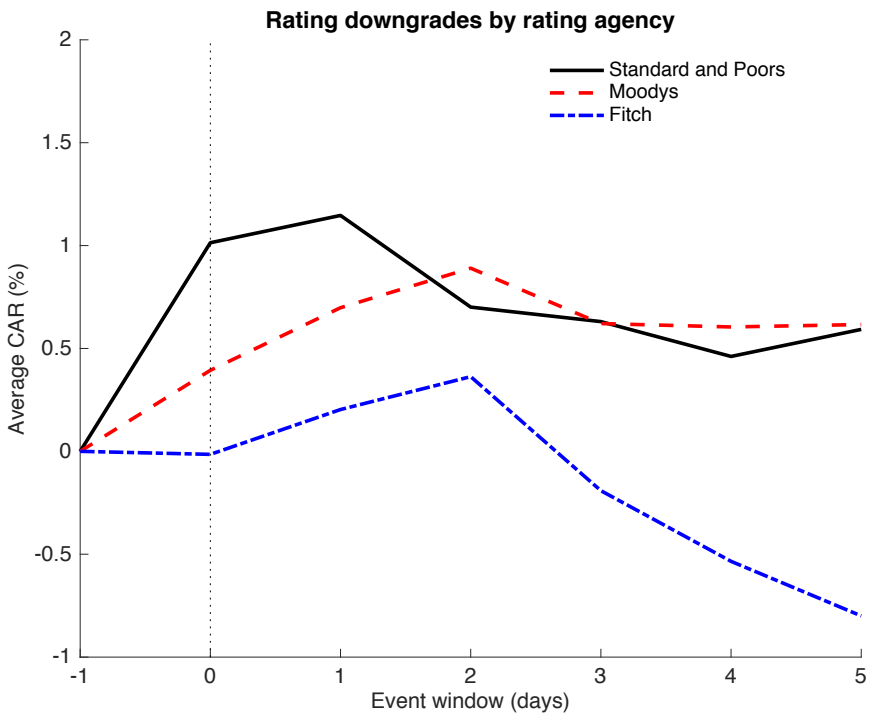

Figure 4. Bank reactions to sovereign rating downgrades by rating agency. This figure shows the bank reactions to sovereign credit news with an analysis of the cumulative abnormal CDS returns. The figure separates events by rating agency. We consider the three major rating agencies, which are Standard & Poor's, Moody's, and Fitch. The sample consists of 40 European banks over the period January 1, 2008 to December 31, 2014.

Dates	Events	Type	Rating Agency	Expected Effect
2008-09-06	U.S. Treasury takes over Fannie Mae and Freddie Mac.	Financial	-	Negative
2008-09-15	Lehman Brothers files for bankruptcy.	Financial	-	Negative
2008-10-07	Iceland's three biggest commercial banks collapse.	Financial	-	Negative
2008-11-04	Barack Obama wins United States presidential election.	Political	-	Uncertain
2009-01-14	Downgrade of Greece	Downgrade	Standard & Poors	Negative
2009-01-19	Downgrade of Spain	Downgrade	Standard & Poors	Negative
2009-03-30	Downgrade of Ireland	Downgrade	Standard & Poors	Negative
2009-04-02	G20 leaders agree to a $1-trillion global stimulus package.	Financial	-	Positive
2009-04-08	Downgrade of Ireland	Downgrade	Fitch	Negative
2009-06-08	Downgrade of Ireland	Downgrade	Standard & Poors	Negative
2009-07-02	Downgrade of Ireland	Downgrade	Moody's	Negative
2009-10-19	Greece reveals that its debt is twice as large as previously thought.	Financial	-	Negative
2009-10-22	Downgrade of Greece	Downgrade	Fitch	Negative
2009-11-04	Downgrade of Ireland	Downgrade	Fitch	Negative
2009-12-08	Downgrade of Greece	Downgrade	Fitch	Negative
2009-12-16	Downgrade of Greece	Downgrade	Standard & Poors	Negative
2009-12-22	Downgrade of Greece	Downgrade	Moody's	Negative
2010-03-24	Downgrade of Portugal	Downgrade	Fitch	Negative
2010-04-09	Downgrade of Greece	Downgrade	Fitch	Negative
2010-04-22	Downgrade of Greece	Downgrade	Moody's	Negative
2010-04-23	Greece requests official financial assistance by EU and IMF	Bailout	-	Positive
2010-04-27	Downgrade of Greece and Portugal	Downgrade	Standard & Poors	Negative
2010-05-01	EU and IMF agree on first bailout for Greece.	Bailout	-	Positive
2010-05-09	The European Financial Stability Facility is agreed by the EU.	Bailout	-	Positive
2010-05-18	Germany bans naked short-selling of sovereign bonds and CDS	Financial	-	Uncertain
2010-05-28	Downgrade of Spain	Downgrade	Fitch	Negative
2010-06-14	Downgrade of Greece	Downgrade	Moody's	Negative
2010-07-13	Downgrade of Portugal	Downgrade	Moody's	Negative
2010-07-19	Downgrade of Ireland	Downgrade	Moody's	Negative
2010-08-24	Downgrade of Ireland	Downgrade	Standard & Poors	Negative
2010-09-30	Downgrade of Spain	Downgrade	Moody's	Negative
2010-10-06	Downgrade of Ireland	Downgrade	Fitch	Negative
2010-11-21	Irish government accepts $113bn bailout from EU and IMF.	Bailout	-	Positive
2010-11-23	Downgrade of Ireland	Downgrade	Standard & Poors	Negative
2010-12-09	Downgrade of Ireland	Downgrade	Fitch	Negative
2010-12-17	Downgrade of Ireland	Downgrade	Moody's	Negative
2010-12-23	Downgrade of Portugal	Downgrade	Fitch	Negative
2011-01-14	Downgrade of Greece	Downgrade	Fitch	Negative
2011-02-02	Downgrade of Ireland	Downgrade	Standard & Poors	Negative
2011-03-07	Downgrade of Greece	Downgrade	Moody's	Negative
2011-03-15	Downgrade of Portugal	Downgrade	Moody's	Negative
2011-03-24	Downgrade of Portugal	Downgrade	Standard & Poors	Negative
2011-03-29	Downgrade of Greece and Portugal	Downgrade	Standard & Poors	Negative
2011-04-05	Downgrade of Portugal	Downgrade	Moody's	Negative
2011-04-15	Downgrade of Ireland	Downgrade	Moody's	Negative
2011-05-04	Portugal reaches agreement with EU and IMF for bailout deal.	Bailout	-	Positive
2011-05-09	Downgrade of Greece	Downgrade	Standard & Poors	Negative
2011-05-20	Downgrade of Greece	Downgrade	Fitch	Negative
2011-06-01	Downgrade of Greece	Downgrade	Moody's	Negative
2011-06-13	Downgrade of Greece	Downgrade	Standard & Poors	Negative

Table 1: List of events, 2008-2014. This table reports the dates of the rating downgrades and upgrades by agencies. It also reports dates of major bailouts, financial news, and political events. When similar events are close to each other (within 4 days), only the last event is considered. The sample spans the period from January 1, 2008 to December 31, 2014.

2011-07-05	Downgrade of Portugal	Downgrade	Moody's	Negative
2011-07-12	Downgrade of Ireland	Downgrade	Moody's	Negative
2011-07-25	Downgrade of Greece	Downgrade	Moody's	Negative
2011-08-07	ECB announces that it will buy Italian and Spanish bonds	Bailout	-	Positive
2011-09-19	Downgrade of Italy	Downgrade	Standard & Poors	Negative
2011-10-04	Downgrade of Italy	Downgrade	Moody's	Negative
2011-10-13	Downgrade of Spain	Downgrade	Standard & Poors	Negative
2011-10-18	Downgrade of Spain	Downgrade	Moody's	Negative
2011-11-03	Greek Prime Minister calls off referendum on EU deal.	Political	-	Negative
2011-11-12	Silvio Berlusconi resigns as Italy's Prime Minister.	Political	-	Uncertain
2011-11-24	Downgrade of Portugal	Downgrade	Fitch	Negative
2011-12-01	European Union bans naked sovereign credit default swaps.	Financial	-	Uncertain
2012-01-13	Downgrade of Italy, Portugal and Spain	Downgrade	Standard & Poors	Negative
2012-01-27	Downgrade of Italy and Spain	Downgrade	Fitch	Negative
2012-02-13	Downgrade of Italy, Portugal and Spain	Downgrade	Moody's	Negative
2012-02-21	Eurozone approves second Greek bailout of $173bn.	Bailout	-	Positive
2012-02-27	Downgrade of Greece	Downgrade	Standard & Poors	Negative
2012-03-02	Downgrade of Greece	Downgrade	Moody's	Negative
2012-03-04	Vladimir Putin wins Russian presidential election.	Political	-	Uncertain
2012-03-09	Downgrade of Greece	Downgrade	Fitch	Negative
2012-03-13	Upgrade of Greece	Upgrade	Fitch	Positive
2012-04-26	Downgrade of Spain	Downgrade	Standard & Poors	Negative
2012-05-02	Upgrade of Greece	Upgrade	Standard & Poors	Positive
2012-05-06	François Hollande wins French presidential election.	Political	-	Positive
2012-05-17	Downgrade of Greece	Downgrade	Fitch	Negative
2012-06-07	Downgrade of Spain	Downgrade	Fitch	Negative
2012-06-13	Downgrade of Spain	Downgrade	Moody's	Negative
2012-07-13	Downgrade of Italy	Downgrade	Moody's	Negative
2012-09-27	The European Stability Mechanism replaces the EFSF.	Bailout	-	Positive
2012-10-10	Downgrade of Spain	Downgrade	Standard & Poors	Negative
2012-11-06	Barack Obama is reelected for a second term.	Political	-	Uncertain
2012-12-05	Downgrade of Greece	Downgrade	Standard & Poors	Negative
2012-12-18	Upgrade of Greece	Upgrade	Standard & Poors	Positive
2013-03-08	Downgrade of Italy	Downgrade	Fitch	Negative
2013-03-25	Cyprus and European leaders agree to bailout deal.	Bailout	-	Positive
2013-05-14	Upgrade of Greece	Upgrade	Fitch	Positive
2013-07-09	Downgrade of Italy	Downgrade	Standard & Poors	Negative
2013-10-16	Financial Conduct Authority confirms investigation into FX markets.	Financial	-	Negative
2013-11-20	JP Morgan Chase reaches $13bn settlement over toxic mortgages.	Financial	-	Uncertain
2013-11-29	Upgrade of Greece	Upgrade	Moody's	Positive
2014-01-07	BNP Paribas fined $8.9bn for breaching U.S. sanctions.	Financial	-	Negative
2014-01-17	Upgrade of Ireland	Upgrade	Moody's	Positive
2014-02-21	Downgrade of Spain	Downgrade	Moody's	Negative
2014-04-18	Vladimir Putin signs annexation pact with Prime Minister of Crimea.	Political	-	Uncertain
2014-04-25	Upgrade of Spain	Upgrade	Fitch	Positive
2014-05-09	Upgrade of Portugal	Upgrade	Moody's	Positive
2014-05-16	Upgrade of Ireland	Upgrade	Moody's	Positive
2014-05-23	Upgrade of Spain	Upgrade	Standard & Poors	Positive
2014-06-06	Upgrade of Ireland	Upgrade	Standard & Poors	Positive
2014-07-25	Upgrade of Portugal	Upgrade	Moody's	Positive
2014-08-01	Upgrade of Greece	Upgrade	Moody's	Positive
2014-08-15	Upgrade of Ireland	Upgrade	Fitch	Positive
2014-08-21	BoA reaches record $17bn settlement for selling toxic MBS	Financial	-	Uncertain
2014-09-12	Upgrade of Greece	Upgrade	Standard & Poors	Positive
2014-09-18	Scotland votes to stay in the UK in independance referendum.	Political	-	Positive
2014-11-12	RBS, HSBC, JPMorgan, UBS, Citibank and BoA fined for currency rigging.	Financial	-	Negative

Table 1: List of events, 2008-2014. To continue..

Variable	N	Mean	Median	Std	Min	Max
CDS spread (bps, EUR)	65035	306.90	177.60	357.20	10.50	10560
CDS spread (bps, USD)	60064	301.40	184.10	332.80	11.00	10560
CDS spread return (%, EUR)	64973	0.0773	0	6.9190	-54.820	47.790
CDS spread return (%, USD)	59971	0.1027	0	6.6140	-40.320	41.200
Downgrade	69570	0.0351	0	0.1841	0	1
Upgrade	69570	0.0079	0	0.0885	0	1
Downgrade S&P	69570	0.0124	0	0.1107	0	1
Downgrade Fitch	69570	0.0101	0	0.1000	0	1
Downgrade Moody's	69570	0.0126	0	0.1117	0	1
Upgrade S&P	69570	0.0026	0	0.0508	0	1
Upgrade Fitch	69570	0.0021	0	0.0461	0	1
Upgrade Moody's	69570	0.0032	0	0.0563	0	1
Bailout	69570	0.0047	0	0.0685	0	1
Financial news (positive)	69570	0.0142	0	0.1184	0	1
Financial news (negative)	69570	0.0404	0	0.1969	0	1
Political event	69570	0.0042	0	0.0645	0	1
Return on asset (%)	59683	0.5817	0.6739	1.6850	-12.420	4.9910
Financial leverage	69570	0.9446	0.9490	0.0304	0.8508	1
Firm size (log of assets)	68363	26.420	26.280	1.3460	22.540	28.880
High yield index (%)	68790	8.0210	6.7100	4.7000	2.9700	23.260
Libor (%, 1m, EUR)	68238	1.1800	0.4725	1.5080	-0.0029	5.1860
OECD recession indicator	69570	0.4722	0	0.4992	0	1

Table 2: Descriptive statistics. This table reports the descriptive statistics of the banks, as well as the statistics of the events considered in this paper. CDS data are from Markit, fundamental data are from Thomson Reuters, and market-wide indices are from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Downgrade				Upgrade			
	Univariate	Firm controls	Market controls	Non-banks	Univariate	Firm controls	Market controls	Non-banks
Downgrade	1.05***	1.10***	1.17***	0.39***				
	(7.15)	(7.10)	(7.59)	(7.33)				
Upgrade					-1.11***	-0.84**	-0.85**	-0.35***
					(-3.67)	(-2.43)	(-2.49)	(-3.13)
Return on assets		0.12***	0.02	0.00		0.11***	0.01	0.00
		(4.80)	(0.58)	(0.00)		(4.44)	(0.44)	(0.06)
Firm size		-0.08	0.21	0.11		-0.08	0.20	0.10
		(-0.36)	(0.97)	(1.56)		(-0.36)	(0.93)	(1.50)
Financial leverage		17.67***	8.69***	-0.70***		17.31***	8.86***	-0.70***
		(7.07)	(3.12)	(-3.20)		(6.91)	(3.18)	(-3.21)
High yield index			-0.04***	-0.03***			-0.04***	-0.03***
			(-5.45)	(-12.07)			(-5.56)	(-12.18)
Libor rate (1m, EUR)			0.36***	0.39***			0.35***	0.39***
			(14.27)	(47.38)			(13.85)	(46.97)
OECD recession indicator			-0.30***	-0.19***			-0.30***	-0.18***
			(-4.25)	(-7.53)			(-4.20)	(-7.44)
Constant	0.04	-14.70**	-13.68**	-2.12	0.09***	-14.28**	-13.54**	-2.00
	(1.44)	(-2.52)	(-2.32)	(-1.30)	(3.17)	(-2.45)	(-2.29)	(-1.22)
Number of observations	64,973	56,239	55,112	261,230	64,973	56,239	55,112	261,230
R-squared	0.001	0.002	0.006	0.009	0.000	0.001	0.005	0.009
Fixed effects	yes	yes	yes	yes	yes	yes	yes	yes

Table 3: Impact of rating changes on CDS spreads in EUR. This table reports the effect of a change in sovereign ratings on CDS spreads. We separately analyze the impact of rating downgrades and upgrades. The dependent variable is the cumulative log return of CDS spreads denominated in EUR between t-1 and t+1. The frequency is daily. CDS data are from Markit, fundamental data are from Thomson Reuters, and market-wide indices are from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Downgrade				Upgrade			
	Univariate	Firm controls	Market controls	Non-banks	Univariate	Firm controls	Market controls	Non-banks
Downgrade	1.08***	1.17***	1.25***	0.44***				
	(7.40)	(7.46)	(7.98)	(8.06)				
Upgrade					-1.15***	-0.96***	-0.96***	-0.46***
					(-3.75)	(-2.71)	(-2.72)	(-3.99)
Return on assets		0.17***	0.01	-0.00		0.16***	0.01	-0.00
		(5.90)	(0.35)	(-0.78)		(5.54)	(0.26)	(-0.75)
Firm size		-0.10	0.39*	0.11		-0.09	0.38*	0.11
		(-0.47)	(1.87)	(1.59)		(-0.44)	(1.81)	(1.53)
Financial leverage		20.06***	7.74***	-0.60***		19.60***	7.93***	-0.61***
		(7.70)	(2.62)	(-2.60)		(7.51)	(2.69)	(-2.66)
High yield index			-0.04***	-0.04***			-0.04***	-0.04***
			(-5.44)	(-13.95)			(-5.54)	(-14.08)
Libor rate (1m, EUR)			0.36***	0.41***			0.35***	0.40***
			(14.28)	(49.50)			(13.81)	(49.02)
OECD recession indicator			-0.31***	-0.22***			-0.31***	-0.22***
			(-4.34)	(-8.80)			(-4.29)	(-8.72)
Constant	0.06**	-16.41***	-17.66***	-2.27	0.11***	-16.05***	-17.45***	-2.13
	(2.35)	(-3.01)	(-3.19)	(-1.35)	(4.12)	(-2.94)	(-3.15)	(-1.27)
Number of observations	59,971	51,246	50,219	233,048	59,971	51,246	50,219	233,048
R-squared	0.001	0.002	0.007	0.011	0.000	0.001	0.006	0.011
Fixed effects	yes	yes	yes	yes	yes	yes	yes	yes

Table 4: Impact of rating changes on CDS spreads in USD. This table reports the effect of a change in sovereign ratings on CDS spreads. We separately analyze the impact of rating downgrades and upgrades. The dependent variable is the cumulative log return of CDS spreads denominated in USD between t-1 and t+1. The frequency is daily. CDS data are from Markit, fundamental data are from Thomson Reuters, and market-wide indices are from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.

	(1)	(2)	(3)	(4)	(5)	(6)
	Downgrade			Upgrade		
	S&P	Fitch	Moody's	S&P	Fitch	Moody's
Downgrade S&P	1.59***					
	(6.23)					
Downgrade Fitch		0.43				
		(1.52)				
Downgrade Moody's			1.25***			
			(4.94)			
Upgrade S&P				-2.03***		
				(-3.50)		
Upgrade Fitch					-1.02	
					(-1.56)	
Upgrade Moody's						0.35
						(0.64)
Return on assets	0.02	0.01	0.01	0.01	0.01	0.01
	(0.55)	(0.45)	(0.54)	(0.46)	(0.45)	(0.46)
Firm size	0.21	0.21	0.21	0.20	0.21	0.21
	(0.95)	(0.95)	(0.98)	(0.92)	(0.95)	(0.96)
Financial leverage	8.96***	8.93***	8.88***	8.95***	8.96***	9.03***
	(3.22)	(3.21)	(3.19)	(3.21)	(3.22)	(3.24)
High yield index	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	(-5.56)	(-5.46)	(-5.35)	(-5.56)	(-5.48)	(-5.43)
Libor rate (1m, EUR)	0.35***	0.35***	0.35***	0.35***	0.35***	0.35***
	(14.08)	(13.96)	(14.01)	(13.82)	(13.89)	(13.92)
OECD recession indicator	-0.31***	-0.30***	-0.30***	-0.29***	-0.30***	-0.30***
	(-4.28)	(-4.21)	(-4.22)	(-4.12)	(-4.21)	(-4.20)
Constant	-13.80**	-13.76**	-13.89**	-13.59**	-13.79**	-13.89**
	(-2.34)	(-2.33)	(-2.35)	(-2.30)	(-2.33)	(-2.35)
Number of observations	55,112	55,112	55,112	55,112	55,112	55,112
R-squared	0.006	0.005	0.006	0.005	0.005	0.005
Fixed effects	yes	yes	yes	yes	yes	yes

Table 5: Impact of rating changes on CDS spreads by agency. This table reports the effect of a change in sovereign ratings on CDS spreads. We separately analyze the impact of rating downgrades and upgrades by agency. The dependent variable is the cumulative log return of CDS spreads denominated in EUR between t-1 and t+1. The frequency is daily. CDS data are from Markit, fundamental data are from Thomson Reuters, and market-wide indices are from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.

	(1)	(2)	(3)	(4)	(5)	(6)
	Banks			Non-banks		
	Bailout	Financial news	Political news	Bailout	Financial news	Political news
	positive	*negative*	*uncertain*	*positive*	*negative*	*uncertain*
Bailout	0.03			-0.49***		
	(0.06)			(-3.44)		
Negative news		1.07***			0.43***	
		(7.41)			(8.58)	
Political events			1.42***			-0.30*
			(3.02)			(-1.86)
Return on assets	0.01	0.02	0.01	0.00	0.00	0.00
	(0.45)	(0.58)	(0.46)	(0.11)	(0.00)	(0.08)
Firm size	0.21	0.21	0.21	0.10	0.11	0.10
	(0.95)	(0.97)	(0.96)	(1.50)	(1.57)	(1.51)
Financial leverage	8.99***	8.80***	8.98***	-0.70***	-0.70***	-0.70***
	(3.23)	(3.16)	(3.22)	(-3.20)	(-3.20)	(-3.21)
High yield index	-0.04***	-0.04***	-0.04***	-0.03***	-0.03***	-0.03***
	(-5.45)	(-5.46)	(-5.43)	(-12.11)	(-12.08)	(-12.06)
Libor rate (1m, EUR)	0.35***	0.35***	0.35***	0.39***	0.39***	0.39***
	(13.91)	(14.15)	(13.96)	(47.00)	(47.33)	(47.05)
OECD recession indicator	-0.30***	-0.30***	-0.31***	-0.18***	-0.19***	-0.18***
	(-4.21)	(-4.25)	(-4.35)	(-7.38)	(-7.53)	(-7.33)
Constant	-13.83**	-13.79**	-13.84**	-2.02	-2.14	-2.03
	(-2.34)	(-2.34)	(-2.34)	(-1.23)	(-1.31)	(-1.24)
Number of observations	55,112	55,112	55,112	261,230	261,230	261,230
R-squared	0.005	0.006	0.005	0.009	0.009	0.009
Fixed effects	yes	yes	yes	yes	yes	yes

Table 6: News impact on CDS spreads. This table reports the effect of bailouts, financial news, and political events on CDS spreads. The dependent variable is the cumulative log return of CDS spreads denominated in EUR between t-1 and t+1. The frequency is daily. CDS data are from Markit, fundamental data are from Thomson Reuters, and market-wide indices are from the Federal Reserve Bank of St. Louis. The sample spans the period from January 1, 2008 to December 31, 2014.