European policy and markets: Did policy initiatives stem the sovereign debt crisis in the Euro Area?*

By

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Abstract

We investigate how European policy initiatives influenced market assessments of sovereign default and banking sector fragility during the sovereign debt crisis in four adversely affected countries—Portugal, Ireland, Spain and Italy. We focus on three broad groups of policies: (a) ECB policy actions (monetary and financial support), (b) EU programs (financial and fiscal rules as well as financial support in crisis countries), and (c) national austerity programs. We address what policies changed risk perceptions, using CDS spreads on sovereign bonds and banks in this assessment, using panel regressions and event study methods. We investigate both direct effects of the programs on the intended markets, and also spill-over effects on other markets. We find that actions designed to shore up sovereign markets often lower risk assessments in bank markets and vice versa. The most effective policies in restoring market confidence were easing of ECB collateral constraints, ECB financial stability actions, and Single Supervisory Mechanism (SSM) announcements. Imposition of tighter fiscal rules, by contrast, reduced market confidence and raised CDS spreads for sovereigns and banks.

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1. Introduction

In the aftermath of the global financial crisis, government budget deficits and debt ratios in many countries in the Euro Area (EA) climbed to the highest levels seen in the post-war period and banks were incurring large losses. Market interest rates and credit default swap (CDS) spreads on sovereign debt and bank liabilities increased sharply in response, signaling lack of confidence in fiscal (and other) policies and bank solvency. The European sovereign debt crisis was characterized by tumultuous markets and technical defaults (Cyprus and Greece) or near-default by other EA countries (Ireland and Portugal) and widespread bank fragility. Against this background, policymakers responded with a multitude of programs designed to provide short-term liquidity to stabilize EA countries' sovereign debt markets, provide governments with short-term financing, restore long-term sustainable public finances, support banks, and restore confidence. Programs by the ECB, EU and IMF — the "troika" — and national governments were announced and implemented.

European policy programs were announced successively over time, somewhat hesitantly at first, and gradually grew in size and breath as the sovereign debt crisis continued and intensified. It is evident that the cumulative impact of policies, culminating with the ECB's Outright Monetary Transactions (OMT) program, eventually had the desired effect of quelling, if not resolving, the sovereign debt crisis. However, it is likely that each policy program in itself had some marginal contribution to stabilizing markets.

This paper addresses three main questions. Firstly, which of the ECB (monetary and financial support), EU (financial, fiscal rules and financial support in crisis countries), and national government (austerity) programs were most effective (ineffective) in stabilizing sovereign debt markets? Secondly, which of these programs were most effective (ineffective) in stabilizing market concerns over bank fragility? And, thirdly, were there unintended market consequences of the programs? That is, were programs targeted toward banks (sovereign debt) helpful in reducing anxiety about sovereign debt (banks)? And did austerity measures adopted in some Euro countries transmit to other EU national markets?

We address these questions by empirically measuring the effectiveness of each policy in reducing market fears of sovereign debt default and bank failure. Specifically, using panel regression and event-study frameworks, we look at the response of sovereign and bank CDS spreads to European policy announcements. The linkages between sovereign and bank risks are evident, as we show below, and are a motivating factor behind moves to create a full banking union in Europe. We divide policy actions into several categories, and whether they are designed to stabilize sovereign debt markets or provide support to banks (liquidity and capital injections). Our objective is to evaluate which policies seemed to be most effective, the magnitude of the effect, and — sometimes unintended — spillover effects of the policies.

Section 2 reviews the literature on how policy actions are incorporated into market perceptions of default risk. Section 3 states our basic hypotheses, empirical methodology and data for measuring market perceptions of default. This is followed, in Section 4, by a presentation of our empirical results on market perceptions of risk and policy effectiveness. This section reports our results on how markets price sovereign and bank risk in four European countries (Portugal, Ireland, Italy and Spain), whether European policy measures affected market pricing of risk, how banking fragility affects risk perceptions, and the nature of contagion. Section 5 concludes and discusses policy implications.

2. Market Perceptions of Default Risk

2.1. How do markets evaluate policy actions, sovereign default risk and bank fragility?

Market signals provide both surveillance as well as direct and automatic sanctions in terms of higher borrowing costs in many financial markets, including the sovereign debt and corporate bond markets, when policies or continued operations are perceived as unsustainable. Market responses also serve as important indicators of the perceived credibility of government and central bank announcements, such as new policies, regulations and debt purchases, designed to shore up fiscal sustainability, stabilize sovereign and bank debt markets, and restore confidence. The question we address is whether markets systematically respond to policy actions designed to stabilize sovereign debt markets and banks. Do financial markets respond systematically and predictably to policy announcements about ECB policy actions, new EU regulations and fiscal rules, financial assistance to governments in distress, and national budget austerity measures that should, in principle, shore up debt sustainability and bank solvency?

2.2. ECB actions

There is a large literature on these topics, addressing these issues from several vantage points. One group of studies investigates ECB actions. Gerlach-Kristen (2015), for example, investigates whether ECB open market operations reduced CDS spreads on bank and sovereign bonds. It is found that (a) purchases under the Covered Bond Purchase Programme reduced spreads, as did the announcement of the Securities Market Programme (SMP), and (b) actual SMP purchases raised spreads, conjecturing that markets may have seen them as a sign of policymaker concern about the financial system.

Altavilla, Giannone and Lenza (2016) focus on announcements of the ECB's Outright Monetary Transactions (OMT) program and the effect on Treasury bond markets. They regress (in the sample from January 2007 to February 2013) changes in government bond yields on a vector of event dummies and financial news. The events are the three announcements regarding the OMT and that occurred between July and September 2012. Using high frequency data, they find that the OMT announcements decreased the Italian and Spanish two-year government bond yields by about 2 percentage points, while leaving unchanged the bond yields of the same maturity in Germany and France.

Focusing on banks, Markman and Zietz (2017) also examine the effectiveness of the Eurosystem's Covered Bond Purchase Programs. They consider the terms of the spread tightening of euro-denominated covered bonds against those issued by British banks (which do not benefit from the program), which serve as the control group. This study uses weekly data from the beginning of 2006 to the middle of 2015. It makes use of an unobserved components model (structural time series) framework. The announcement effects identified by prior studies for the first Covered Bond Purchase Program are confirmed, but effects of the subsequent two programs differ. Their implementation tends to widen covered bond yields, contrary to the Eurosystem's objectives, but in line with liquidity expectations.

Ricci (2015) also assesses the impact of ECB monetary policy announcements, focusing on the stock prices of large European banks. He conducts an event study measuring cumulated abnormal returns (CARs) around the announcements over June 2007–June 2013, and a regression analysis aimed at identifying the determinants of CARs. It is found that banks were more sensitive to non-conventional measures than to interest rate decisions, that the same type of intervention may have a different impact depending on the stage of the crisis, and that banks with weaker balance sheets and operating with high-risk were more sensitive to monetary policy interventions.

2.3. Fiscal actions, financial assistance and other policies

In terms of fiscal actions, Alter and Beyer (2012) analyze specific news announcements and find that the establishment of the European Financial Stability Facility (EFSF) - created as a temporary crisis resolution mechanism by the EA in June 2010, providing financial assistance to Ireland, Portugal and Greece — and the two long-term refinancing operations (LTROs) decided upon in December 2011, tended to reduce contagion across European markets somewhat. On the other hand, the bailout of the Spanish bank Bankia had the opposite effect, and tended to increase contagion.

More broadly, Thornton and Vasilakis (2015) examine whether adopting a numerical fiscal rule (FR) framework to guide fiscal policy helps reduce sovereign risk premia in a sample of advanced and developing countries for 1985–2012. They address the self-selection problem of policy adoption by applying propensity score matching methods, and find that adopting fiscal rules reduces sovereign risk premia. Specifically, they test the impact of FRs adoption on sovereign risk premia by examining developments in the spread between the interest rate at which a country borrows and the "risk free" rate, which they define as the yield on long-term U.S. Treasury bonds. They employ two treatment groups: One group of 33 advanced and developing countries that had adopted a numerical rule on the fiscal balance by the end of 2012, and another group of 27 advanced and developing countries that had adopted a rule on the stock of public debt (with overlap between the two groups as many countries adopted both rules). The control group comprises 29 non-FRs adopting countries. Their results indicate that the adoption of FRs on the fiscal balance and/or the stock of public debt resulted in a statistically significant reduction in sovereign risk premia, suggesting that FRs help build policy credibility, reducing the risk premia paid to compensate lenders for the possibility of government default.

Also on fiscal actions, Feld et al. (2017) analyze the effects of a credible no-bailout policy and stringent sub-national FRs on the risk premia of Swiss subnational government bonds in the period from 1981 to 2007. In July 2003, the Swiss Supreme Court decided that the canton of Valais is not liable for municipal debt. This landmark decision reduced cantonal risk premia by about 26 basis points and cut the link between cantonal risk premia and the financial situation of the municipalities that existed before. The result demonstrates that a not fully credible no-bailout commitment can entail high costs for the potential guarantor. Additionally, strong and credible balanced budget rules reduce risk premia. They also find positive market reactions to unexpected changes in the programs' eligibility criteria.

2.4. Financial assistance programs and other policies

In terms of financial assistance, Klomp (2013) examines the effectiveness of the financial sector rescue packages provided by the national governments during the 2008 Global Financial Crisis. He finds financial sector rescue package announcements reduce credit default premiums on banks, but the effect varies across banks: most interventions do not decrease premiums on intermediate to low-risk banks, while they do reduce premiums on high-risk banks. He also finds that interventions aimed at specific financial institutions are more effective in reducing banking risk than broad interventions taken to stabilize the financial market as a whole.

Grammatikosa et al. (2015) explore the impacts of key policy actions by US and European authorities on stock returns of systemically important banks in Europe and US around the Global Financial Crisis. They find that US policy announcements had a stronger impact on the European and US banking industry than European policy announcements. In particular, the announcements of monetary policies by the US authorities were accompanied by higher abnormal returns compared to related announcements of European authorities. But both US and European policy announcements increased return volatility during the crisis.

More broadly, Aït-Sahalia et al. (2012) examine the impact of macroeconomic and financial sector policy announcements in the United States, the United Kingdom, the euro area and Japan on interbank credit and liquidity risk premia during June 1, 2007–March 31, 2009. They measure credit and risk premia by the Libor–OIS spread, and investigate responses to a variety of policy announcements across countries. They find that policy interventions were associated with a reduction in interbank risk premia, most significantly for recapitalization programs. By contrast, decisions to bail out individual banks in an ad hoc manner or let them fail were accompanied by a significant rise in interbank risk premia. Moreover, most policy announcements had international spillovers.

Mink and de Haan (2013) consider the impact of Greek news including the Greek bailouts on bank stock prices. They look at 48 European banks in 2010. They find that Greek news did not affect bank stock prices. However, the Greek bailout had a tremendous impact with stronger effects on banks heavily exposed to

Greek debt. What is interesting is that even banks not exposed to GIPS (Greece, Italy, Portugal and Spain) debt also were significantly affected.

The relationship between CDS spreads and fundamentals, including fiscal stance, is studied by Aizenman, Hutchison and Jinjarak (2012) who find that fundamentals explain spreads but that default risk in periphery euro area countries are priced too high given current fundamentals during the crisis period, and perhaps too low during the pre-crisis period. The European Commission (2012) also considered the determinants of CDS spreads in Europe, including fiscal stance. Their results suggest fiscal balance and other macro variables significantly affect the spreads.

The overall conclusion from the empirical literature studying the effects of policy news announcements is that market prices respond strongly. The specific literature on European program initiatives during the sovereign debt crisis is small but growing, and questions remain about how markets respond to new programs, regulations and other policy announcements by the ECB and the European Commission.

3. Data, Methodology and Testable Hypotheses

3.1. Measuring market responses of default risk

In this section, we describe our approach to analyzing the effects of policy announcements. Building on the literature discussed in the previous section we focus on the response of CDS spreads to European policy announcements. Our main contributions are to examine how sovereign and bank debt markets in EU countries, and GIIPS (Greece, Italy, Ireland, Portugal and Spain) in particular, respond to a host of ECB actions, EU policy and regulatory changes, national austerity policies, and the nature of transmission and contagion across the EU.

Our analysis of the impact of news announcements on interest spreads is influenced by Dooley and Hutchison (2009) who study the transmission of news from the US on emerging markets. Collecting news announcements and categorizing these into different groups allow them to study the effects of on a selection of emerging markets.[1] Our work is also influenced by Beetsma, Giuliodori, de Jong and Widijanto (2012) who study the transmission of news on GIIPS countries on euro area and non-euro area Member States.

We measure the market perception of sovereign and bank default risk by the spreads on sovereign and bank CDS. CDS instruments are mainly transacted in over-the-counter (OTC) derivative markets. The spreads represent the quarterly payments that must be paid by the buyer of CDS to the seller for the contingent claim in the case of a credit event, in this case non-payment (or forced restructuring) of sovereign debt, and is therefore an excellent proxy for market-based default risk pricing.

The total CDS market grew from about 10 trillion USD in 2004, when statistics were first systematically

[1] The main result from their study is that news announcements do lead to responses in CDS spreads. For example, the Lehman Brothers failure and associated news raised CDS spreads in all 14 countries studied and the effect ranges from 7 basis points increase for the Chinese sovereign spread to over 100 basis points for Argentinian spreads.

reported, to a peak prior to the global financial crisis of almost 60 trillion USD in 2007, and then fell sharply to around 32 trillion USD in mid-2011 according to Bank of International Settlement (BIS) surveys. The share of sovereign CDS has grown since 2008 from around 15% (10%) to almost 25% (20%) in December 2011 of total net notional (total gross notional) amount (International Organization of Securities Commission, 2012).

Sovereign CDS provide a market-based real time indicator of sovereign credit quality and default risk. We consider sovereign CDS spreads with five-year maturities, as this is the most liquid part of the CDS market. Despite the low probability of a credit event in most advanced economies, CDS markets are still active in most markets as buyers can use the sovereign CDS as a hedge and for mark-to-market response. Buyers of the sovereign CDS may or may not own the underlying government bonds. The latter case is termed 'naked' sovereign CDS, and frequently labelled as a speculation.

Daily data on CDS prices are taken from Markit.[2] The data are CDS spreads in USD. The quoting convention for CDS is the annual premium payment as a percentage of the notional amount of the reference obligation. The sovereign CDS spreads are reported in basis points, with a basis point equal to $1,000 to insure $10 million of debt.[3]

Figure 1 shows daily observations of sovereign CDS spreads in the 16 EMU countries (there is no CDS spread for Luxembourg) from January 1, 2001 until September 13, 2012.[4] To illustrate the large differences across the countries we use the same scale for all countries except Greece (the upper left graph). It is a striking feature in Figure 1 (and Figure 2) that CDS spreads are almost constant until the failure of Lehman Brothers. As the credit crunch developed, CDS spreads in all EMU countries started to rise and when the credit crunch later developed into a European debt crisis, CDS spreads in the GIIPS countries and in some of the periphery countries also became affected. The Estonian CDS spread increased considerably during the 2008 crisis, much more than in the GIIPS countries. The Cypriot CDS spread became heavily affected from 2010 and onwards as a consequence of its close connections to Greece. The CDS spread increased to similar levels as the Portuguese spread as can be seen in Figure 1. Core EMU countries were not affected to the same degree as can be seen in the lower right graph. It increased somewhat. Even among these countries there are some notable differences. Belgium and Austria were more affected than other core countries and France somewhat more than Germany and the Netherlands.

[2] Markit receives contributed CDS data from market makers from their official books and records. According to the company, Markit "cleans" this data, testing it "…for stale, flat curves, outliers and inconsistent data". If a contribution fails any one of these tests, they discard it. Markit states that they ensure superior data quality for an accurate mark-to-market and market surveillance.

[3] For example, a spread of 197 basis points means that it costs 197,000 USD to insure against 10,000,000 in sovereign debt for 10 years; 1.97% of notional amount needs to be paid each year, so 0.0197 x 10 million = $197,000 per year.

[4] The reason why we end our sample on September 13, 2012, is that this allows us to study the short-run effects of the program on CDS spreads and at the same time taking into account that this decision constituted a significant change or a regime change in the EA as has been argued by, e.g., De Grauwe (2013).

These developments can be compared to EU countries not participating in the monetary union. Figure 2 shows the CDS spread for the remaining 10 EU countries. We are using the same scale as for the EA countries except Greece in Figure 1. Looking first at the 6 East European countries we first find a strong convergence in CDS spreads in other EU countries, a rise during the credit crunch and high CDS spreads during the 2009 to 2010 period. The Czech Republic also stands out as an exception in this group with persistently lower spreads, comparable to the other group of outsiders shown in the lower graph. Poland has been more affected by the international crises than the other three countries, on a level comparable to the Czech Republic and Belgium and Austria. Denmark, given its fixed exchange rate policy, has been more affected than Sweden and the UK.

Figure 3 shows sovereign CDS spreads for Spain and Ireland together with bank CDS spreads and Fitch Rating downgrading of both sovereigns and banks in these two countries.[5] We show the CDS spread for two (one) banks in Spain (Ireland). In accordance with the CDS spreads for the sovereigns, we use spreads on five-year senior debt. Clearly, bank and sovereign CDS spreads are highly correlated, usually moving in the same direction simultaneously and it is difficult to see any leading or lagging effects.

A similar, though less clear, relationship is evident from Figure 3. Credit rating downgrades on sovereigns are usually followed by credit downgrades of banks, while not responding much to their own credit downgrades, i.e., sovereign downgrades increase the likelihood of a bank credit downgrade. Fitch Rating publications explaining credit rating changes also suggest banks are often downgraded as a result of an earlier downgrade of the sovereign.

The overall picture when looking at the CDS data is that it seems that both EMU countries and EU countries that have no adopted the euro have been affected and that being an outsider has not insulated the economy from shocks related to the credit crunch and the debt crisis. EU countries are integrated regardless of whether they have adopted the euro or not. At the same time, it is clear that there are differences. Contagious effects to the smaller EMU and non-EMU countries may explain why these countries have been more affected than the larger EU countries.

Moreover, it is evident that sovereign risk and bank risk are closely connected. This is shown more formally in Table 1, motivating our exploration of how policy actions are transmitted to both markets, perhaps in unintended and surprising ways. The table shows the contemporaneous correlation (with t-statistic and probability) between sovereign CDS spreads and bank CDS spreads (in first differences) as well as Granger causality tests between these two series. Two banks are considered for Ireland and one bank each for Portugal, Spain and Italy. Two lags of daily data are used in the Granger tests.

[5] We use five-year senior CDS spreads for banks downloaded from Bloomberg and Reuters.

High contemporaneous correlations are evident in most cases between sovereign and bank CDS spread changes. In four of the five cases the correlations between CDS spreads range from 0.26-0.75, and the single (low) outlier has a correlation of 0.04 (Bank of Ireland and Irish sovereign CDS). All correlations are positive and, except in one case (again, Bank of Ireland), statistically significant, indicating strong linkages between the two measures of default risk. The Granger tests indicate two-way feedback is strong: sovereign CDS "Granger cause" bank CDS, and bank CDS "Granger cause" sovereign CDS. (The only exception is for Allied Irish Bank.)

3.2. Policy announcements

The news announcement variables are collected from four different sources. First, we use several chronologies of the recent financial crisis and the key developments in the European economies including policy measures both at a national level as well as on a pan-European level; "Key dates in financial crisis" published by the ECB, "Timeline: The unfolding Eurozone crisis" published by BBC, and "Europe's Debt Crisis" published by Wall Street Journal, "Euro crisis" published by Bruegel (prepared by Christophe Gouardo in cooperation with Jean Pisani-Ferry), and "European Sovereign Debt Crisis: Overview, Analysis, and Timeline of Major Events" published by Enterprising Investor. In addition to these sources we use Bloomberg news announcements.

From these chronologies, we identify 276 news events. These news events are then coded into 11 categories. Table 2 provides a list of these categories and examples of events for each type of news.[6] These categories, and broad criteria for inclusion, are:

- Austerity Programs (AP): Announcements of austerity programs in GIIPS countries.
- ECB- Banking: ECB policy initiatives supporting the banking system. These include the long-term refinancing operation (LTRO) that has been implemented and renewed during our sample period.
- ECB- MP: ECB's monetary policy actions including changes in key interest rates, expansion of swap lines, and Governor Draghi's speech (London, 2012) where he declared that the ECB would do everything possible ("whatever it takes") to preserve the euro.
- ECB- Easing Collateral Constraints: ECB policy measures supporting sovereigns, including debt purchases and suspension of programs tightening financial regulation.
- ECB- Tightening Collateral Constraints: ECB tightening of collateral constraints, including suspension of government purchase programs or limits eligibility for government debt as collateral.
- ECB-- Financial Stability: ECB policies designed to support and improve financial stability, including public and private debt securities markets programs and the Outright Monetary Transactions (OMT) announcements and implementation.[7]

[6] In addition, Table A.1 in Appendix A lists four additional types of news announcements (good and bad news on GIIPS countries and credit rating downgrades for these sovereigns and banks in these countries) used as additional control variables in our empirical analysis.

[7] In the period July to September 2012, the Governing Council of the ECB announced that the bank might engage in outright monetary transactions (OMTs) in the secondary markets for government bonds. In particular, on July 26, 2012, during a conference in London, President Draghi said that the ECB was ready to do "whatever it takes" to preserve the euro within the limits of its mandate. On August 2, 2012, during the press conference after the Governing Council meeting, President Draghi announced, "ECB may undertake outright open market operations." Finally, on September 6, 2012, the ECB's Governing Council announced a number of technical features of the OMT program. More precisely, the ECB stated that no ex ante quantitative limits would be considered for outright transactions in secondary sovereign bond markets, that purchases would concentrate on bonds with remaining maturities of up to three years, and without seniority (pari passu), and that bond purchases would be conditional. The effect of these OMT announcements on European bond yields is investigated by Altavilla et al. (2014). De Grauwe (2013)

- ECB/EU Joint Initiatives: EFSF and European Stability Mechanism (ESM) programs.
- EU Fiscal Rules: Tightening of fiscal rules and regulations in EU, including proposals, decisions and implementation of the fiscal compact.
- EU Stress Tests: EU wide bank stress test
- Single Supervisory Mechanism (SSM)
- Support: Announcement of EU/IMF financial assistance to GIIPS governments.

As our objective is to analyze the effects of news from the GIIPS countries as well as the existence of contagion, we code separate categories of austerity plans and bailouts for each of the five GIIPS countries. For example, coding in this way allows us to analyze the effects of a new austerity plan in Portugal on both the Portuguese CDS spread as well as on the Spanish CDS spread, where the latter effect is our measure of contagion.

Table 3 reports the number of events for each news announcement for the full sample. As expected there is more news on Greece than on other countries, reflecting that the problems in the Greek economy are much more severe than in other GIIPS countries. Note also that for some indicators and for some countries there are no news announcements at all. For example, there is no bailout for Italy. It is important to use precise definitions as well as excluding the possibility that a news announcement we code is a response to market developments. We have used a conservative interpretation of the events in order not to contaminate our estimates. This limits the number of events but gives confidence that the events are exogenous of contemporaneous financial market fluctuations. We have also excluded news announcements reflecting general market conditions such as the announcement by EU that it endorses Greece's austerity plan that was announced on Feb. 3, 2010. The occurrence of strikes is not classified as news even though it can be regarded as negative news increasing the uncertainty about whether a planned austerity plan for example will be implemented or not.

We do not have a quantitative or continuous measure of the magnitude of an “unexpected” policy announcement. Due to data limitations, we employ the date of the announcement itself (as a dummy variable on the day of announcement) and measure the effect on CDS spreads. This follows the event study in related literature on the effects of general policy announcements on financial assets prices (e.g., Dooley and Hutchison, 2009; Aït-Sahalia et al., 2012). There is no generally accepted methodology or systemic data source on market expectations of austerity plans or other policy actions. Hence, a result of “no significance,” or even an unexpected directional sign, may be due to either the policy being fully expected or disappointing to market participants in that a more forceful policy action was anticipated by the market.

Having defined the categories, we define a dummy variable taking the value one on the date when the news was announced; otherwise the dummy is equal to zero. Such a definition excludes the possibility that some news announcements are anticipated, implying that there is a market reaction prior to the actual

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argues that OMT, by explicitly accepting unconditional lender of last resort responsibility, was a fundamental departure from previous ECB policy.

announcement. It may also well be that the market does not respond immediately on the same day but respond the next day. For this reason, we utilize event windows.

We follow the standard approach in event studies and define a two-day window, i.e., we let the dummy variable be equal to unity on the day of the event, the previous day and the following day.[8] Using wider windows runs the risk of contaminating our results as other news or events may also affect our measures. A too narrow event window could imply that we exclude anticipation effects and are not taking into account that the market may not respond immediately. Many of the news announcements we study are related to policy initiatives that are discussed in public prior to any decision. The closer to the expected policy decision, the more likely it is that the market anticipates the particular announcement. This is particularly relevant for EU policy initiatives, for example the decisions to establish ESM, where the decision may be anticipated and the effect therefore may be spurious. This is a problem that is unavoidable since we do not have data allowing us to distinguish between the anticipated and the unanticipated news announcement on policy initiatives.

3.3. Estimation equations and hypotheses

We focus on the 2009-01-01 to 2012-09-04 sample using daily data. This period encompasses the global financial crisis which evolved into the European sovereign debt and bank crisis. We focus on the IIPS countries (Italy, Ireland, Portugal and Spain). There are missing observations in the dataset, resulting in regression samples are not the same across all countries. In addition to the event study, we also run panel data regressions of the following type:

$$\Delta CDS_{i,t} = \alpha + \beta_0 \Delta CDS_{i,t-1} + \underbrace{\beta_i X_{i,t}}_{\text{Domestic austerity}} + \overbrace{\sum_j \gamma_j X_{j,t}}^{\text{Austerity other IIPS}} + \underbrace{\delta_k Z_{k,t}}_{\text{Common Policy}} + \sum_l \theta_l Y_{l,t} + \varepsilon_{i,t} \quad (1)$$

where ΔCDS_t is the change in the CDS spread in IIPS country i, $X_{i,t}$ denotes news announcements in country i, $X_{j,t}$ denotes news announcements in IIPS country j, $j \neq i$ and $Z_{k,t}$ denotes EU and ECB policy initiatives or changes in financial or fiscal regulations, i.e., all news announcements listed in Table 2, $Y_{l,t}$ contain other controls, i.e., probability of simultaneous default of two or more banks provided by ECB, global risk aversion indicator also provided by ECB, the VIX index and the 10-year Treasury constant maturity rate both downloaded from FRED, see Appendix A. We use the change in these four control variables in our panel data regressions and we also use the news announcements listed in Appendix A as additional controls. The own effect of news is measured by β_i, contagion from other IIPS countries is captured by γ_j and δ_k measures the effects from other news announcements including changes in fiscal and

[8] We have also estimated models with no window, i.e., we have a dummy variable taking the value one on the day of the event and zero otherwise. In general, the sign of the point estimates is unaffected but the standard errors are considerably larger than when using a two-day window.

financial regulations. Note that we include the lagged change in the CDS spread as in Dooley and Hutchison (2009) and Beetsma, Giuliodori, de Jong and Widijanto (2012).

Fixed effects estimation corrects for group effects that make OLS estimates from a pooled regression inconsistent. However, it is still the case that the demeaned dependent variable in the fixed effects model is correlated with the residuals through the group mean, implying that the residual influences the dependent variable and therefore also the mean for all t. Several methods produce consistent estimates of a dynamic panel data, including the difference and system Generalized Methods of Moments (GMM) approach suggested by Arellano and Bond (1991) and Blundell and Bond (1998). Both these methods apply to the case of large N and small T panels, i.e., many individuals and few time periods. The basic idea of these methods is to use more instruments and can improve efficiency significantly. A potential problem when implementing the GMM methods is that the number of instruments explodes with T, overall the number of instruments is quadratic in T. In our empirical application $N \leq 6$ and $T = 959$, implying a very large number of instruments. Roodman (2009) discusses many of the potential pitfalls of instrument proliferation and its consequences, including over fitting of endogenous variables, bias in estimates and the weakening of Sargan tests.

These issues have not been fully analyzed in the literature and there exists very little guidance on how to handle this problem in GMM estimation of dynamic panel data models, see the discussions in Hall and Peixe (2003), Roodman (2009) and Bontempi and Mammi (2012). At the same time, we know that as $T \to \infty$ the bias disappears in the fixed effects model. Given the lack of solid methods and the fact that we have a panel with small N and large T we assume that inefficiency is likely to be small. Hence, we use the fixed effects estimator when analyzing the effects of news announcements.

We expect the effect on the change of the CDS spread from the implementation of austerity plans to be negative (a falling CDS spread) and that the effect of tighter fiscal rules should be negative (a falling CDS spread). The contagious effects from Greece (or other GIIPS) measured by γ_j depend on the type of news. For example, we expect a Greek austerity to lower CDS in Spain if markets expect less turmoil transmission from Greece to Spain. Tighter fiscal rules in the EU generally should cause lower CDS spreads.

4. Empirical Results: Market Responses to Policy Announcements

4.1. Preliminaries: Event study

We use a matched sample test to analyze whether there are significant shifts in the CDS spread between the period prior to the events, during the events and post events. The idea behind the matched sample test is to compare changes in the CDS spread between three windows: prior to and during the announcement event, prior to and after the event, and during the event and after the event. For each observation, we compute the difference between the change in the CDS spread before and after the event, compute the mean and standard

deviation of the difference and under the assumption that both samples are normally distributed we use the t-ratio with n-1 degrees of freedom where n is the number of paired observations to test whether the difference is significantly different from zero. Using these tests, we can make inference on the question whether the direction of the change is the expected, whether there is smoothing, i.e., if the change in the CDS spread (if it is increasing both prior to and after the event but the rate of increase has fallen) and if the policy initiative has reversed the direction of changes in CDS spreads. As is standard in the literature, we compute the cumulative change in the CDS spread. We use a three days window.

Table 4 and Figure 4 report the results for sovereign CDS spreads. The matched-sample tests indicate that five of the policy announcements resulted in significant falls sovereign spreads during the announcement period compared with the prior period: AP (National austerity programs), ECB: MP (ECB monetary actions), ECB collateral easing, SSM (Single Supervisory Mechanism) and, surprisingly, ECB collateral tightening. In addition, ECB:banks policy announcements (expanding ECB balance sheet, bank recapitalizations) marginally increased sovereign CDS spreads (significance level 0.106).

Turning to bank CDS spreads, reported in Table 5 and Figure 5, five announcements show significant changes, either sharp declines or smaller increases in spreads, between the prior- and during-event windows. In particular, easing of ECB collateral constraints and the SSM announcement significantly lowered bank spreads, while national austerity programs, ECB monetary actions and bank stress tests significantly lowered the increase in bank CDS spreads compared to the pre-event window. In addition, ECB financial stability was marginally significant (0.11) in lowering bank CDS spreads.

In summary, numerous policy announcements and actions effectively lowered, or slowed the rise, in CDS spreads and restored confidence to markets. Four policies impacted *both* sovereign and bank CDS spreads (AP, ECB: MP, ECB: collateral easing, and SSM), while four other policies apparently had no effect on either sovereign nor bank spreads (ECB: banks, ECB/EU Joint, EU fiscal rules, Support). Moreover, ECB collateral tightening only impacted sovereign spreads, and EU-wide stress tests only impacted bank spreads.

4.2. Policy effects: Panel regressions

Table 6 presents panel regression results focusing on the effects of different policy announcements on sovereign and bank CDS spreads. Table B.1 in Appendix B shows the detailed results. We focus on the aggregate effects of the various categories of news announcements (described above) and present results with all control variables as mentioned above.

Table 6 results indicate that ECB financial stability actions (SMP, OMT) and EU-wide fiscal rules had the desired effect and significantly lowered CDS spreads in *both* sovereign and bank bond markets. These measures had the desired impact qualitatively and, especially in the case of the OMT announcements (potentially unlimited support of sovereign markets), were very favorably received by the markets. In

addition, ECB monetary actions (monetary loosening actions, expansion of international swap lines, Draghi's "whatever it takes" London speech) and the SSM announcement significantly had the desired effect in reducing sovereign spreads but surprisingly did not move bank spreads in the panel estimates. The easing of ECB collateral constraints and stress test announcements, by contrast, significantly raised sovereign spreads but with surprisingly little on bond spreads. The news impacts on both markets is especially noteworthy in several cases: ECB easing of collateral constraints—focused on bank liquidity but concerning sovereign bond collateral—only impacted sovereign spreads; financial stability (SMP and OMT) announcements focused on sovereign markets, but a large impact was also felt on banks; fiscal rules were focused on sovereign markets but had a large impact on bank spreads. On the other hand, no announcement changed bank CDS spreads without also significantly affecting sovereign spreads.

By contrast, the results reported in Table 6 indicate that austerity programs, ECB bank programs (expanding ECB balance sheet, bank recapitalizations), ECB tightening of collateral constraints, ECB/EU joint programs (EFSF, ESM), and "support" (announcements of EU/IMF financial assistance to GIIPS governments) did *not* systematically move CDS spreads for either sovereign debt or bank bonds. Either these programs did not restore confidence in sovereign debt or bank solvency, perhaps viewed by markets as too little or too late in announcement and implementation, or they were fully anticipated. Moreover, austerity programs could affect CDS markets in two ways, with potentially offsetting effects — on the one hand shoring up fiscal sustainability but on the other hand lowering aggregate demand and worsening recessionary conditions.

The matched sample tests indicate a greater number of policy announcements and actions had significant effects on spreads than did the panel regression results. Policy actions found to significantly lower spreads by both methodologies—providing greater confidence in the robustness of the results— were evident for ECB monetary policy actions (sovereigns), financial stability actions (bonds), and SSM announcements (sovereigns). Several of these results are consistent with the matched sample tests reported in Tables 4 and 5.

4.3. Announcement versus implementation effects

It is problematic in many cases to distinguish between market responses to the announcement and implementation of policies. For some policies, however, it is possible clear distinction and in this section we we distinguish between announcement of policy programs, announcement of operation details, and implementation for six policy interventions: (1) covered bonds purchasing program (CBPP and CBPP2), (2) Long Term Refinancing Operations (LTRO), (3) securities market program (SMP), (4) European Financial Stability Facility (EFSF), (5) European Stability Mechanism (ESM), and (6) six-pack/two-pack fiscal initiatives. Table C.1 in Appendix C summarizes the details on when these programs where announced and implemented.

4.3.1. Announcement versus implementation timing

The CBPP was first announced on May 7, 2009 by the ECB. Almost a month later, on June 4, 2009, ECB announced the operational specifications of the program including when it was supposed to be implemented, and then on July 6, 2009 the first round of the program was implemented and it lasted until June 30, 2010. A second round of the program (CBPP2) was announced on October 6, 2011. ECB released the operational specification on November 3, 2011 and the program was implemented from November 28, 2011 until October 31, 2012. We distinguish in our empirical analysis below between all these dates.

The second ECB program to be analyzed is the SMP. This program was announced on May 10, 2010, operational specification was revealed on May 14, 2010 and the program was implemented in two rounds, the first period lasted from May 17, 2010 until July 9, 2010 whereas the second program lasted from August 16, 2010 until January 16, 2011.

LTRO was announced by the ECB on December 8, 2011 and the first round was implemented on December 21, 2011. The press release from the Governing Council of ECB that was made public on December 8 also included the operational specification of the program. Later, a second round of LTOR was implemented on February 28, 2012.

In addition to these three programs initiated by ECB we also consider three programs that were proposed by the EU Commission and agreed upon by the European Council, ECOFIN and the EU Parliament. The first is the agreement to establish the European Financial Stability Facility (EFSF) in 2010 as part of the rescue and bail-out of Greece and other GIPSI countries. The decision to establish this facility was taken on May 9, 2010 and it went into force on June 7, 2010. Later, this facility was replaced by the European Stability Mechanism (ESM). On October 29, 2010, the European Council agreed to establish a crisis management mechanism in the euro area to replace EFSF and the Greek loan facility. On December 17, 2010, there was political consensus on establishing ESM and it was agreed to add a paragraph to the Treaty using a simplified process in order to have legal support for the establishment. The European Council adopted a package including ESM on March 25, 2011. Later, on July 11, ECOFIN confirmed the establishment of ESM. Prior to the implementation, two modifications were made on ESM, on July 21 and December 9, 2011. Finally, the addition to the Treaty was signed on February 2, 2012 and ESM went into force on September 27, 2012. The ESM board of governors held it inaugural meeting on October 8, 2012.

The final program focusing on reinforcing the fiscal framework that we consider here is the six-pack. The EU Commission/European Council task force presented a proposal on how to strengthen the fiscal framework in Europe including the proposal to set up the Macroeconomic Imbalance Procedure. On March 25, 2010, ECON and the EU Commission reached an agreement to move forward and start negotiations with the EU Parliament. The decision to adopt the six-pack program was made on November 8, 2011 and it went into force on December 13, 2011.

Looking more closely at the dates when different policy initiatives were announced we find three overlapping dates, the first operational specification of ESM was revealed at the same time as the second announcement of the six-pack, LTRO was announced at the same time as the operational specifications were stated, and the operational specification of the EFSF was stated at the same time as the SMP was announced. In the empirical analysis we have included these events but results are not reported since we cannot distinguish between the effects of these announcements.

4.3.2. Announcement versus implementation results

Table 7 reports the effects of these programs by stage—initial announcement, operational specification announcement and implementation-- on sovereign CDS spreads.[9] The results vary markedly by the type of program and the stage. Of the three ECB programs — CBPP, LTRO and SMP — only the initial SMP program announcement was received (very) favorably by the markets, reducing sovereign CDS spreads immediately and over a longer-period by 32 to 38 basis points. But the subsequent announcement over operational specification and actual implementation (second round) was somewhat disappointing and spreads increased spreads somewhat (7-8 basis points). Although we found no impact effect for either CBPP and CBPP2 upon announcement, both programs significantly reduced spreads either at the announcement of operation details (CBPP and CBPP1) or implementation (CBPP1). We only found disappointment over the LTRO program, and that in the second round in terms of significantly raising spreads by around 20 basis points (long-term effect).

In terms of the EC programs, implementation of the EFSF had a large stabilizing impact, reducing spreads 11-13 basis points (short- and long-term). The EFSF replacement, ESM, apparently disappointed markets at announcement (raising spreads significantly 9-10 basis points) and also at the stages of European Council agreement and confirmation, also increasing spreads. The first revision in the ESM, however, helped restore market confidence, lowering (long-term) spreads by about 43 basis points. The second revision and when the Treaty was signed did not move market spreads. The Six-Pact fiscal program has a modest but significant impact (long-term at -4 basis points) but operational details and implementation disappointed markets with small increases in CDS spreads.

4.4 Transmission of EU news announcements to other EU countries on the periphery

In addition to analyzing the effects of news announcement on IIPS CDS spreads we also run the panel regressions above for other EU and euro area countries (Cyprus, Malta, Slovak Republic, Czech Republic, Hungary and Romania), i.e., we run regressions of GIIPS news announcements (the X_t variables) and EU news announcements (the Z_t variables) on these countries. These countries form two groups, three EMU

[9] We have also run regressions testing whether these announcements affect banks CDS spreads. We do not find evidence suggesting significant effects. These results are not reported here for brevity but are available upon request from the authors. It seems as if these announcements are of significance, they mainly affect sovereign CDS spreads.

member states and three countries that have not adopted the euro. It would be interesting to test whether policy actions targeting the IIPS countries also had an effect on other small EMU member states.

The question we address in this section is how common EU news announcements impacted three EMU countries outside of GIIPS (Cyprus, Malta and the Slovak Republic) and three non-EMU countries that are members of the EU (Czech Republic, Hungary and Romania). All of the countries may be considered outside of the EU "core", i.e., in the periphery, and may in some respects be comparable to the GIIPS area. The objective here is to determine whether EU policy and regulatory announcements (the same news variables listed in previous tables) impacted these EU countries differently than the GIIPS countries, and whether EMU membership makes a difference in measured responsiveness. We report these results in Appendix B, Table B.2.

Consider first the EMU countries and the question whether responses to news announcements are different compared to non-EMU countries we find the, somewhat, surprising result that the effects of negative GIIPS news (a smaller positive effect), ECB fiscal tightening (no effect) and ECB/EU joint initiatives (only a small positive effect) are significantly different. The direction of the responses is also surprising given that the policy initiatives are targeting GIIPS countries in particular but also other euro area countries. For all other news announcements, we obtain very similar responses but they are in general much smaller. Even though one would expect EU countries outside the euro area not to be affected, we find that they respond in the same way as euro area countries and, not least, the GIIPS countries. But, as is clear when comparing the estimates in Table B.2 to those in Table 6, the effects are much stronger on IIPS countries.

One explanation could be that these countries were not affected to the same degree by the financial crisis. Debt ratios were substantial higher in IIPS countries compared to the six other EU countries. In 2012 the debt ratios were highest in Cyprus and in Hungary (slightly below 80% of GDP) and well below the 60% reference value in the Stability and Growth Pact in the other countries. This can be compared to the debt levels in the four focus countries where Portugal, Ireland and Italy all had debt ratios exceeding 120% and Spain around 85% of GDP. It is likely that the very strong statements by the ECB should have had stronger effects on countries with high debt levels than on those countries having more moderate debt ratios.

5. Conclusions and further perspectives

This paper considers the impact of European policy announcements on perceptions of sovereign and bank default risk in four countries greatly affected by the European debt crisis — Portugal, Ireland, Spain and Italy. We distinguish between 25 different types of national, ECB and EU-wide policy announcements (total number of news announcements including those that are used as controls is 276), e.g., the implementation of austerity programs changes in monetary policy, other policy initiatives at the EU level, tightening of fiscal rules as well as financial regulation and credit downgrading of both sovereigns and banks. We group these policy announcements into eight categories and measure their effects on sovereign and bank credit default

swap spreads. We seek to identify which policies were most effective in quelling market fears during the crisis and whether policy announcements focused on sovereign debt markets affected banks and vice versa. We identify these effects using three empirical methodologies—panel regressions, country-specific time series regressions and matched-sample event studies.

The results identify several policy announcements which played a large role in dampening market fears for both sovereign and bank risks. In particular, ECB policies at monetary easing, loosening collateral constraints for central bank credit, financial stability, as well as the SSM announcement significantly lowered sovereign CDS spreads. These policies also lowered bank CDS spreads in three cases (monetary actions are the exception). On the other hand, tightening of EU-wide fiscal rules raised risk perceptions in both markets, perhaps because of the perceived adverse effects on economic activity. These results highlight how policies designed to stabilize sovereign markets, e.g. financial stability programs, also feed over to bank markets. And policies designed to ensure safety and soundness of the European banking system, e.g. Single Supervisory Mechanism (SSM), has large positive reinforcing effects on sovereign debt markets. Similarly, tightening of fiscal rules had almost as large effect on assessments of bank risk as sovereign risk.

We found mixed evidence that national fiscal austerity policy announcements, bank support programs, tightening of ECB collateral constraints or other programs had much effect on risk perceptions. This highlights that many of ECB and EU-wide policies had limited effects on either sovereign or bank bond markets. The question of why these policies had such limited effects is open for further research

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Table 1: Granger non-causality tests between changes in sovereign and bank CDS spreads in IIPS countries.

Panel A: Granger non-causality tests											
		Ireland				Portugal		Spain		Italy	
		Allied Irish Bank		Bank of Ireland		Banco Com Portugues		Banco de Sabadell		Intesa Sanpaolo	
		IRE CDS	Bank CDS	IRE CDS	Bank CDS	PT CDS	Bank CDS	SP CDS	Bank CDS	IT CDS	Bank CDS
CDS lags	F-stat		4.90***		2.29*		13.85***		31.57***		15.18***
	Prob		0.008		0.10		0.000	0.000	0.000		0.000
Bank Lags	F-stat	1.27		2.77*		3.49**		6.25***		7.04***	
	Prob	0.282		0.063		0.031		0.002		0.001	
Panel B: Contemporaneous correlations											
Correlation		0.26***		0.04		0.44***		0.37***		0.75***	
t-stat		6.48		1.06		15.25		12.54		35.73	
Probability		0.00		0.29		0.00		0.00		0.00	
Samples		1/02/2009- 4/21/2011		1/01/2009 - 2/22/2012		1/02/2009 - 9/13/2012		1/05/2009- 9/13/2012		1/02/2009- 9/13/2012	

Note: Panel A reports tests of the null hypothesis of no Granger causality between changes in sovereign and bank CDS spreads for each GIIPS country. Panel B reports estimates of the contemporaneous correlation between changes in sovereign and bank CDS spreads.

Table 2: Definition and examples of news events in the EU.

Event Variable	Definition of event	Event example: date and description
	AP: National Austerity Programs	
AP	Announcements of Austerity plans in GIIPS countries	Aug 1, 2012 Leaders of Greece's coalition government have agreed on 11.5bn euros in new spending cuts.
	ECB: Banks (Policy Initiatives Supporting Banking System)	
ECBBAL	Policy announcements that will expand the ECB'S balance sheet to support banking sector	Mar 1, 2012 ECB allots 530 billion euros to 800 banks in second 36-month longer-term refinancing operation (LTRO).
RECAP	Announcement of recapitalization of euro area financial institutions	March 30, 2010 Extra capital that will need to be injected into Irish Life and Permanent
	ECB: MP (Monetary Policy Actions)	
MP	General announcements of monetary policy loosening by ECB	July 5, 2012 ECB has reduced its key interest rate from 1% to 0.75%, a record low for the euro area
SWAP	Expansion of ECB swap lines and international liquidity shortage	Aug 25, 2011 Prolongation of swap line with Bank of England.
ECBDraghi	Draghi speech in London	July 26, 2012 Speech by Mario Draghi at the Global Investment Conference in London stating that the euro is irreversible and that "the ECB is ready to do whatever it takes to preserve the euro"
	ECB: Easing Sovereign Collateral	
ECBGOV	ECB balance sheet government debt purchases or direct liquidity support to governments	March 8, 2012 ECB reactivates eligibility of Greek bonds as collateral
	ECB: Tightening Sovereign Collateral	
ECBGOVSUSPEND	ECB suspension of government purchase programs or limits eligibility for government debt as collateral	July, 20, 2012 ECB suspends Greek bonds as collateral
FREG	Important tightening in euro area financial regulations	Oct 26, 2012 From 1 Nov. traders and investors will be unable to buy insurance against sovereign-debt defaults unless they hold the underlying bonds.
	ECB: Financial Stability	
ECBSMP	Interventions in the euro area public and private debt securities markets (SMP)	May 10, 2010 Decision by ECB to conduct interventions in securities markets (SMP)
ECBOMTAnnon	Outright Monetary Transactions Announcements	August 2, 2012 Press conference after the Governing Council meeting, ECB President Draghi announced, "ECB may undertake outright open market operations."
ECBOMT	Outright Monetary Transactions decision (OMT)	September 6, 2012 Technical features of OMT revealed by the Governing Council of ECB
	ECB/EU Joint Initiatives	
REGEFSF	EFSF	May 9, 2010 European leaders decide to establish EFSF
REGESM	ESM	February 2, 2012 European leaders decide to establish ESM
	EU Fiscal Rules	
REGtwo	Tightening of fiscal rules in Europe: Two-pack	November 23, 2011 EC proposed Two-Pack in order to strengthen government finances
REGSix	Tightening of fiscal rules in Europe: Six-pack	December 13, 2011 European leaders sign six-pack
REGTSCG	Tightening of fiscal rules in Europe: Treaty on Stability	March 1, 2012 European leaders sign Treaty on Stability, Coordination and Governance
REGOther	Tightening of fiscal rules in Europe: Other announcements	October 28, 2010 European Council announces plans to tighten the SGP
	EU Wide Stress Test	
Bankstress	EU wide bank stress test	July 15, 2011 Results from stress tests of 90 banks in 21 EU countries is released
	SSM (Single Supervisory Mechanism)	
SSM	Proposal and decision to establish Single Supervisory Mechanism	June 29, 2012 Proposal to establish SSM
	Support	
Support	Announcement of EU/IMF financial assistance to GIIPS governments	May 2, 2010 Loan package for Greece agreed

Table 3: News Announcements: GIIPS and ECB/EU.

	GIIPS News and Bailouts					
	Total	Greece	Portugal	Ireland	Italy	Spain
AP	33	12	8	3	4	6
Support	30	15	3	5	0	7

ECB/EU policy initiatives			
MP	7	FREG	14
ECBGOV	5	REGESM	2
ECBGOVSUSP	3	REGEFSF	2
ECBBAL	9	REGSix	1
SWAP	7	REGTSCG	1
RECAP	10	REGOther	5
ECBSMP	1	REGtwo	1
ECBDraghi	1	Bankstress	2
ECBOMTAnnon	1	SSM	2
ECBOMT	1		

AP= austerity programs; Support=EU/IMF financial assistance; MP=monetary easing; ECBGOV=ECB government debt purchases or direct liquidity support; ECBGOVSUSP=ECB suspension of debt purchase programs; ECBBAL=ECB support of banks; SW=ECVB swap lines; RECAP=recapitalization of Euro financial institutions; ECBSMP=Securities market program; ECBDraghi=speech by Mario Draghi; ECBOMTAnonn=Outright monetary transaction announced; ECBOMT=OMT initiated; FREG=tightening of financial regulations in Euro area; REGESM=tightening fiscal rules: ESM; REGEFSF=tightening of fiscal rules: EFSF; REGtwo=tightening of fiscal rules: two-pack; SSM=Single Supervisory Mechanism; Bankstress=EU wide stress test; REGSix=Tightening of fiscal rules: six-pack; REGTSCG=tightening of fiscal rules: Treaty on Stability; REGOther=other tightening of fiscal rules.

Table 4: Matched sample tests of changes in sovereign CDS spreads in GIIPS countries prior to, during and post events.

	Prior	During	Post	H0: prior=during	H0: prior=post	H0: during=post
AP: national austerity programs	20.06	-14.12	5.98	0.000	0.000	0.000
ECB: banks	0.12	5.12	4.78	0.106	0.892	0.166
ECB: MP	20.54	-15.37	2.68	0.000	0.000	0.000
ECB collateral easing	29.29	-30.19	3.60	0.000	0.000	0.000
ECB collateral tightening	6.68	-15.90	9.35	0.000	0.000	0.317
ECB: financial stability	-9.29	-30.25	-7.86	0.210	0.029	0.877
ECB/EU joint	8.51	-1.69	-17.56	0.427	0.099	0.001
EU fiscal rules	4.51	-1.58	8.70	0.163	0.047	0.198
EU wide stress test	33.26	21.98	-55.43	0.156	0.002	0.000
SSM	15.55	-37.27	4.42	0.000	0.219	0.004
Support	-4.01	-4.33	13.23	0.904	0.000	0.001

Note: Prior, during and post are the cumulative change in CDS spreads prior to, during and post events. A three days' window is used. The p-values of matched sample (paired comparison) tests of changes in cumulative CDS spread changes are shown in the last three columns. Underlying assumption is that both series are normally distributed.

Table 5: Matched sample tests of changes in bank CDS spreads in GIIPS countries prior to, during and post events.

	Prior	During	After	H0: prior=during	H0: prior=after	H0: during=after
AP: national austerity programs	21.09	2.10	9.72	0.004	0.000	0.070
ECB: banks	-5.04	-6.69	6.43	0.797	0.037	0.002
ECB: MP	14.10	2.10	-3.06	0.045	0.395	0.001
ECB collateral easing	25.89	-16.97	-9.52	0.000	0.175	0.000
ECB collateral tightening	8.36	4.63	11.47	0.618	0.305	0.570
ECB: financial stability	2.73	-18.38	-20.71	0.114	0.739	0.039
ECB/EU joint	13.14	28.04	0.54	0.301	0.019	0.081
EU fiscal rules	0.86	2.92	8.26	0.540	0.322	0.126
EU wide stress test	15.15	6.99	-37.34	0.060	0.007	0.001
SSM	10.10	-29.09	-8.96	0.073	0.052	0.349
Support	-12.74	-5.02	7.61	0.127	0.003	0.001

Note: Prior, during and post are the cumulative change in CDS spreads prior to, during and post events. A three days' window is used. The p-values of matched sample (paired comparison) tests of changes in cumulative CDS spread changes are shown in the last three columns. Underlying assumption is that both series are normally distributed.

Table 6: Effects of news announcements in GIIPS countries, sovereigns and banks. Fixed effects panel data regression.

	Sovereigns		Banks	
	Short-run	Long-run	Short-run	Long-run
AP: national austerity plans	-1.06	-1.27	2.13	2.24
	(1.44)	(1.79)	(3.49)	(3.63)
ECB: banks	0.89	1.07	-3.58	-3.76
	(1.52)	(1.76)	(7.94)	(8.37)
ECB: MP	-6.90	-8.26**	8.59	9.03
	(3.86)	(4.21)	(9.34)	(9.76)
ECB tightening sovereign collateral	-1.20	-1.44	-1.46	-1.53
	(1.27)	(1.57)	(2.76)	(2.87)
ECB easing sovereign collateral	2.56	3.07**	-4.94	-5.19
	(1.13)	(1.49)	(3.81)	(3.94)
ECB: financial stability	-31.02***	-37.15***	-19.22*	-20.20***
	(1.21)	(1.37)	(6.51)	(6.61)
ECB/EU joint	-4.30	-5.15	17.92	18.84
	(7.60)	(9.27)	(17.77)	(18.94)
EU fiscal rules	-32.50**	-38.92***	-14.92	-15.69*
	(6.53)	(9.99)	(8.63)	(8.74)
EU wide stress test	9.22**	11.04***	3.79	3.99
	(2.66)	(3.77)	(3.62)	(3.74)
SSM	-4.06	-4.86**	-5.20	-5.47
	(2.11)	(2.29)	(4.51)	(4.62)
Support	-0.16	-0.19	-2.77	-2.91
	(0.70)	(0.84)	(6.78)	(7.11)
#countries	4		4	
Observations	3552		3164	
R^2	0.40		0.19	
F-test	62.24***		19.90***	

Note: AP = sum of the parameters associated with APDOM and APFOR; ECB: banks = sum of ECBBAL and Recap in the detailed tables; ECB: MP = sum of MP, SWAP and Draghi; ECB: financial stability = sum of SMP, OMTAnnon and OMT; ECB easing sovereign collateral = ECBGOV; ECB tightening sovereign collateral= sum of ECBGOVSUSP and FREG; ECB/EU joint = the sum of FRESM, FREFSF; EU fiscal rules = the sum of FRSix, FRTSCG, FRother, FRtwo; EU wide stress test = bankstress; SSM = Single Supervisory Mechanism. Standard errors shown in parentheses below each estimate are clustered and robust. All test statistics are based on estimates shown in Table B.1 in Appendix B. F-test refers to the null hypothesis that all regressors are equal to zero.

Table 7: Short- and long-run effects of announcement, operational specification and implementation of specific policy initiatives on sovereign CDS spreads. Fixed effects panel data regression.

		Announcement		Operational Specification		Implementation
CBPP		-2.60 (2.71) [-2.99]		-0.46 (0.27) [-0.53*]		0.74 (0.92) [0.86]
CBPP2		0.39 (1.46) [0.45]		-11.26** (3.00) [-12.97***]		-2.49 (1.38) [-2.87*]
LTRO		1.59 (3.45) [1.83]		n.a.	First Round	1.80 (3.19) [2.08]
					Second round	17.86 (9.08) [20.57*]
SMP		-32.84** (6.30) [-37.82***]		7.18 (4.03) [8.27*]	First round	0.98 (2.08) [1.20]
					Second round	6.73* (2.33) [7.75***]
EFSF		n.a.		n.a.		-11.21*** (1.30) [-12.91***]
ESM	First decision	8.74* (3.30) [10.07**]	European Council Agreement	7.65* (2.86) [8.82**]		n.a.
	Treaty adoption	6.31 (5.03) [7.27]	ECOFIN Confirmation	10.78 (5.83) [12.42*]		
			First revision	-37.20 (18.28) [-42.84*]		
			Second revision	-2.12 (3.44) [-2.44]		
			Treaty signed	-16.24 (16.37) [-18.71]		
Six-Pack		-3.46 (1.84) [-3.99*]		5.78 (2.87) [6.66**]		-2.56* (0.95) [-2.96’’**]
#countries		4				
Observations		3552				
R^2		0.42				
F-test		46.11***				

Note: The table shows short-run effects and long-run effects within brackets of each policy intervention. Robust standard errors are shown within parenthesis below each estimate. Some policy initiatives were revised after first announcement or during the process leading to the final operational specification, see Table C.1 in Appendix C. The regression includes all control variables as well as all other policy initiatives used in Table 6. F-test refers to the null hypothesis that all regressors are equal to zero.

Figure 1: CDS spreads in EMU countries 2001-2012.

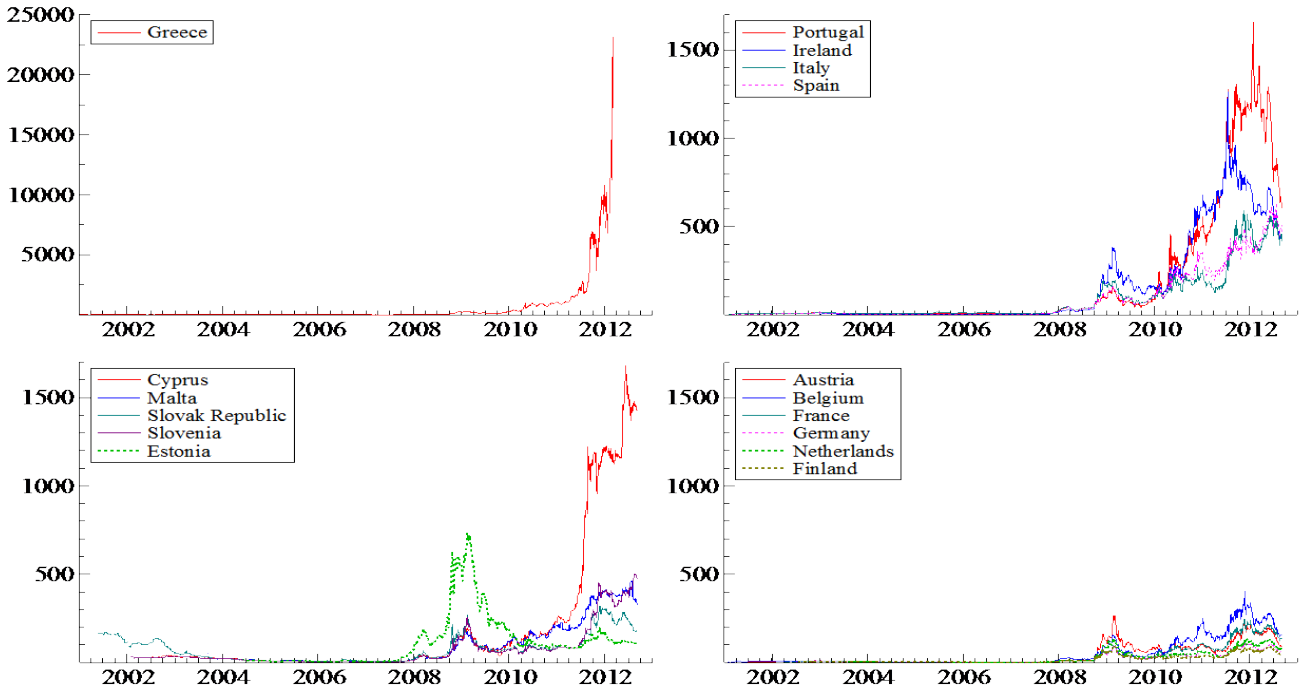


Figure 2: CDS spreads in EU countries not participating in EMU.

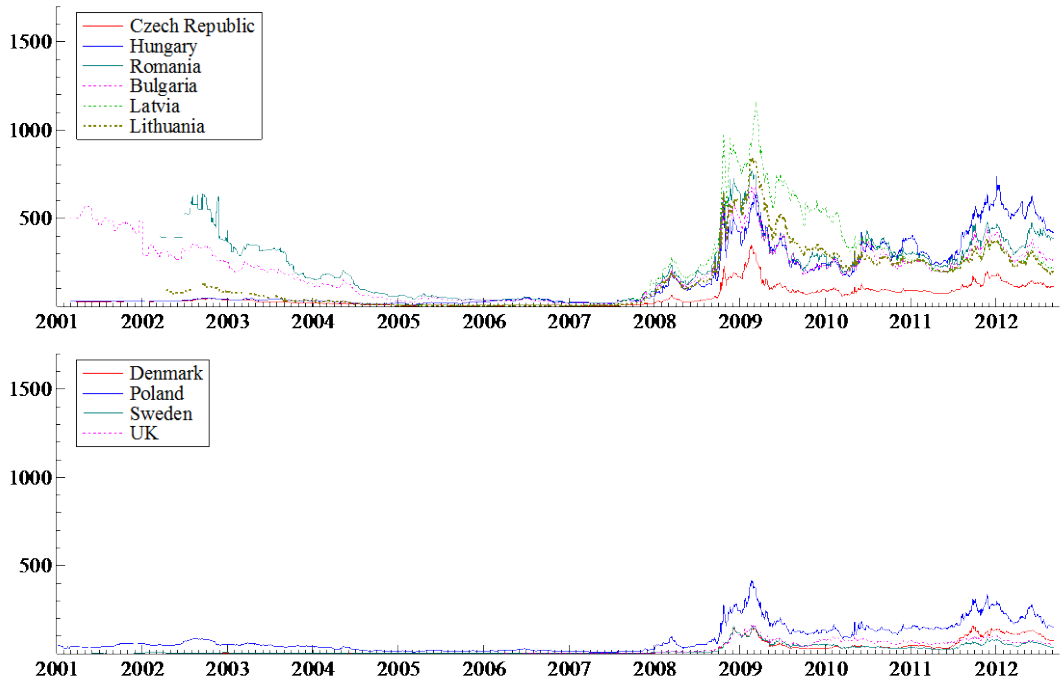


Figure 3: CDS spreads in Spain and Ireland with Fitch Rating downgrading of both sovereign and large banks.

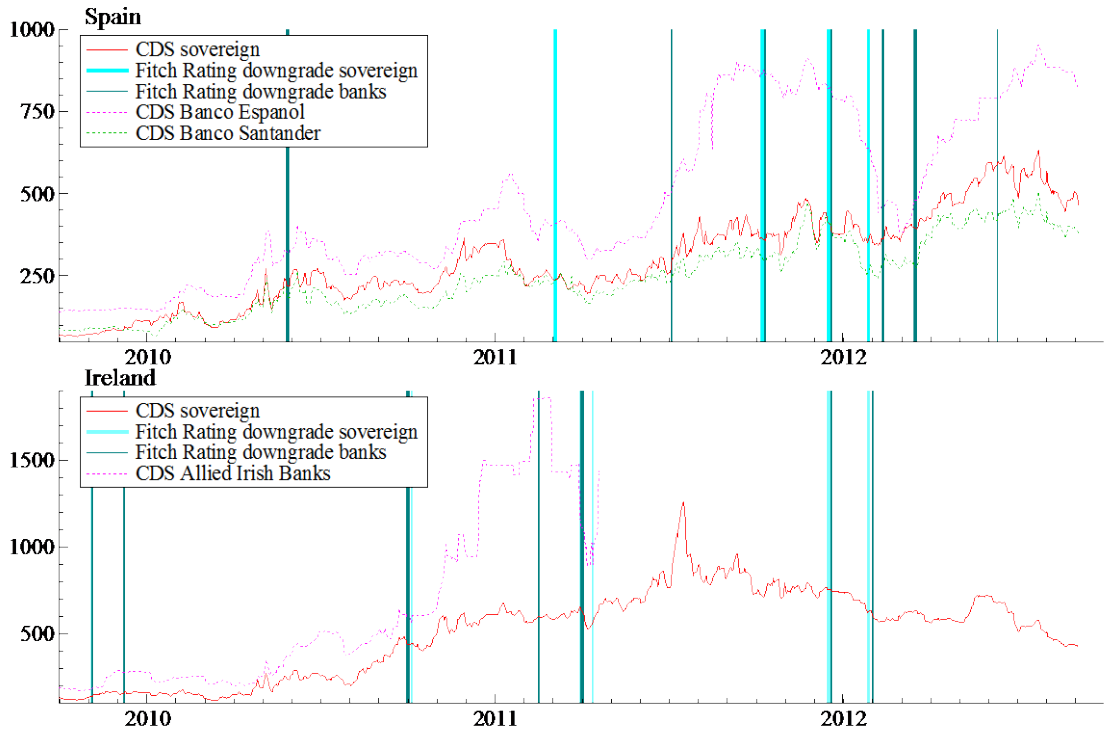


Figure 4: Sovereign CDS spread change prior to, during and after events.

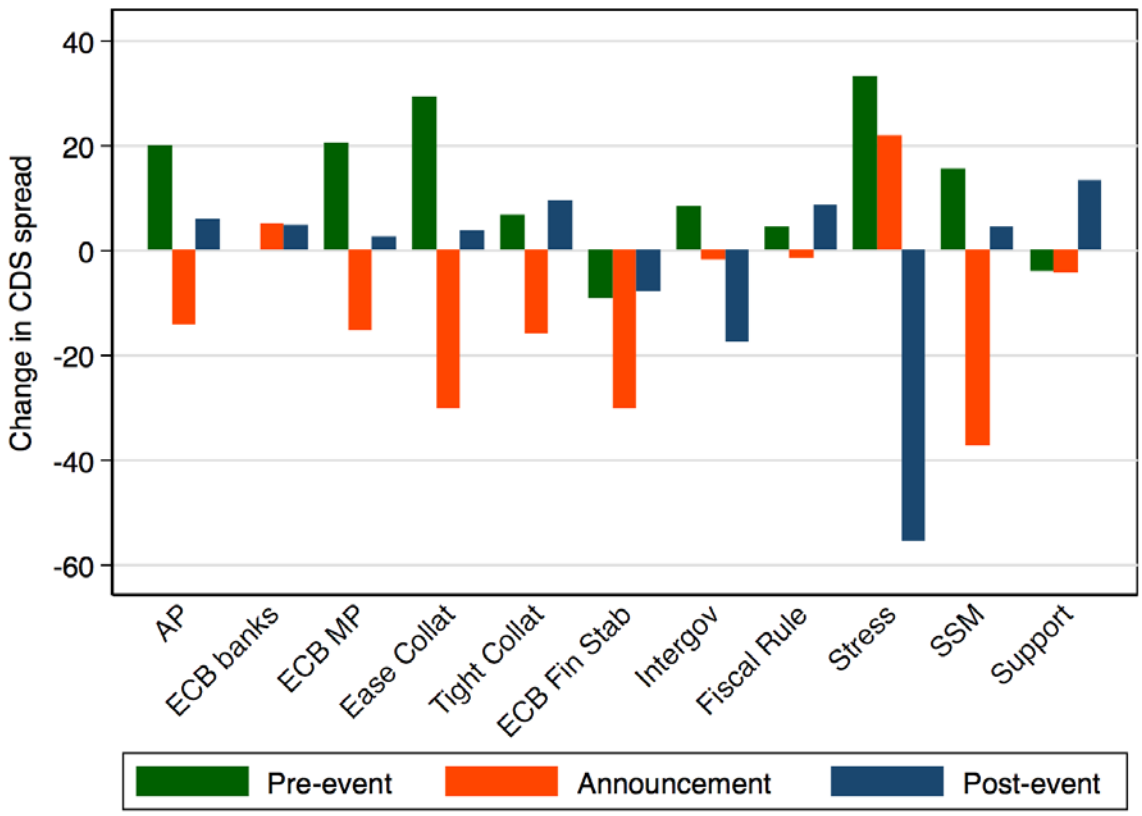
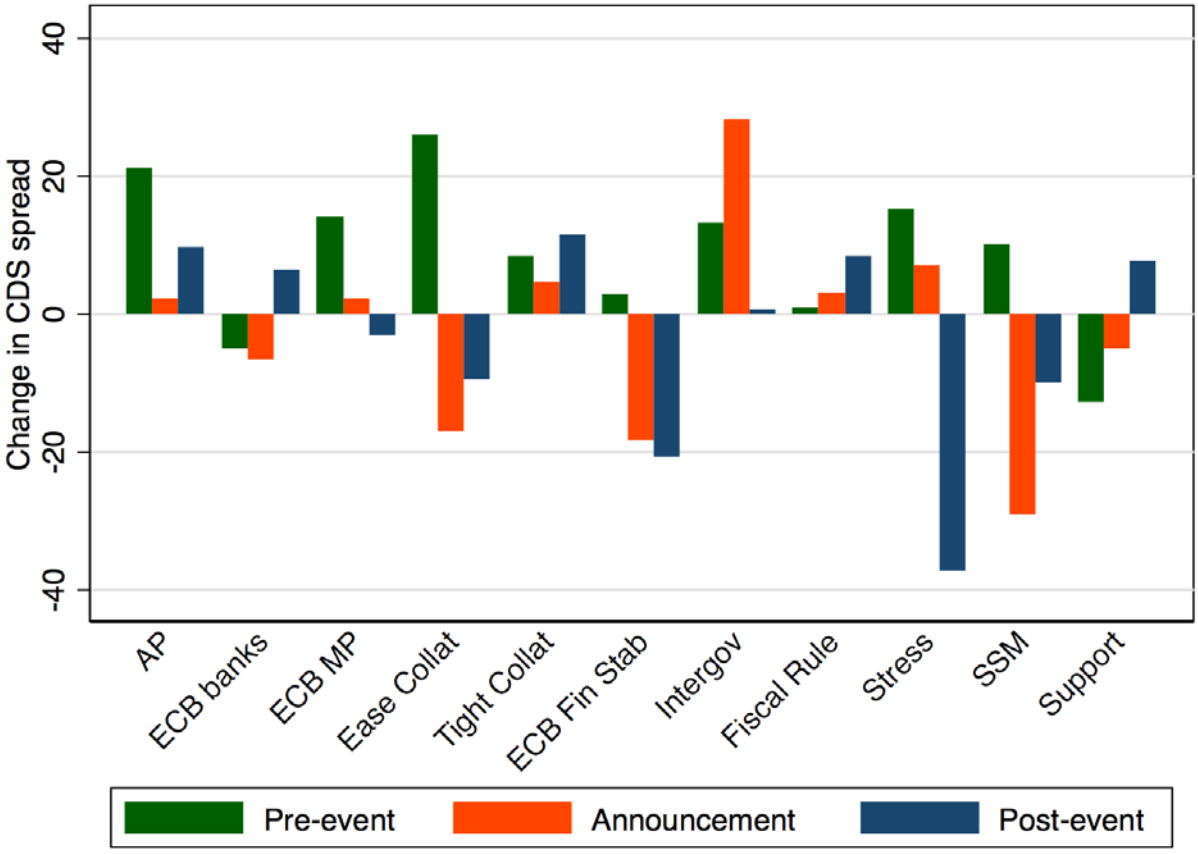


Figure 5: Bank CDS spread change prior to, during and after events.



Appendix A: Control variables.

In Table A.1 we list the four additional national news categories for the five GIIPS countries, Good (positive news about the fiscal situation in a GIIPS country), Neg (negative news about the fiscal situation in a GIIPS country), SUPPORT (EU/IMF financial assistance to a GIIPS country), CR (Fitch Rating downgrades of a GIIPS country sovereign) and CR Bank (Fitch Rating downgrade of large banks in a GIIPS country) are all country specific. Note that we define positive and negative news about the fiscal situation in relation to what was expected. For example, if the budget deficit increased more than what was expected, this is considered as negative news but if the budget deficit increased less than what was expected, then this is defined as positive news. We use, as indicated above, credit rating downgrades by Fitch as our measure of the CR news announcements. These announcements also include cases when the credit rating is unchanged but the outlook for a particular country has been downgraded.

Table A.1: Other news announcements and variables used as controls.

GIIPS specific news		
Event Variable	Definition of event	Event example: date and description
Good	Positive news about GIIPS countries fiscal situation	November 23, 2010 Positive statement by EC, ECB and IMF on second review mission to Greece
Neg	Negative news about GIIPS countries fiscal situation	April 22, 2010 The Greek government's budget deficit increased more than expected to 13.6% of GDP
CR	Credit rating downgrades of GIIPS sovereigns	June 7, 2012 Fitch downgraded Spanish bonds from A to BBB.
CRBanks	Credit rating downgrades of GIIPS banks	November 26, 2011 Fitch downgraded Allied Irish Banks from BB to B.
Additional control variables		
Variable	Definition	Source
ProbdefBanksEuro	Probability of simultaneous default of two or more banks as measured by the Systemic Risk Measure	ECB
GlobriskEuro	Financial market liquidity indicator: Global risk aversion indicator"	ECB
VIX	VIX	FRED database
US10ybond	10-Year Treasury Constant Maturity Rate, Percent, Daily, Not Seasonally Adjusted	FRED database

Since the literature reviewed above suggests that there is a link between the health of the banking sector and public sector solvency we include credit rating downgrades on the largest banks in the GIIPS countries. We focus on the two largest banks in each of the GIIPS countries except for Spain where we use credit rating downgrades for the three largest banks. The reason is that there are relatively few downgrades of the two largest Spanish banks over the sample, which is not reflecting the state of the banking sector properly. Therefore, we use credit rating downgrades for the third largest Spanish bank. The largest banks in Ireland are Bank of Ireland and Allied Irish Banks; in Spain Banco Santander, Banco Bilbao Vizcaya Argentaria and Banco Popular Español; in Greece National Bank of Greece and EFG Eurobank Ergasias; in Italy Unicredito Italiano and Intesa Sanpaolo; and in Portugal Banco Espirito Santo and Banco Comercial Português. The dates on credit rating downgrades are taken from Fitch Ratings homepage[10].

[10] Fitch is the only European-based credit rating agency among the "big three." Alfonso et al. (2012) find that credit rating announcements by the three large credit rating agencies (S&P, Moody's and Fitch) have similar effects, for both bad and good news, on government bond yields.

Table A.2: Number of additional news announcements.

	GIPSI News					
	Total	Greece	Portugal	Ireland	Italy	Spain
Good	24	14	4	6	0	0
Neg	28	21	1	3	1	2
CR	43	10	6	13	4	10
CR Banks	43	11	5	13	4	10

Appendix B: Additional estimates.

Table B.1: Fixed effect panel data regression with robust and clustered standard errors, CDS spreads IIPS sovereign and IIPS banks.

	Sovereigns				Banks		
CDS(-1)	0.165**	BailFor	0.041	CDS(-1)	0.049	BailFor	-0.423
	(0.049)		(0.355)		(0.024)		(1.217)
VIX	-0.591*	Fitchfor	1.199	VIX	-0.424	Fitchfor	0.612
	(0.248)		(1.005)		(0.417)		(0.335)
ProbdefBanksEuro	16.701***	FBFor	1.657**	ProbdefBanksEuro	17.607**	FBFor	-0.329
	(1.456)		(0.485)		(3.529)		(2.627)
US10ybond	-22.015***	MP	-2.373*	US10ybond	-3.236**	MP	-2.435
	(1.609)		(0.952)		(0.902)		(1.547)
GlobriskEuro	4.401**	SWAP	-0.674	GlobriskEuro	2.485	SWAP	8.600
	(1.255)		(0.601)		(3.434)		(5.550)
OMTAnnon	-1.386	ECBGOV	-1.200	OMTAnnon	1.530	ECBGOV	-1.458
	(2.176)		(1.266)		(2.246)		(2.760)
OMT	-13.979*	ECBGOVSUSP	3.722	OMT	-10.487*	ECBGOVSUSP	-5.098
	(4.529)		(1.783)		(3.479)		(4.278)
Draghi	-3.850	ECBBAL	3.403**	Draghi	2.426	ECBBAL	-2.395
	(4.583)		(0.693)		(5.460)		(7.547)
SMP	-15.661**	Recap	-2.509	SMP	-10.267	Recap	-1.181
	(4.407)		(1.683)		(6.095)		(1.453)
APDOM	-0.389	FREG	-1.158	APDOM	1.355	FREG	0.156
	(0.744)		(1.504)		(3.433)		(1.052)
GOODDOM	7.332	FRESM	-5.515	GOODDOM	5.852	FRESM	11.397
	(4.319)		(7.786)		(2.827)		(19.643)
NEGDom	-1.276	FREFSF	1.215	NEGDom	3.292	FREFSF	6.522
	(3.249)		(1.906)		(2.745)		(3.470)
BailDom	-0.198	FRSix	-3.736*	BailDom	-2.347	FRSix	0.980
	(1.018)		(1.299)		(5.712)		(2.373)
FitchDom	-0.786	FRTSCG	-1.135	FitchDom	-8.348	FRTSCG	2.736
	(0.375)		(2.456)		(6.263)		(5.185)
FBDom	3.655**	FROther	-2.739	FBDom	-0.890	FROther	-1.444
	(1.028)		(1.481)		(1.295)		(1.814)
APFOR	-0.675	bankstress	9.224**	APFOR	0.779	bankstress	3.793
	(0.756)		(2.659)		(1.097)		(3.619)
GoodFor	0.321	FRtwo	-24.889**	GoodFor	1.340	FRtwo	-17.197**
	(0.546)		(4.920)		(0.835)		(5.233)
NEGFor	0.682	SSM	-4.061	NEGFor	1.842	SSM	-5.205
	(0.295)		(2.109)		(0.876)		(4.509)
Constant	-0.143				0.415		
	(0.107)				(0.439)		
#countries	4				4		
Obs	3552				3164		
R^2	0.40				0.19		
F-test	64.24***				19.90***		

Table B.2: Short-run effects of news announcements in GIIPS countries on CDS spreads in non-GIIPS countries (Cyprus, Slovenia, Slovak Republic, Czech Republic, Hungary and Romania). Fixed effects panel data regression.

	non-EMU	EMU (difference)
Positive GIIPS news	-1.25*	-0.68
	(0.49)	(1.86)
Negative GIIPS news	3.73***	-3.20**
	(0.80)	(1.08)
ECB: banks	2.35*	-0.58
	(0.91)	(2.06)
ECB: MP	-0.74	16.62
	(2.29)	(10.21)
ECB fiscal easening	0.80	-2.28
	(0.86)	(2.35)
ECB fiscal tightening	1.62	-3.64**
	(0.82)	(1.22)
ECB: financial stability	-9.51*	9.48
	(4.10)	(6.16)
ECB/EU joint	8.55**	-10.13**
	(2.89)	(3.48)
EU fiscal	-15.91**	0.15
	(4.94)	(4.60)
EU wide stress test	1.85*	0.41
	(0.83)	(1.08)
SSM	1.31	4.02
	(1.21)	(3.64)
Support	-0.30	0.17
	(0.36)	(0.38)
#countries	6	
Observations	5323	
R^2	0.14	
F-test	14.83***	

Note: Positive GIIPS news = AP and good news on GIIPS countries; Negative GIIPS news = Negative news on GIIPS countries, and credit rating downgrades for both sovereigns and banks; ECB: banks = sum of ECBBAL and Recap in the detailed tales; ECB: MP = sum of MP, SWAP and Draghi; ECB: financial stability = sum of SMP, OMTAnnon and OMT; ECB fiscal easing = ECBGOV; ECB fiscal tightening = sum of ECBGOVSUSP and FREG; ECB/EU joint = the sum of FRESM, FREFSF; EU fiscal = the sum of FRSix, FRTSCG, FRother, FRtwo; EU wide stress test = bankstress; SSM = Single Supervisory Mechanism. Standard errors shown in parentheses below each estimate are clustered and robust. The regression includes all control variables as well as all other policy initiatives used in Table 6. F-test refers to the null hypothesis that all regressors are equal to zero.

Appendix C: Specifics of selected policy initiatives

Table C.1: Details on programs implemented by ECB and EU Commission/EU Parliament.

Program	Announcement date	Operational specifications revealed	Implemented
Covered Bonds Purchasing Program (CBPP)	May 7, 2009	June 4, 2009	July 6, 2009 until June 30, 2010
CBPP2	October 6, 2011	November 3, 2011	November 28, 2011 until October 31, 2012
Securities Market Program (SMP)	May 10, 2010	May 14, 2010	May 17, 2010 until July 9, 2010 and August 16, 2011 until January 16, 2011
Long Term Refinancing Operation (LTRO)	December 8, 2011	December 8, 2011	December 21, 2011 February 28, 2012
European Financial Stability Facility (EFSF)	n.a.	May 9, 2010	June 7, 2010
Six-pack	September 29, 2010 March 25, 2011 (negotiations with EU Parliament started)	November 8, 2011	December 13, 2011
European Stability Mechanism (ESM)	October 29, 2010 December 17, 2010 (political consensus reached and agreement to use simplified process)	March 25, 2011 (European Council agreement to establish ESM) July 11, 2011 (ECOFIN confirmed the establishment of ESM) July 21, 2011 (modification of initial proposal) December 9, 2011 (a second modification of the proposal) February 2, 2012 (the addition to the Treaty signed)	September 27, 2012 October 8, 2012 (ESM board of governors held its inaugural meeting)