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THE GLOBAL EFFECTS OF THE EURO DEBT CRISIS

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In 2013 all ECB publications feature a motif taken from the €5 banknote.

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Abstract

This paper is an event study focusing on the global effects of the euro debt crisis in 2010-2013. After identifying 18 key exogenous crisis events, I analyse the impact on equity returns, exchange rates and government bond yields in 12 advanced and 13 emerging countries. The main effect of euro debt crisis events is a rise in global risk aversion accompanied by fall in equity returns, in particular in the financial sector, in advanced countries (but not in emerging countries). The effect on bond yields is not statistically significant for the whole set of countries, but is significant and negative for key advanced countries such as the US and the UK. The paper also analyse the transmission channels by looking at how pre-crisis country characteristics influence the strength and direction of the spill-over, concluding that the transmission hinges more on trade than on finance

Keywords: Euro debt crisis, contagion, spill-over, global risk aversion.
JEL: F3.

Non-technical summary

The main purpose of this paper is to try and measure the impact of the crisis on global financial markets, using an event study approach. More generally, this exercise may be useful to understand the external spillover emanating from the euro area and the crisis may be interpreted, in this regard, as an interesting pseudo-natural experiment for the global transmission of shocks. In this respect, it is worth emphasising that the euro debt crisis is a particularly interesting case study in order to understand contagion and spillover, because it was punctuated by events and decisions at the political level (at both national and European level, adding a further layer of complexity), arguably more so than other crisis episodes in the past. It is therefore comparatively easier to identify truly exogenous events driving its evolution.

The period covered by the analysis goes from January 2010 to May 2013. I identify crisis events based on three restrictions: (i) on the event day there must be a *very large* increase in the government bond spread in *both* Italy and Spain vs. Germany (the assumption on how large is based on the statistical distribution of daily changes in the spread); (ii) the movement must be motivated by a specific *euro area* event happening on that day and widely reported in the financial press as the motivating factor for the jump in the spread (I focus in particular on announcements by policy makers and decisions taken at the European level, which have reflected repeated attempts at crisis resolution); (iii) no other important event should have intervened on the same day, in particular not from outside the euro area (such as, e.g., a large data surprise from the US).

The main result of the analysis is that euro debt crisis events have had sizeable effects on global financial markets outside the euro area. In particular, a notable effect of the crisis events is a rise in global risk aversion, accompanied by sizeable negative equity returns. The fall in equities is particularly sharp in the financial sector (even after controlling for the relatively high beta of this sector), suggesting that the bank-sovereign nexus is not something which is limited to the euro area countries only. Equity returns and excess returns for the financial sector go down even in countries (such as Germany and the US) that are safe havens in terms of the reaction of their government bond yields. Finally, I find that the euro depreciates across the board, but other key bilateral exchange rates (such as the US dollar-Swiss franc) appear to be only marginally affected.

In a second step of the analysis, I also look at countries' own characteristics as well as at the links (real and financial) with the euro area to find out what factors matter the most for the transmission of euro crisis events to countries outside the euro area. I find that the trade and economic link with the euro area (both as a whole and high-yield countries only) is the most important channel of contagion, which is statistically significant and sizeable for all assets except exchange rates. Results for other possible channels are more mixed. A proxy for the country risk rating dampens contagion for government bonds and exchange rates, but is insignificant for equities. Financial integration with the euro area is generally found to be insignificant as a conduit of contagion. Financial development and openness of the recipient country dampens contagion for bonds, but increases it for exchange rates. Overall, a main result of the paper is that real economy links seem to be the most consistent factors affecting the transmission of euro debt crisis events to the rest of the world.

1 Introduction

The euro sovereign debt crisis has made headlines the world over and attracted global attention. Renewed turmoil in global financial markets has been associated with it by observers and policy makers, and discussed in main international meetings such as the G7 and the G20. Against this background, the main purpose of this paper is to try and measure the impact of the crisis on global financial markets, using an event study approach. More generally, this exercise may be useful to understand the external spillover emanating from the euro area and the crisis may be interpreted, in this regard, as an interesting pseudo-natural experiment for the global transmission of shocks. In this respect, it is worth emphasising that the euro debt crisis is a particularly interesting case study in order to understand contagion and spillover, because it was punctuated by events and decisions at the political level (at both national and European level, adding a further layer of complexity), arguably more so than other crisis episodes in the past. It is therefore comparatively easier to identify truly exogenous events driving its evolution.

In this paper I regard the "euro debt crisis" mainly as a phenomenon affecting the euro area in its entirety and hence focus on the two largest high-yield countries, Spain and Italy (as opposed to the smaller countries such as Greece, Ireland and Portugal). A worsening

of the crisis may be interpreted as a shock increasing the distance of Spanish and Italian government bonds from, and the substitutability with, German bonds. Fluctuations in the spreads between sovereign bond yields within the euro area are of course normal and may well reflect country fundamentals as well as factors other than a worsening of the euro debt crisis, such as increases in global risk aversion and shifts in sentiment elsewhere. Nevertheless, *sharp* increases in government bond yield spreads within a monetary union have been widely associated with a worsening of market sentiment on the viability of the euro area in the medium to long term, and I therefore focus on this variable for the identification of crisis events.[1]

The period covered by the analysis goes from January 2010 to May 2013. I identify crisis events based on three restrictions. First, on the event day there must be a *very large* increase in the government bond spread in *both* Italy and Spain vs. Germany (the assumption on how large is based on the statistical distribution of daily changes in the spread). Second, the movement must be motivated by a specific *euro area* event happening on that day and widely reported in the financial press as the motivating factor for the jump in the spread. I focus in particular on announcements by policy makers and decisions taken at the European level, which have reflected repeated attempts at crisis resolution. Third, no other important event should have intervened on the same day, in particular not from outside the euro area (such as, e.g., a large data surprise from the US). Note that the focus on days characterised by *large* movements in intra-euro area spreads is similar in spirit to the identification through heteroscedasticity proposed by Rigobon (2003).

After identifying crisis events, I examine their impact on daily equity returns, equity returns for the financial sector, bond yields and exchange rates in 25 non-euro area countries (12 of which advanced) using a standard event study approach (see McKinlay 1997 for a survey of event studies in economics). Generally speaking, there are advantages and disadvantages associated with event studies. On the positive side, the *identification* of exogenous shocks is easier and cleaner than is usually the case in macroeconomic models. Indeed Gurkaynak and Wright (2013) even argue that many important macro-finance

[1]Note that in this paper I do not define precisely what the "crisis" is. It may encompass the market expectation of a sovereign default in a large euro area country, the simultaneous default in more than one euro area country, possibly brought about by a self-fulfilling spiral of lack of confidence, or event redenomination risk or the prospect of a break up of the euro area. What the crisis scenario exactly implies was probably unclear even in the minds of market participants.

questions can *only* be answered using event studies with high-frequency financial market data. On the other hand, event studies like the present one can only be used to analyse the *short term* impact of exogenous shocks on financial market variables, and it is also difficult to give a structural connotation to the events without a theoretical model underpinning the analysis. Hence, this study should be considered only as a first step towards the understanding of the global implications of the euro debt crisis.

This paper is related to a large literature on *contagion* in financial markets; for a recent survey, see Forbes (2012). As explained by Forbes, contagion (as opposed to interdependence) can be explained as the transmission of very large (in particular negative) events such as crises, which is closely related to the event study in this paper. The analysis is also especially related to the literature trying to identify the channels of contagion; e.g., Van Rijckeghem and Weder (2001).

Two recent papers focused on the transmission of the euro debt crisis and are for that reason also closely related to the present study. Aizenmann et al. (2011) analyse the effects of the global financial crisis (Lehman) and the euro debt crisis on stock and bond market indices in *developing* countries, up to end-2011. In order to identify crisis events, that paper looks at (i) daily news from the euro area, (ii) abnormal (very large) returns in four financial indicators (the VIX, the EONIA 3-month EONIA swap, the 5-year CDS index for Europe, the Fitch 1-year default probability of Western Europe).[2] After identifying 23 euro crisis-related events in this way, the authors look at abnormal returns around the event date and find that responses in developing countries to euro crisis events are generally rather small, significantly less than for the global financial crisis (although they do not consider the 2012 events which arguably marked the peak of the euro debt crisis). They also find that the effect is larger in countries having a higher trade exposure to the euro area (measured by exports to the euro area divided by the country's GDP). Claessens, Tong and Zuccardi (2011) look at 3 specific events, 10 May 2010 and 21 July 2011 (positive) and 8-10 June 2011 (negative), and is based on firm-level stock returns in EU and non-EU countries (for the most part advanced countries – over one third from Japan). They run a cross sectional regression for each event and find that firms' financial dependence matters for the impact of the events if interacted

[2]The VIX stands for the Chicago Board Options Exchange Market Volatility Index; the EONIA for Euro OverNight Index Average; and CDS for Credit Default Swap.

with country-level bank exposure to euro area high-yield countries, and that the effect is positively related to trade linkages to the same countries. This paper has a somewhat a different focus compared with both Aizenmann et al. (2011) and Claessens et al. (2011): its main objective is to understand the *global* implications of the crisis events and the transmission to both advanced and emerging countries (different from Aizenmann et al.) and on country-level variables (different from Claessens et al. 2011). Moreover, the identification of the crisis events is different from both papers and covers the year 2012, arguably the most important in the unfolding of the crisis. Finally, I include a broader analysis of the possible transmission channels of the crisis events to the rest of the world. Fratzscher (2009) looks at the global effects of negative US-specific macroeconomic shocks during the Lehman crisis and finds them to have triggered a significant strengthening of the US dollar, rather than a weakening. Macroeconomic fundamentals and financial exposure of individual countries are found to contribute to the transmission process of US shocks. In particular, countries with low forex reserves, weak current account positions and high direct financial exposure vis-à-vis the United States have experienced larger currency depreciations during the crisis.[3]

Finally, a recent literature has analysed spillover and contagion during the crisis period *within the euro area*, e.g. Amisano and Tristani (2012), Claeys and Vašíček (2012), De Santis (2012), and Kalbaska and Gatkowski (2012); an earlier study on sovereign spreads within the euro area in the pre-crisis period is Manganelli and Wolswijk (2009). These papers however do not address the central question of this paper, namely the transmission of the euro debt crisis to the rest of the world.

The main result of the analysis is that euro debt crisis events have had sizeable effects on global financial markets outside the euro area. In particular, a notable effect of the crisis events is a rise in global risk aversion, accompanied by sizeable negative equity returns. The fall in equities is particularly sharp in the financial sector (even after controlling for the relatively high beta of this sector), suggesting that the bank-sovereign nexus is not something which is limited to the euro area countries only. Equity returns and excess returns for the financial sector go down even in countries (such as Germany and the US) that are safe havens in terms of the reaction of their government bond yields. Finally,

[3]Fratzscher et al. (2012) look at the global effects of the non-standard monetary policy operations in the euro area, in particular the very long term operations (VLTRO).

I find that the euro depreciates across the board, but other key bilateral exchange rates (such as the US dollar-Swiss franc) appear to be only marginally affected. On the positive side, I also find that policies aimed at reducing the severity of the crisis, such as those taken in the second half of 2012, also helped stabilise financial markets out of the euro area.

What are the transmission channels of euro debt crisis shocks? In a second step of the analysis, I look at countries' own characteristics as well as at the links (real and financial) with the euro area to find out what factors matter the most. I find that the trade and economic link with the euro area (both as a whole and high-yield countries only) is the most important channel of contagion, which is statistically significant and sizeable for all assets except exchange rates. Results for other possible channels are more mixed. A proxy for the country risk rating dampens contagion for government bonds and exchange rates, but is insignificant for equities. Financial integration with the euro area is generally found to be insignificant as a conduit of contagion. Financial development and openness of the recipient country dampens contagion for bonds, but increases it for exchange rates. Overall, a main result of the paper is that real economy links seem to be the most consistent factors affecting the transmission of euro debt crisis events. This stands in contrast with previous results in the literature, such as Van Rijckeghem and Weder (2001), which had given more emphasis to the financial channel. We can conjecture that the financial channel is still important but works in a rather homogeneous way across countries, given the higher degree of financial globalisation compared with real globalisation, where geography still matters to an important extent.

The paper is organised as follows. Section 2 presents the data. Section 3 describes the econometric approach. Section 4 presents the results. Section 5 contains the conclusions.

2 Data

This study is based on daily data for 10-year government bond yields, equity returns (total market and financial sector) and bilateral exchange rates vs. the euro for 25 advanced and emerging countries (the full country list is in *Table 1*) from January 2010 to May 2013.[4]

[4]The country list is chosen so as to reflect a broad selection of both advanced and emerging countries. I consider all G20 countries except Saudi Arabia (excluded for data availability reasons) and add the largest advanced and emerging countries ranked by GDP. Together with the euro area, the country

The main source for the data is Datastream. Moreover, I also use data for the VIX, oil and gold prices, and key exchange rates, the BBB-AAA US corporate bond spread at 7-10 year maturity, and the spread between the (unsecured) Euribor and the overnight indexed swap in the euro area, i.e. a proxy of risk aversion in the euro area interbank market, and the same concept for the US. Finally, I also use daily data for global mutual fund portfolio flows from the Emerging Portfolio Fund Research (EPFR). This database contains daily portfolio flows and geographic allocations by more than 14,000 equity funds and more than 7,000 bond funds. From the EPFR data, I compute daily data for net bond and portfolio flows to the euro area, the euro area high-yield countries and to the non-euro area advanced and emerging countries covered in Table 1. Note that portfolio flows are corrected for valuation effects, i.e. they reflect the true underlying portfolio flows. On the other hand, note that these data cover the portfolio decisions of (mainly US) funds and are not necessarily indicators of *cross border* capital flows in terms of the ultimate holder of the securities.

Identification of the crisis events. This is evidently the most important step in an event study. As mentioned in the Introduction, I focus on the spread between the average 10-year government bond yields in Italy and Spain and the corresponding rate in Germany (henceforth "spread"). The level of the series behaves very much like a random walk, hence I focus on the first differences which exhibit fat tails and strong non-Normality (with a kurtosis close to 9). This suggests the presence of large (and not very infrequent) 'jumps' in the series. Based on this observation, following the general principle of identification by heteroscedasticity proposed by Rigobon (2003), I identify events by imposing three conditions: (i) there must be a very large movement (jump) in the first difference of the spread, which I impose to be at least 2.5 standard deviations and which should be visible for *both* Spain and Italy; (ii) the jump should be associated with a significant political event or euro area policy makers' decisions (including the ECB) and be widely in the press on the same day; (iii) it should not be (even potentially) explained by another non-euro area event occurring in the same day. Note that the crucial condition in the identification of the events is the second one, based on the historical reconstruction of the news hitting the markets on a particular day; the first condition is just a way to

sample accounts for more than 90 per cent of world GDP. I exclude bond yields in Argentina, Venezuela and Chile on account of their erratic behaviour and/or very thin markets.

pre-select the universe of all possible events in order to restrict ourselves to those which are of material importance. Note that I am not claiming that the proposed approach is necessarily better than other alternative ways to identify relevant events in general, but it may be the most convenient for a crisis with the peculiar characteristics of the euro debt crisis in 2010-2012.

Following this approach, I identify 18 events (11 positive ones - namely implying an easing of the crisis - coded "-1"; 7 negative ones coded "+1").[5] The full list of events and the related explanations are reported in *Table 2*.

After identifying the crisis event dates, I then turn to the country characteristics that may be relevant for their international transmission. Generally speaking I use pre-crisis data, because the objective is to understand what makes a country more or less vulnerable once the crisis strikes and to avoid reverse causality problems. The data are mostly drawn from the IMF World Economic Outlook (WEO) and International Financial Statistics (IFS) databases.

Size. One possible first channel of international transmission is the size of the country receiving the shock. It could be argued, in particular, that larger countries should be more insulated from contagion, as it is harder "to rock a bigger boat". I proxy size by population and world GDP weight, from the IMF WEO database, both in 2009 (hence this variable only has a cross sectional variation).

Trade and financial openness. More open economies, both in trade and finance, could be more vulnerable to contagion. I proxy trade openness as the sum of exports and imports to GDP; financial openness as the sum of external assets and liabilities to GDP (sources are the IMF WEO for the former and IFS for the latter). For financial openness I also consider the Chinn-Ito index (see Chinn and Ito 2006). Trade openness is measured in 2009, financial openness in 2008 due to data availability constraints.

Net Financial Asset position (NFA). Contagion could also be transmitted differently to countries that are net borrowers or net lenders at the international level. Habib and Stracca (2012) show that the NFA position (relative to GDP) is the most reliable predictor of the safe haven status of a currency. Data for all countries refer to end 2008.

Financial development. Countries with more developed financial markets may be more exposed to contagion and more inter-connected, but also more resilient to withstand

[5] Note that the sign is chosen so as to have the same sign of the spread following a crisis event.

external shocks; the net effect of these two forces is largely an empirical question. I measure the degree of countries' financial development by the ratio between private credit and stock market capitalisation and GDP (data are from the World Bank Database on Financial Institutions and Structure).

Country risk rating. If the crisis events lead to changes in global risk aversion, riskier countries may be more affected than relatively safer ones. I use data on risk rating from the International Country Risk Guide (ICRG), in particular in (i) economic risk, (ii) financial risk and (iii) political risk. The ICRG risk ratings are computed by assigning risk points to a pre-set group of factors; for *economic risk*, the indicators are GDP per head, GDP growth, inflation, the budget balance and the current account; for *financial risk*, foreign debt as a percentage of GDP, foreign debt service and the current account as a percentage of exports of goods and services, the net international liquidity as months of import cover, exchange rate stability; for *political risk*, government stability, socioeconomic conditions, the investment profile (such as contract viability and payment delays), internal conflict, external conflict, corruption, military in politics, religious and ethnic tensions, law and order, democratic accountability, de iure or de facto one-party State, autarchy, and bureaucracy quality.[6] Again, the data refer to end-2009.

Public debt to GDP. Since the euro debt crisis is mostly about public debt sustainability, it is straightforward to expect a stronger impact on non-euro area countries with a worse fiscal sustainability outlook (for example because market participants become more attentive towards the fiscal outlook). I proxy this variable with the public debt to GDP ratio in 2009. The source of the data is the IMF WEO.

Trade exposure to the euro area. I proxy this variable by dividing exports to the euro area (total and high-yield countries[7]) in 2009, by either total exports or real GDP (both in US dollars). Again, the source of the data is the IMF WEO as well as the IMF Direction of Trade (DOT) statistics.

Financial integration with the euro area. Here we want to measure whether a certain country i is more or less financially integrated with the euro area. In this paper I focus on price integration rather than quantity-based measures. Indeed, data on cross border portfolio exposure (e.g., from the IMF Coordinated Portfolio Investment Survey,

[6] For further details see http://www.prsgroup.com/ICRG_methodology.aspx#Background.
[7] Italy, Spain, Greece, Ireland and Portugal.

CPIS) are incomplete due to non-reporting emerging countries and potentially distorted by the presence of intermediation hubs such as the United Kingdom or Switzerland.[8] I therefore follow Bekaert et al. (2009) and estimate

$$r_{it} = \alpha_{it} + \beta_i^{glo} F_t^{glo} + \beta_i^{EA} r_t^{EA} + \varepsilon_{it} \tag{1}$$

where r_{it} are monthly equity returns in country i (outside the euro area), and F_t^{glo} is the first principal component of equity returns in all countries including the euro area (but excluding country i), and r_t^{EA} is equity returns in the euro area. I estimate equation (1) on monthly equity returns between January 1999 and December 2009, hence again on the pre-crisis period. For each country in Table 1 I derive two possible measures of integration, (i) the β_i^{EA} coefficient as such, (ii) its absolute value (in the understanding that, e.g., even a strong negative co-movement with the euro area could still denote high financial integration). The measures based on the β_i^{EA} coefficients are computed for the euro area as a whole, the euro area high-yield countries, as well as both for the total stock market and for the financial sector separately.

3 Econometric approach

The estimated model is a panel fixed-effect equation,

$$x_{it} = \alpha_i + \rho x_{i,t-1} + \beta I_t + \gamma z_{it} + \varepsilon_{it} \tag{2}$$

where x is the variable of interest (e.g., equity returns), I_t is the euro area debt crisis dummy described in Section 2, and z are controls. Standard errors are adjusted for serial correlation and cross sectional dependence (Driscoll-Kraay). The coefficient of interest in this part of the analysis is β.

I also want to understand the channels of transmission of the crisis events and hence estimate

$$x_{it} = \alpha_i + \rho x_{i,t-1} + \beta I_t + \gamma z_{it} + \delta X_{i,PRECRIS} I_t + v_{it} \tag{3}$$

where $X_{i,PRECRIS}$ is a vector with the country variables of interest at their pre-crisis value (e.g., the economic risk rating in 2009).[9] In this case we are interested in the δ parameters;

[8] On the relevance of price-based vs. exposure-based financial integration see also Dedola and Lombardo (2012).

[9] Note that it is not needed to include the variable $X_{i,PRECRISIS}$ separately because it is contained in the fixed effects.

if the parameter associated to a variable in the X vector is significant, it implies that that particular variable helps explain the transmission of the shocks to non-euro area countries.

4 Results

4.1 Preliminary evidence

Before turning to describing the multi-country analysis as in equations (2) and (3), I first report illustrative evidence for selected individual countries in order to gain a first understanding of the evidence. Impulse responses reported in *Figures 1-6* are derived from regressing the variable of interest on up to five lags of the crisis dummy, I_t. This should also give a first idea of whether the effect is concentrated on the first day or is rather more drawn out. I mostly find the effect to be confined to the first day, and for this reason do not include lags of I_t in equations (2) and (3) (see also the robustness analysis in Section 4.4).

Figure 1 reports on the effects of crisis events on government bond yields. In the upper left corner of the figure the effect on the spread in Italy and Spain is reported. By construction, this is positive and significant, as the two spreads go up by about 40 basis points each. Interestingly, the French-German spread also goes up, but not due to a rise in French yields (which remain practically unchanged) but rather due to fall, by about 8 basis points, in the German yields (safe haven assets). This evidence confirms the conventional wisdom that France is an intermediate case between the euro high-yield and low-yield countries. Bonds in other key advanced countries appear to be safe havens, in particular the UK (around 8 basis points, similar to Germany), less so the US and Switzerland (4 basis points) and Japan (1 basis point).

Figure 2 reports on the effects on equity returns. These are negative in particular in Italy and Spain, and to a lesser degree (but still significantly negative) in Germany and even in the US. The two measures of global risk aversion that I consider (the VIX and the BBB-AAA corporate bond spread in the US at 7 to 10 years maturity) both go up significantly, suggesting a sizeable rise in market stress. Gold and oil prices, however, are not affected in a statistically significant way by the crisis events.

Is the financial sector particularly affected by the crisis events? *Figure 3* zeroes in on excess equity returns in the financial sector (defined as financial equity returns minus

equity returns in the whole market in each country). These are again strongly negative especially in Italy, reflecting the bank-sovereign nexus that has been at the core of the euro debt crisis. Excess returns also go down in Germany, suggesting that German banks were also exposed to a worsening of the crisis, but significantly less so in the US. Quite surprisingly, however, the crisis events do not appear to affect interbank market spreads in either the euro area or the US.

Figure 4 reports on the effect on exchange rates. The main message here, which is hardly surprising, is a depreciation of the euro across the board, by about half a percentage point.[10] Do crisis events affect global exchange rate configurations beyond the euro? Figure 5 also reports on the US dollar-Swiss franc and the US dollar-yen bilateral exchange rates. There is a slight appreciation of the yen vs. the US dollar and a slight appreciation of the US dollar vs. the Swiss franc with a delay of one day, but the effects are quantitatively small and hence not economically significant.

Finally, in *Figures 5-6* I report the effect of crisis events on EPFR portfolio flows (Figure 5 for bond flows, Figure 6 for equity flows). Overall, results for portfolio flows are mixed. Crisis events lead to net bond portfolio inflows in the euro area low-yield countries and in countries other than the euro area high yield countries (both advanced and emerging), while there is a net outflow (with some lag) out of euro area high yield countries. Surprisingly, crisis events lead to net equity inflows in all considered countries (euro area and other countries, both advanced and emerging). It should be considered, however, that the EPFR data that I use are not necessarily proxies for cross border portfolio flows, as they could well reflect either the purchasing of assets by domestic investors through global funds or resulting from portfolio shifts between the funds covered in the survey and other investors, not included in the survey.

4.2 Baseline multi-country evidence

After presenting first illustrative evidence I now turn to the estimation of equation (2) in a multi-country setting. The baseline results for equation (2) are reported in *Table 4*. I find (β coefficient) that equity returns go down by about 0.7 percentage points on impact, and excess equity returns for the financial sector by an additional 0.2% (note that total

[10] The nominal effective exchange rate of the euro also depreciates significantly (not reported for brevity).

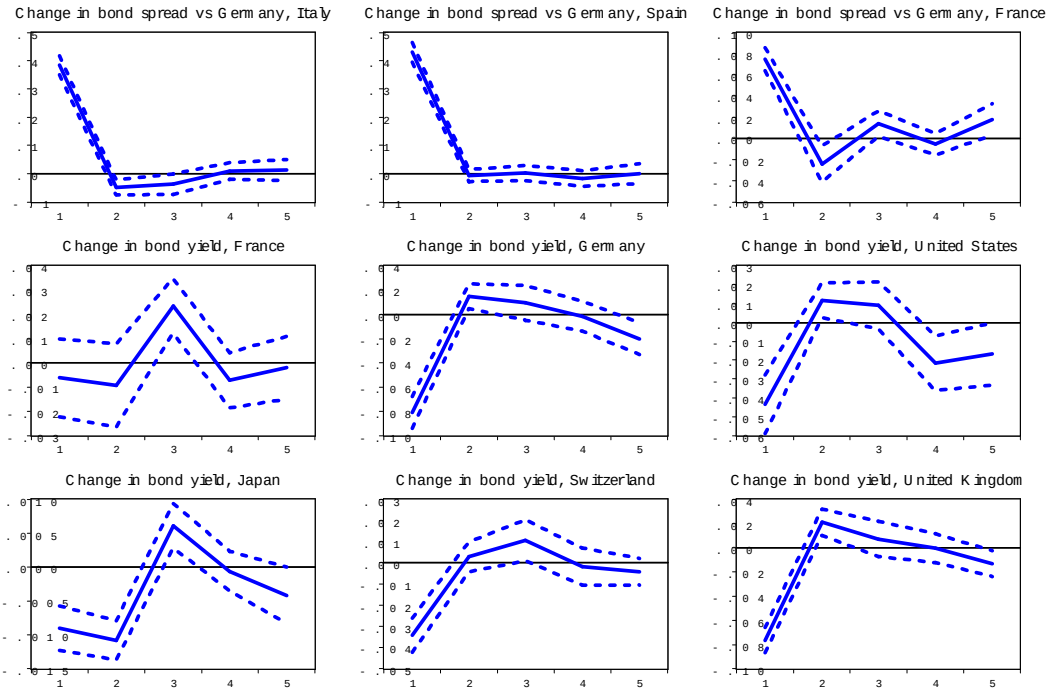

Figure 1: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation).

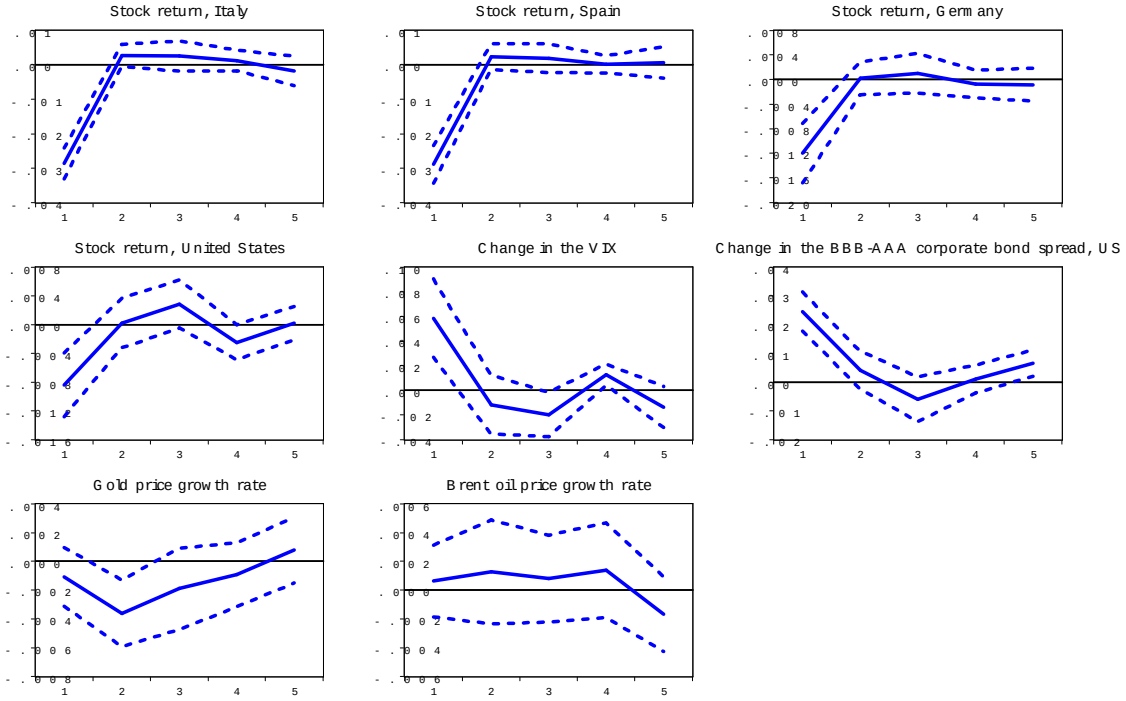

Figure 2: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation).

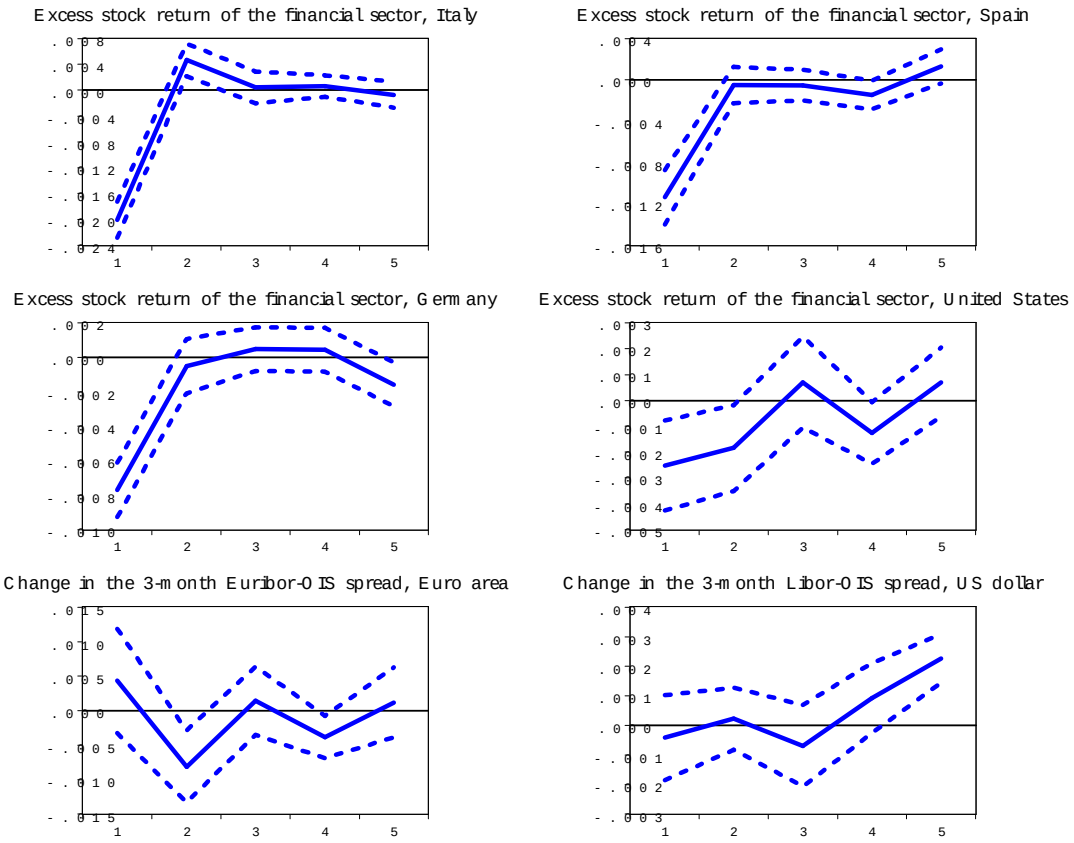

Figure 3: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation).

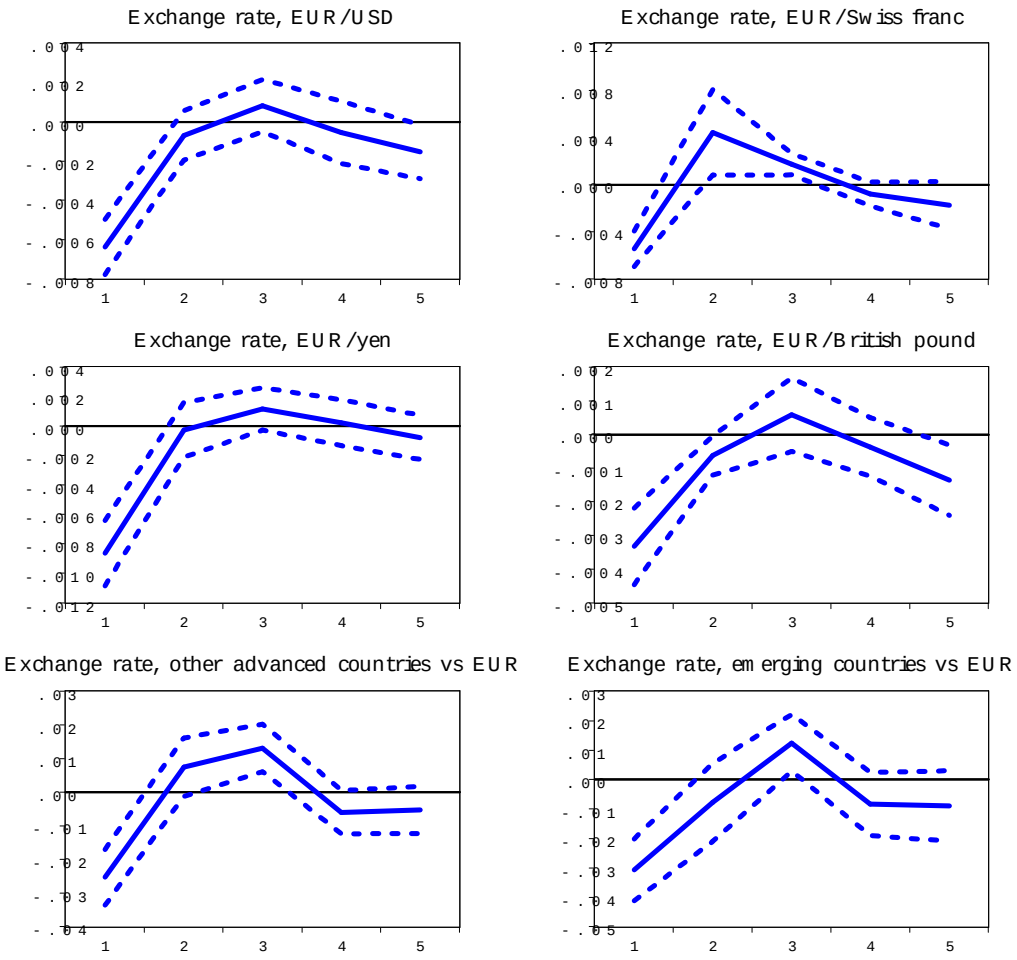

Figure 4: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation). A fall indicates a depreciation of the euro.

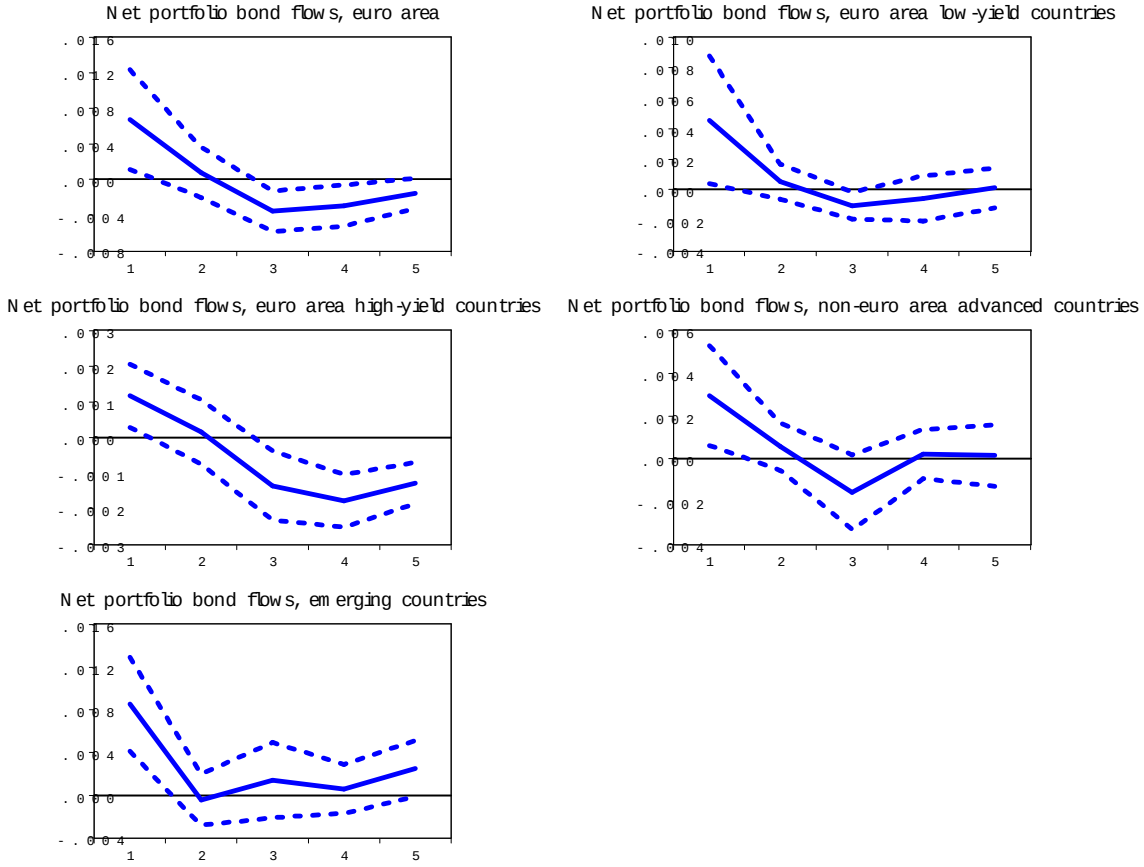

Figure 5: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation).

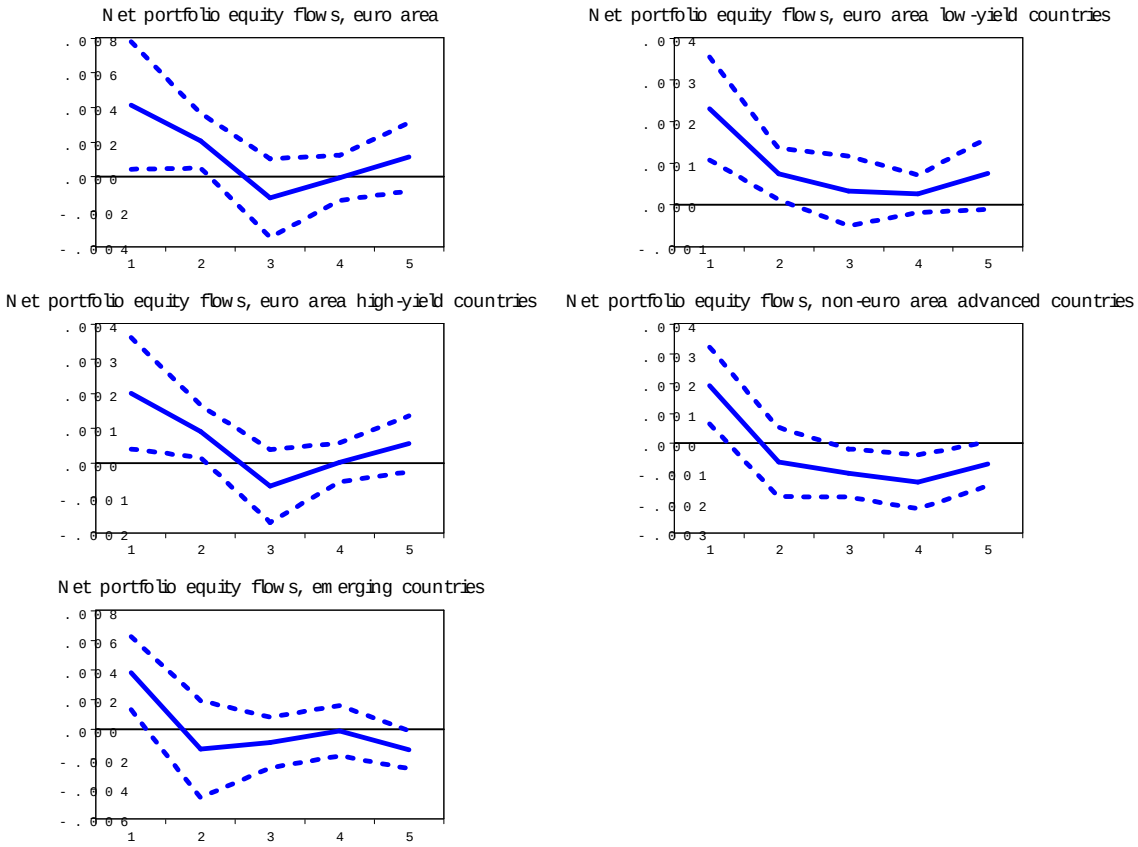

Figure 6: The impulse responses are based on a regression of daily data on the crisis event dummy (see Table 2) and up to five lags. The sample period goes from 1 January 2010 to 13 May 2013. The dashed lines are confidence intervals (one standard deviation).

market returns are now included as a control variable).[11] The effect on bond yields is not statistically significant on the whole sample. On exchange rates I find that the euro depreciates on average by around 0.2% following a negative crisis event (i.e., coded +1).

I also test whether the impact of crisis events is symmetric, by distinguishing between positive and negative events (i.e., coded +1 and -1); see columns (5)-(8). I find that the effects appear to be broadly symmetric and there is no statistically significant difference between the two β coefficients associated to positive and negative events. In terms of size of the coefficient, however, I find that the effect on the exchange rates vs. the euro is significantly larger on negative events

Overall, the main finding of this part of the analysis is that euro debt crisis events have led to (i) a global fall in equity markets and a rise in global risk aversion, (ii) a fall in excess returns in the financial sector, (iii) no significant change in long term government bond yields, though bond yields in key advanced countries such as the US and the UK do go down and can therefore be considered as safe haven assets; (iv) a depreciation of the euro.

Tables 5-6 report some robustness analysis of the baseline results. In Table 5, in columns (1)-(4) I substitute the crisis dummy with a new variable which "weighs" the event days by the size of the daily change in the spread (Weighted crisis dummy).[12] Results are similar and generally the coefficients are larger, although for equity returns it is not statistically significant. In columns (5)-(8), I include another variable including leads and lags of the crisis dummy, excluding the day t values. The inclusion of this variable tests whether there are anticipation or delayed effects of the crisis event, possibly also on account of asynchronous trading in different time zones, but such effects are found to be always statistically insignificant. In Table 6, columns (1)-(4) I report regressions that are the same as in the baseline but excluding the United States from the sample, on account of its special role in the global economy and in the international monetary system. I find that all the main results are the same when excluding the US. In columns (5)-(9), I report estimates using the Mean Group estimator which does not assume slope homogeneity in order to test for possible aggregation bias when applying fixed-effect pooled OLS. Again, results are largely the same as in the baseline exercise.

[11] Note that the beta of the financial sector is found to be larger than 1, indicating that financial excess returns are pro-cyclical.

[12] On non-event days, the variable continues to be equal to zero.

4.3 Transmission channels

As the last step in the analysis we now turn to the transmission channels based on the estimation of equation (3) and the parameters δ. Because including all potential regressors in the X vector would result in a very large model, I run a principal component regression after identifying a few underlying factors:[13]

$$x_{it} = \alpha_i + \rho x_{i,t-1} + \beta I_t + \gamma z_{it} + \delta \widetilde{X}_{i,PRECRIS} I_t + v_{it} \tag{4}$$

where $\widetilde{X}$ is a vector of factors of (much) lower dimensionality than X. In particular, the first factor is *country risk rating* and is estimated as the first principal component of whether the country is an advanced country, its size, the three ICRG risk ratings (economic, financial and political), the NFA position (an indication of financial strength) and the public debt to GDP ratio. A second factor, *trade and economic links with the euro area*, is the first principal component of the exports to the euro area total and euro area high-yield countries, weighted by either GDP or total exports, as well as the correlation between the GDP growth of each non-euro area country and the euro area, measured on quarterly data from 1999 to 2009. The third factor measures *financial integration with the euro area*, including all the financial integration indicators discussed in Section 2. A fourth factor is *financial development and openness*, which includes the two financial openness measures (sum of external assets and liabilities over GDP and the Chinn-Ito index) and the two financial development variables (private credit to GDP and stock market capitalisation to GDP). Finally, I include the country's *trade openness* in the $\widetilde{X}$ vector, which has therefore five components.

Table 7 reports the correlation between the four factors derived as principal components and their constituent series. While the correlations are in line with theoretical priors for most variables, one notable surprise is that a higher public debt to GDP ratio is positively, rather than negatively correlated with the country risk rating factor; this may be due to the fact that lower-risk countries are able to issue more debt than higher-risk countries. Indeed, the public debt to GDP ratio is significantly higher in advanced countries than in emerging countries. Another surprising feature is that measures of financial integration based on the absolute value of the β^{EA} coefficient in equation (1) are generally

[13] Principal component regression is widespread in the literature; see among others Cochrane and Piazzesi (2005).

negatively correlated with the common factor and with the measures based on the β^{EA} as such.

In *Table 8* I show results for the estimation of equation (4) for equity returns, financial equity returns, government bond yields and changes in exchange rates vs. the euro. Note that a negative δ implies a stronger contagion for equities and financial equities, but also indicates a contribution towards a more safe haven behaviour for bond yields and exchange rates (and vice versa for a more positive δ).[14] In other words, a country which is more negatively affected by the crisis is assumed to be one where crisis events lead to (i) more negative equity returns, (ii) a rise in government bond yields and (iii) a depreciation of the currency vs. the euro. Also note that the factors in the $\widetilde{X}$ vector are all standardised, so that the size of the δ coefficients measures what happens to the response to the crisis event when moving from the average to one standard deviation above average for each factor. This should help to interpret the coefficients in terms of the economic significance.

Four main results emerge from Table 8. First, a lower country risk reduces contagion for bond yields and exchange rates, but not for equities where it is insignificant. Second, trade and economic links with the euro area always increase contagion, though the interaction term is insignificant for exchange rates. The coefficients associated with this second factor are larger, and hence more significant from an economic point of view. Third, and partially in contrast with the previous result, trade openness not only does not appear to increase contagion, but it actually reduces it for equities. Fourth, is contagion smaller or larger in thinner markets? I find that financial development and openness of the receiving country reduce contagion for bonds, but increase it for exchange rates (possibly because countries with a lower level of financial development also tend to peg their currency), so that the overall impact of this variable is mixed. It is interesting to note that, overall, these results suggest that real economic links (notably trade links) are the most consistent and important conduit of contagion from the euro debt crisis, more so than financial channels. While this stands in contrast with previous results in the literature (such as Van Rijckeghem and Weder 2001) it is in keeping with the recent paper by Rose (2012), who finds that financial integration measures (both multilateral and bilateral with the US and China) do not help to explain countries' crisis intensity in 2008-09.

[14]Note that I will refer to "reducing contagion" in the meaning of a factor contributing to increasing equity returns, lowering bond yields and leading to an exchange rate appreciation after an event worsening the euro debt crisis.

4.4 Robustness

In *Tables 9-12* I present some robustness checks for the evidence presented in Table 8, for equity returns (Table 9), financial equity returns (Table 10), government bond yields (Table 11) and exchange rates (Table 12). In each table, I include alongside the baseline regression in column (1) a variant of the country risk factor excluding the public debt to GDP ratio (column (2)); trade and economic links and financial integration with the euro area high yield countries only, rather than with the whole euro area in column (3); financial openness (first principal component of the two financial openness measures) and financial development (first principal component of the two financial development) separately in column (4); and finally in column (5) a dummy variable whether a country is in the EU but not in the euro area and whether it pegs its currency to the euro. All in all, results are very similar to the baseline ones in all variants, suggesting that the results of Table 8 are remarkably robust. In addition, I find that contagion for a EU country outside the euro area (e.g., the UK) is dampened for the bond market but amplified for the equity market (including for excess returns in the financial sector). A dummy for whether a country is pegged to the euro is also significant when interacted with crisis events for exchange rates, signalling that currencies of pegged countries tend to depreciate more than the others (not surprisingly, since the euro itself depreciates after a crisis event).

5 Conclusions

The euro debt crisis has been in the global spotlight in the past couple of years and has been heavily influenced, arguably more than past crises, by events and decisions at the political level, both national and European. This paper has aimed at measuring the impact of the crisis on global financial markets by conducting an event study around key political events and decisions in the 2010-2013 period. I look at data on equities, bonds, exchange rates and commodities from a large sample of advanced and emerging countries.

The main result of this study is that euro debt crisis events which led to large increases in the spread between Italian and Spanish vs. German government bond yields have determined a sizeable rise in global risk aversion and a sell-off of equities. Another clear effect of crisis events is a depreciation of the euro across the board, while the impact on bond yields is generally less clear-cut. However, I find that the government bond

market in key advanced countries (most notably the UK and the US) acts as a safe haven in the wake of crisis events. I also look at the possible transmission channels and find some pre-crisis country characteristics to matter for the effect of crisis events on non-euro area countries. In particular, we find that trade and economic links to the euro area are the most consistent and sizeable conduit of transmission of euro debt crisis events. By contrast, I do not find clear evidence of a financial channel; financial integration with the euro area is often insignificant and financial development and openness have a mixed effect (thin markets increase contagion in bond markets, but reduce it for exchange rates). Finally, countries' own riskiness is found to matter for bonds and exchange rates, whereby contagion is reduced for safer countries.

The present paper has focused on first moments (asset returns). In follow up work, it would be useful to extend the analysis (including the focus on transmission channels) to higher order moments, such as volatility, skewness and kurtosis.

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Table 1. Country list

Advanced	Emerging
Australia	Argentina
Canada	Brazil
Denmark	Chile
Japan	China
Korea	India
New Zealand	Indonesia
Norway	Malaysia
Poland	Mexico
Sweden	Russia
Switzerland	South Africa
United Kingdom	Thailand
United States	Turkey
	Venezuela

Table 2. Description of crisis events

Date	Description	Coding
10-May-10	Leaders of the Eurozone countries resolved in Brussels to take drastic action to protect the euro from further market turmoil	-1
1-2 Dec-10	ECB reported to be purchasing government bonds in large scale	-1
11-Jul-11	The crisis engulfs Italy; public disagreement between Italian Prime Minister Berlusconi and Finance Minister Tremonti	1
21-Jul-11	Euro area summit	-1
08-Aug-11	ECB reported to 'actively' buy bonds to fight the debt crisis	-1
05-Sep-11	Bond markets reacting to perceived U-turn on austerity by Italy's government	1
09-Nov-11	High tension on the markets: reports that Germany and France had begun preliminary talks on a break-up of the euro area	1
01-Dec-11	Coordinated announcement on dollar swap lines by six central banks	-1
05-Dec-11	Sarkozy-Merkel agreement that no losses will be automatically imposed to private investors in the European Stability Mechanism	-1
08-Dec-12	ECB President Draghi rules out more bond buying ahead of the summit	1
19-20 Jun 2012	G20 summit in Los Cabos; reports that European leaders are poised to announce a 750 billion euro deal to bail out Spain and Italy	-1
29-Jun-12	EU Leaders Summit: reports of Germany accepting demands made by Italy and Spain for immediate aid	-1
26-Jul-12	ECB President Draghi's pledge to do "whatever it takes" to protect the single currency	-1
02-Aug-12	Market observers disappointed by outcome of ECB Governing Council amid high expectations	1
6-7 Sep-12	ECB Governing Council announcement of the Outright Monetary Transactions (OMT)	-1
26-Sep-12	Heavy and violent protests in Spain and Greece	1
17-Oct-12	EU Leaders Summit; promise to reform the euro area, establish a banking union, attribute supervisory powers to the ECB	-1
26-Feb-13	Italian elections end up in a hung Parliament, with high political uncertainty ahead	1

Notes: Events are identified by imposing that, on the selected date, (i) there is a large movement (jump) in the average government bond yield spread of Spain and Italy over Germany, affecting both countries and larger than 2.5 standard deviations of the series, (ii) there is a specific euro area-originated political and policy-making driven event which is reported by the financial press as driving market developments on that day and (iii) there is no particularly important news elsewhere justifying a jump on Spanish and Italian bond spreads. Data on events are drawn from several online sources, in particular the series "Debt crisis: As it happened" maintained by The Telegraph.

Table 3. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gov bond yield (first diff.)	21857	0.00	7.43	-777.53	775.34
Equity return	21875	0.03	1.13	-10.11	31.89
Financial equity return	21875	0.04	1.35	-11.28	36.91
Change in exch. rate vs. euro	20448	-0.01	0.61	-4.35	8.00
Size	25	2.76	4.39	0.17	19.92
Population	25	166.28	330.31	4.32	1334.50
Public debt to GDP	25	51.14	38.64	5.81	210.25
Trade openness	25	0.63	0.32	0.22	1.63
ICRG economic risk	25	33.11	4.44	24.00	44.00
ICRG political risk	25	75.78	10.42	57.00	89.00
ICRG financial risk	25	40.54	4.61	31.00	48.00
Export to euro area/GDP	25	0.06	0.05	0.01	0.18
Export to euro area/total export	25	0.16	0.11	0.03	0.45
Export to euro area high yield/GDP	25	0.01	0.01	0.00	0.04
Export to euro area low yield/total export	25	0.04	0.04	0.01	0.18
Private credit to GDP	25	98.82	61.90	12.92	214.88
Stock market capitalisation to GDP	25	73.96	47.98	15.14	210.96
Output growth correlation with the euro area	25	0.71	0.25	0.12	0.97
Fin. integr. with the euro area (Beta coeff.)	25	0.00	0.08	-0.20	0.17
Fin. integr. with the euro area (absolute Beta coeff.)	25	0.06	0.05	0.00	0.20
Fin. integr. with the euro area high yield (Beta coeff.)	25	0.03	0.29	-0.62	0.59
Fin. integr. with the euro area high yield (absolute Beta coeff.)	25	0.23	0.17	0.02	0.62
Fin. integr. with the euro area (Beta coeff.), fin. sector	25	0.00	0.10	-0.21	0.22
Fin. integr. with the euro area (absolute Beta coeff.), fin. sector	25	0.08	0.06	0.00	0.22
Fin. integr. with the euro area high yield (Beta coeff.), fin. sector	25	0.04	0.27	-0.48	0.64
Fin. integr. with the euro area high yield (absolute Beta coeff.), fin. sector	25	0.21	0.18	0.01	0.64
Peg to euro	25	0.10	0.30	0.00	1.00
Net Financial Assets / GDP	25	-0.02	0.37	-0.67	1.18
Financial openness (external assets and liabilities over GDP)	25	2.38	2.73	0.59	12.04
EU non-euro area	25	0.16	0.37	0.00	1.00
Chinn-Ito index	25	0.85	1.44	-1.60	2.44

Table 4. Baseline regression results

Columns (1) and (5); equity returns; (2) and (6): fin. equity returns; (3) and (7): government bond yields; (4) and (8): exchange rates

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial equity return, t-1		0.00				0.00		
		(0.00)				(0.00)		
Equity return		1.05***				1.05***		
		(0.01)				(0.01)		
Crisis event	-0.71***	-0.17***	-0.01***	-0.22***				
	(0.25)	(0.04)	(0.00)	(0.08)				
Equity return, t-1	0.04*				0.04*			
	(0.02)				(0.02)			
Change in bond yield, t-1			-0.07***				-0.07***	
			(0.02)				(0.02)	
Exchange rate appreciation vs. euro, t-1				0.02				0.02
				(0.02)				(0.02)
Crisis event: Worsening					-0.75***	-0.16***	-0.02***	-0.35***
					(0.20)	(0.04)	(0.00)	(0.13)
Crisis event: Improvement					-0.62	-0.18***	-0.01	-0.14**
					(0.40)	(0.06)	(0.01)	(0.06)
Observations	21,850	21,850	19,210	20,217	21,850	21,850	19,210	20,217
Number of groups	25	25	22	24	25	25	22	24

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Pooled fixed-effect OLS regression of equation (1) in text. Sample period of daily data from January 2010 to May 2013; the list of countries is in Table 1. Equity returns are in percentage points, changes in bond yields in basis points. Driscoll-Kraay standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Robustness I

Columns (1) and (5); equity returns; (2) and (6): fin. equity returns; (3) and (7): government bond yields; (4) and (8): exchange rates

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial equity return, t-1		0.00				0.00		
		(0.00)				(0.00)		
Equity return		1.05***				1.05***		
		(0.01)				(0.01)		
Weighted crisis dummy	-1.29	-0.47***	-0.03*	-0.60***				
	(1.10)	(0.12)	(0.02)	(0.20)				
Equity return, t-1	0.04**				0.03*			
	(0.02)				(0.02)			
Change in bond yield, t-1			-0.07***				-0.07***	
			(0.02)				(0.02)	
Exchange rate appreciation vs. euro, t-1				0.02				0.02
				(0.02)				(0.02)
Crisis event					-0.71***	-0.17***	-0.01***	-0.22***
					(0.25)	(0.04)	(0.00)	(0.08)
Crisis event, t-5 to t+5 excluding t)					0.03	0.00	-0.00	-0.00
					(0.06)	(0.01)	(0.00)	(0.03)
Observations	21,850	21,850	19,210	20,217	21,650	21,650	19,037	20,048
Number of groups	25	25	22	24	25	25	22	24

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 4.

Table 6. Robustness II

Columns (1) and (5); equity returns; (2) and (6): fin. equity returns; (3) and (7): government bond yields; (4) and (8): exchange rates

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial equity return, t-1		0.01*				0.00		
		(0.00)				(0.01)		
Equity return		1.04***				1.02***		
		(0.01)				(0.04)		
Crisis event	-0.71***	-0.18***	-0.01***	-0.20***	-0.72***	-0.17***	-0.01*	-0.22***
	(0.24)	(0.04)	(0.00)	(0.08)	(0.07)	(0.05)	(0.01)	(0.07)
Equity return, t-1	0.04**				0.04***			
	(0.02)				(0.01)			
Change in bond yield, t-1			-0.07***				-0.03	
			(0.02)				(0.03)	
Exchange rate appreciation vs. euro, t-1				0.02				0.03**
				(0.02)				(0.01)
Observations	20,976	20,976	18,336	19,376	21,850	21,850	19,210	20,217
Number of groups	24	24	21	23				
Number of country					25	25	22	24

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 4.

Table 7. Correlations with country factors

Country characteristic	Country risk factor	Economic link to the euro area	Financial integration with the euro area	Fin. development and openness
Advanced country	0.88*			
Size	0.07*			
Economic risk	0.69*			
Political risk	0.87*			
Financial risk	0.05*			
NFA to GDP	0.43*			
Public debt to GDP	0.40*			
Real GDP growth correlation with euro area		0.22*		
Export to euro area/total export		0.90*		
Export to euro area/real GDP		0.88*		
Export to euro area high yield/total export		0.94*		
Export to euro area high yield/real GDP		0.69*		
Fin. integration with the euro area (Beta)			0.71*	
Fin. integration with the euro area (absolute Beta)			-0.51*	
Fin. integration with the euro area high yield (Beta)			0.31*	
Fin. integration with the euro area high yield (absolute Beta)			0.11*	
Fin. integration with the euro area (Beta), fin. sector			0.72*	
Fin. integration with the euro area (absolute Beta), fin. sector			-0.66*	
Fin. integration with the euro area high yield (Beta), fin. sector			0.45*	
Fin. integration with the euro area high yield (absolute Beta), fin sector			0.43*	
Financial openness (ext. assets and liabilities to GDP)				0.90*
Financial openness (Chinn-Ito)				0.72*
Stock market capitalisation to GDP				0.62*
Private credit to GDP				0.77*

The asterisk indicates statistical significance at the 5 per cent level.

Table 8. Analysis of transmission channels

Column (1); equity returns; (2): fin. equity returns; (3): government bond yields; (4): exchange rates

VARIABLES	(1)	(2)	(3)	(4)
Equity return, t-1	0.02			
	(0.02)			
Crisis event	-0.75***	-0.96***	-0.01***	-0.19**
	(0.26)	(0.29)	(0.00)	(0.08)
Country risk factor*crisis event	-0.08*	-0.12**	-0.02***	-0.01
	(0.04)	(0.05)	(0.00)	(0.02)
Trade openness*Crisis event	0.12*	0.12*	-0.01**	-0.00
	(0.06)	(0.07)	(0.00)	(0.02)
Trade and economic link with the euro area*Crisis event	-0.16**	-0.32***	0.01**	0.19***
	(0.07)	(0.09)	(0.00)	(0.05)
Financial integration with the euro area*Crisis event	-0.09*	-0.05	-0.00	-0.05
	(0.05)	(0.07)	(0.00)	(0.04)
Financial development and openness*Crisis event	0.07	-0.01	-0.01***	-0.11***
	(0.06)	(0.09)	(0.00)	(0.03)
Financial equity return, t-1		0.02		
		(0.02)		
Change in bond yield, t-1			-0.07***	
			(0.02)	
Exchange rate appreciation vs. euro, t-1				0.02
				(0.02)
Observations	20,102	20,102	19,210	19,376
Number of groups	23	23	22	23

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 4. The variables that are interacted with the crisis events refer to the pre-crisis period (normally 2009) and are constructed as principal components of individual country characteristics before the crisis (see Table 7 for details).

Table 9. Robustness of the analysis of the transmission channels - Equity returns

Dependent variable: Equity returns

VARIABLES	(1)	(2)	(3)	(4)	(5)
Equity return, t-1	0.02	0.02	0.02	0.03	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Crisis event	-0.75***	-0.75***	-0.77***	-0.74***	-0.71***
	(0.26)	(0.26)	(0.26)	(0.24)	(0.26)
Country risk factor*crisis event	-0.08*		-0.13***	-0.08	-0.08*
	(0.04)		(0.04)	(0.13)	(0.04)
Trade openness*Crisis event	0.12*	0.12**	0.08*	0.13**	0.12**
	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
Trade and economic link with the euro area*Crisis event	-0.16**	-0.16**		-0.16***	-0.12*
	(0.07)	(0.07)		(0.06)	(0.06)
Financial integration with the euro area*Crisis event	-0.09*	-0.09*		-0.11	-0.06
	(0.05)	(0.05)		(0.07)	(0.05)
Financial development and openness*Crisis event	0.07	0.07	0.20**		0.07
	(0.06)	(0.06)	(0.08)		(0.06)
Country risk factor (excluding public debt to GDP)*crisis event		-0.07			
		(0.04)			
Trade and economic link with the euro area high-yield*Crisis event			-0.14***		
			(0.06)		
Financial integration with the euro area high yield*Crisis event			-0.20*		
			(0.11)		
Financial openness*Crisis event				0.06	
				(0.11)	
Financial development*Crisis event				0.09	
				(0.08)	
EU non-euro area*Crisis event					-0.26*
					(0.14)
Euro peg*Crisis event					0.08
					(0.11)
Observations	20,102	20,102	20,102	15,732	20,102
Number of groups	23	23	23	18	23

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 8.

Table 10. Robustness of the analysis of the transmission channels - Financial equity returns

Dependent variable: Financial equity returns

VARIABLES	(1)	(2)	(3)	(4)	(5)
Financial equity return, t-1	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Equity return	1.07***	1.07***	1.07***	1.09***	1.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Crisis event	-0.16***	-0.16***	-0.17***	-0.12***	-0.12***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Country risk factor*crisis event	-0.03		-0.05**	0.02	-0.03
	(0.03)		(0.03)	(0.04)	(0.03)
Trade openness*Crisis event	-0.01	-0.01	-0.02	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Trade and economic link with the euro area*Crisis event	-0.15***	-0.15***		-0.10***	-0.12***
	(0.03)	(0.03)		(0.04)	(0.03)
Financial integration with the euro area*Crisis event	0.04	0.04		0.02	0.05
	(0.04)	(0.04)		(0.04)	(0.04)
Financial development and openness*Crisis event	-0.09**	-0.10***	0.05		-0.09**
	(0.04)	(0.04)	(0.03)		(0.04)
Country risk factor (excluding public debt to GDP)*crisis event		-0.02			
		(0.02)			
Trade and economic link with the euro area high-yield*Crisis event			-0.11***		
			(0.03)		
Financial integration with the euro area high yield*Crisis event			-0.15***		
			(0.04)		
Financial openness*Crisis event				-0.13***	
				(0.04)	
Financial development*Crisis event				-0.01	
				(0.04)	
EU non-euro area*Crisis event					-0.17**
					(0.08)
Euro peg*Crisis event					-0.03
					(0.09)
Observations	20,102	20,102	20,102	15,732	20,102
Number of groups	23	23	23	18	23

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 8.

Table 11. Robustness of the analysis of the transmission channels - Government bond yields

Dependent variable: Government bond yields

VARIABLES	(1)	(2)	(3)	(4)	(5)
Change in bond yield, t-1	-0.07***	-0.07***	-0.07***	-0.08***	-0.07***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Crisis event	-0.01***	-0.01***	-0.01***	-0.01	-0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Country risk factor*crisis event	-0.02***		-0.02***	-0.01**	-0.02***
	(0.00)		(0.00)	(0.00)	(0.00)
Trade openness*Crisis event	-0.01**	-0.01**	-0.01***	-0.00*	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Trade and economic link with the euro area*Crisis event	0.01**	0.01***		0.01***	0.01***
	(0.00)	(0.00)		(0.00)	(0.00)
Financial integration with the euro area*Crisis event	-0.00	-0.00		-0.00	0.00
	(0.00)	(0.00)		(0.00)	(0.00)
Financial development and openness*Crisis event	-0.01***	-0.01***	-0.01		-0.01***
	(0.00)	(0.00)	(0.00)		(0.00)
Country risk factor (excluding public debt to GDP)*crisis event		-0.02***			
		(0.00)			
Trade and economic link with the euro area high-yield*Crisis event			0.01***		
			(0.00)		
Financial integration with the euro area high yield*Crisis event			-0.01**		
			(0.00)		
Financial openness*Crisis event				-0.02***	
				(0.01)	
Financial development*Crisis event				-0.01**	
				(0.00)	
EU non-euro area*Crisis event					-0.03***
					(0.01)
Euro peg*Crisis event					0.00
					(0.01)
Observations	19,210	19,210	19,210	14,840	19,210
Number of groups	22	22	22	17	22

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 8.

Table 12. Robustness of the analysis of the transmission channels - Exchange rates

Dependent variable: Exchange rates vs. the euro

VARIABLES	(1)	(2)	(3)	(4)	(5)
Exchange rate appreciation vs. euro, t-1	0.02	0.02	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Crisis event	-0.19**	-0.19**	-0.17**	-0.34***	-0.25***
	(0.08)	(0.08)	(0.07)	(0.10)	(0.09)
Country risk factor*crisis event	-0.01		0.03	-0.18***	-0.01
	(0.02)		(0.02)	(0.06)	(0.02)
Trade openness*Crisis event	-0.00	0.00	0.01	-0.02	-0.01
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Trade and economic link with the euro area*Crisis event	0.19***	0.19***		0.03	0.14***
	(0.05)	(0.05)		(0.04)	(0.04)
Financial integration with the euro area*Crisis event	-0.05	-0.06*		-0.07*	-0.07*
	(0.04)	(0.04)		(0.04)	(0.04)
Financial development and openness*Crisis event	-0.11***	-0.13***	-0.28***		-0.12***
	(0.03)	(0.04)	(0.06)		(0.04)
Country risk factor (excluding public debt to GDP)*crisis event		0.04**			
		(0.02)			
Trade and economic link with the euro area high-yield*Crisis event			0.19***		
			(0.04)		
Financial integration with the euro area high yield*Crisis event			0.16***		
			(0.04)		
Financial openness*Crisis event				0.00	
				(0.03)	
Financial development*Crisis event				0.10***	
				(0.03)	
EU non-euro area*Crisis event					0.30***
					(0.07)
Euro peg*Crisis event					0.13**
					(0.06)
Observations	19,376	19,376	19,376	15,171	19,376
Number of groups	23	23	23	18	23

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: See notes to Table 8.