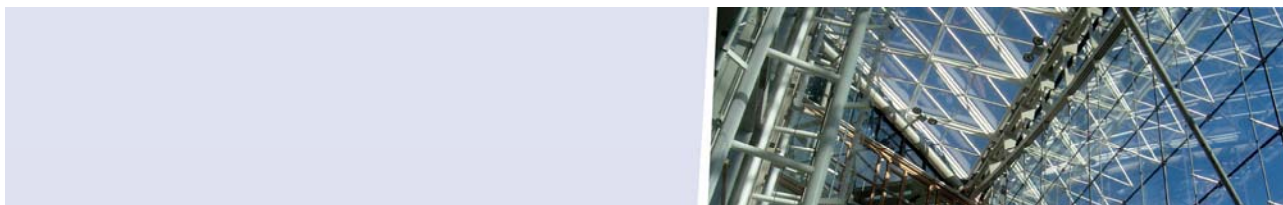




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# **Recent developments in Euro-area sovereign bond and CDS markets**

## **Part 1: Euro-bonds and systemic risk**

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**Executive summary**

Recent years have witnessed a dramatic increase in Euro-area sovereign bond spreads to the Bund. This note sheds light on the main drivers of these spreads by decomposing the bond yields into the common risk-free rate, the credit risk premium (CRP) and the liquidity risk premium (LRP). The risk-free rate is here defined as the return on a hypothetical bond that is free of credit and liquidity risk but not necessarily free of inflation or interest rate risk.

Credit risk is the most important driver of the rise in bond spreads. Yet, the CRP has increased for all issuers, including those with safe-haven status. For example, the cost of insurance against default of Germany has risen above 100 basis points, demonstrating that no country in the Euro-area is shielded from systemic risk. Systemic risk puts the Euro-area as a whole under pressure.

The issuing of debt that is guaranteed by a group of sovereigns is seen by several politicians and newspaper columnists as an additional and appropriate tool to combat the crisis. One can think of two possible ways in which Euro-bonds issued with joint and several guarantees can lead to lower funding costs: Firstly, Euro-bonds may lower systemic risk through diversification as long as the aggregate fiscal space is sufficient. Secondly, Euro-bonds may demand lower liquidity risk premiums. The obvious counter argument against Euro-bonds is that they may take away the effect of market discipline on fiscal policies. Some economists have indeed warned that Euro-bonds would not cure the fiscal problems of its weakest members, but would instead prolong their over-reliance on debt.

Whether or not issuing Euro-bonds is attractive for all depends on the empirical importance of the different types of risk premiums. One measure of systemic risk is double default risk in CDS prices, which corresponds to a simultaneous collapse of both the sovereign and the financial sector. During the sovereign debt crisis the average double default systemic risk premium was 17 and 21 basis points on 5-year and 10-year instruments, respectively. Alternative measures of systemic risk signal even more potential for yield reduction. All issuers, including the strongest countries, would benefit from the elimination of the Systemic Risk Premium (SRP). Evidently, this only holds if Euro-bonds were to be accompanied by strict fiscal discipline and improved economic governance.

The expected gain in the LRP of Euro-bonds is however marginal when compared to the LRP on the Bund but is substantial for countries that needed assistance from the IMF/EC/ECB troika. For example, at the end of 2011 almost half of the risk premium on Greek bonds consisted of liquidity risk compensation. Euro-bonds thus also have the potential to lower the LRP paid by the Euro-area members in total. An in-depth examination of the LRP shows that investors chase both credit quality and liquidity.

The non-systemic components of the CRP on Euro area sovereign bonds display very strong co-movements, even for AAA-rated borrowers. Whether or not these co-movements can be ascribed to contagion or whether they reflect structural interdependencies and home-grown imbalances will be investigated in a follow-up note.

## 1. Introduction

This note analyses recent developments in Euro-area sovereign bond and CDS markets, and discusses related topics such as systemic risk and the common Euro-bond proposal. Recent years have witnessed a dramatic increase in bond spreads. One of the objectives of this note is to shed light on the main drivers of these spreads. With this end in view, we decompose bond yields into the common risk-free rate, the credit risk premium and the liquidity risk premium. CDS prices are decomposed into the net credit risk premium, which depends on the default risk of both the insurer and the insured, and the CDS liquidity risk premium. The estimates of the different risk components are then used to test whether investors chase liquidity, credit quality, or both.

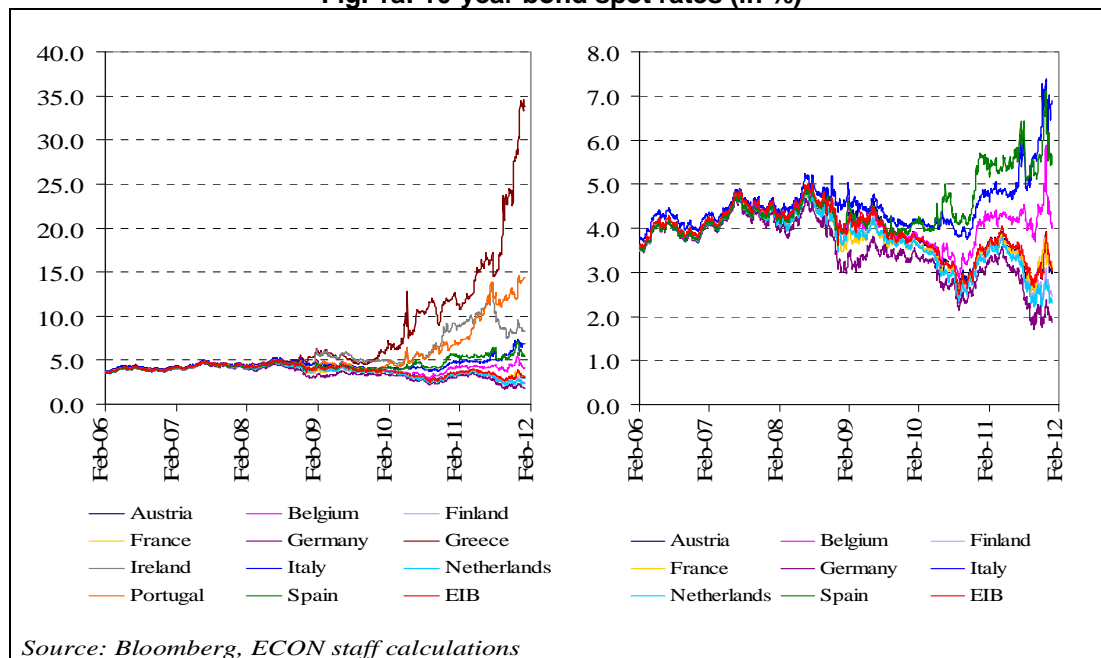
Furthermore, a systemic risk measure is derived. Both politicians and academics have argued that one important benefit of a common Euro-bond is that it will lower systemic risk, and, as a result, reduce funding cost. This note measures the empirical importance of such a premium.

The note is organised as follows: Section 2 describes the recent evolution in both bond yields and CDS prices. Then, bond yields are decomposed in Section 3. Section 4 tests for different flight hypotheses, i.e. flight-to-liquidity versus flight-to-quality. Section 5 measures systemic risk and the common Euro-bond proposal is discussed in Section 6. Section 7 concludes.

## 2. Recent developments in Euro-area bond and CDS markets

Let us begin by describing recent developments in Euro-area sovereign bond and CDS markets. Figure 1a shows 10-year bond yields between February 2006 and December 2011.<sup>1</sup> The left panel includes the 11 largest Euro-area members and the EIB. As shown by this panel, there has been a dramatic increase in bond spreads over the sample period. The difference between the German bund and the Greek bond has increased a 100-fold from around 30 basis points to more than 30 percentage points. Three countries clearly stand out: Greece, Ireland and Portugal. The fiscal and debt situation deteriorated substantially during the crisis for these countries, which have needed official assistance from the IMF/EC/ECB troika.

**Fig. 1a: 10-year bond spot rates (in %)**



<sup>1</sup> Figure 1b in the Annex shows the yield evolution of 5-year bonds. The figures show bond spot yields of large plain-vanilla fixed-coupon bonds that were corrected for maturity differences. Economic and Financial Report (EFR) 2010-05 provides further details of the bond selection and spot yield estimation.

The right panel of Figure 1 zooms into the bond yields of countries that so far have not needed official assistance. Two groups of countries can be distinguished: On the one hand, triple-A rated sovereigns and the EIB, which all have nowadays lower funding cost than before the crisis, and, on the other hand, Belgium, Italy and Spain, which last year paid substantially more than before the crisis.

**Fig. 2a: 10-year CDS prices (in b.p.)**

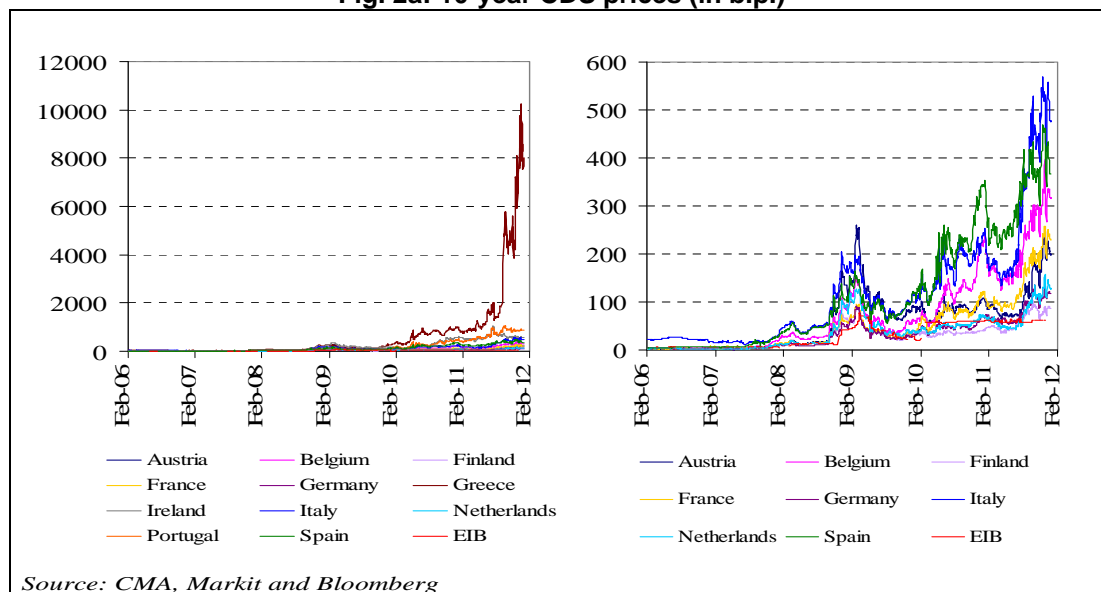


Figure 2a contains 10-year CDS prices.<sup>2</sup> It shows another dimension of the data as one can distinguish, broadly speaking, four different periods.<sup>3</sup> Each period corresponds to a different stage of the crisis. Again, Greece, Ireland, and Portugal are left out in the right panel where it is easier to see the four different periods: The first pre-crisis period goes until June 2007. The crisis began in the summer of 2007 with turmoil in the interbank and money markets. CDS prices increased considerably but from today's perspective were still rather low. This second period ended in August 2008. The crisis deepened substantially in September 2008 when the fall of Lehman Brothers and the US insurer AIG became imminent. CDS prices rose sharply and for some countries, such as Austria and Italy, exceeded 200 b.p. at the beginning of 2009. In the course of 2009, while at the height of the economic crisis, prices of default insurance started to decline until March 2010, which marks the end of the third period, which is denoted by the subprime debt crisis. Since April 2010, the Euro-area is hit by the sovereign debt crisis, which began with Greece. Strong systemic risk effects however have left traces in CDS prices of all countries. For example, at the end of 2011, German CDS prices exceeded 100 b.p. compared to about 3.5 basis points before the crisis. To summarize, four consequent periods are distinguished: the pre-crisis period, the interbank crisis, the subprime debt crisis and the euro-area sovereign debt crisis.

In order to analyse what has driven the massive increase in bond spreads and CDS prices, bond yields are decomposed in the next section.

### 3. Decomposition of bond yields

Bond yields are decomposed in three components: the common risk-free rate (CRF), the credit risk premium (CRP) and the liquidity risk premium (LRP):

$$\text{Bond yield} = \text{Common Risk-Free rate} + \text{Credit Risk Premium} + \text{Liquidity Risk Premium}$$

In general, the risk-free rate is defined as the return that can be obtained by investing in short-term financial instruments with no default risk. US treasury bills are an example. The fact that the Federal Reserve can print as much money as needed substantially reduces the risk of default. Compared to the Fed, the ECB is more

<sup>2</sup> Low variation in EIB CDS prices signals very low liquidity. These prices may not necessarily reflect actual trading opportunities. Therefore, some caution is warranted in the interpretation of these results.

<sup>3</sup> 5-year CDS prices are shown in Figure 2b of the Annex.

limited in its monetary policy options, and is not a sovereign Lender of Last Resort. There is also no comparable institution with taxing power at the EU-level. Indeed, in a monetary union with centralised (and restricted) monetary policy and decentralised tax collection, default-free instruments *de facto* do not exist. We define the common risk-free rate as the return on a *hypothetical* common bond without default and liquidity risk. Since we analyse long-term instruments, this bond however is not free of inflation and interest rate risk. Thus, in this note, risk-free only means that the instrument is free of default and liquidity risk. The CRF equals the minimum possible aggregate nominal funding costs of the Euro-area member states.<sup>4</sup>

**Fig. 3: Bund yield versus the Common Risk Free rate**

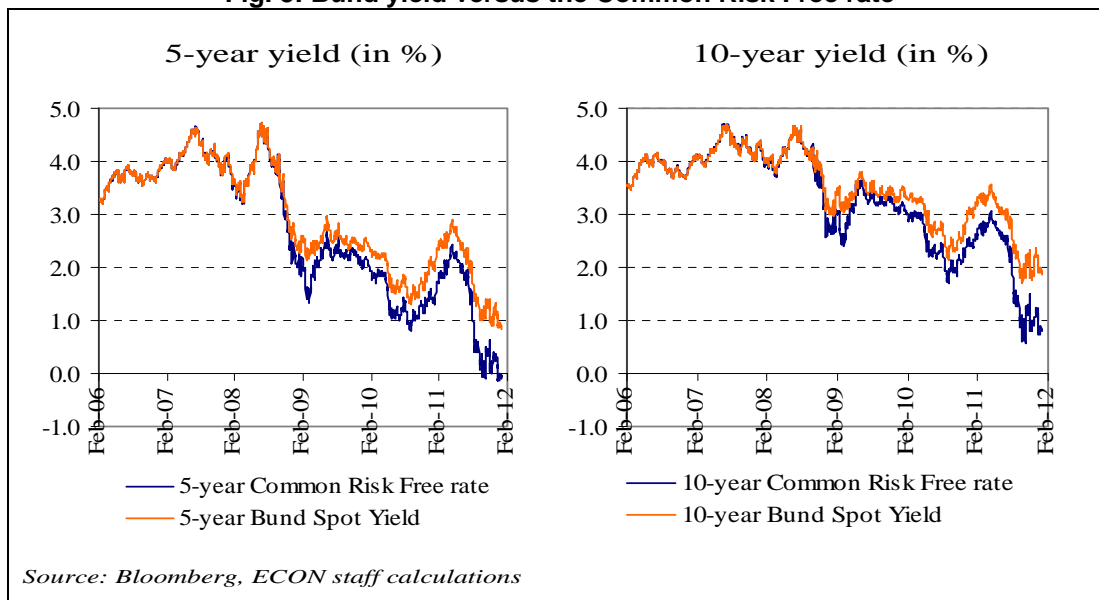


Figure 3 compares the CRF with the Bund yield. The left panel contains the 5-year yields whereas the right panel contains the 10-year yields. As is clear from this chart, since the subprime debt crisis the bund yield is no longer the same as the risk-free rate. At the moment, the risk-free rate is very low, and implies negative real rates. At the end of 2011, the 5-year rate is about zero and the 10-year rate is about 80 basis points. If inflation remains close to 2%, or goes above the inflation target, then expected risk-free real rates are negative. This does not bode well for the Euro-area economy as the risk-free rate signals the fundamental state of the economy. Part of it could reflect an over-reaction of investors who fly to safe-havens, but with a looming recession and fiscal consolidation nearly everywhere on the menu the short-term economic outlook is poor. In the US the same phenomenon is observed as inflation-linked bonds traded at negative rates, implying negative real returns.

The fall in the CRF during the crisis was largely offset by an increase in the risk premium for non-triple-A issuers. For them funding costs increased.

Bond risk premiums are decomposed into a credit risk and a liquidity risk component. Neither the Credit Risk Premium (CRP) nor the Liquidity Risk Premium (LRP) is directly observable. We assume that the LRP is proportional to current transaction cost, which are measured by the bond bid-ask spread. In theory the LRP will depend on the probability that the investor wants to liquidate its position before maturity of the bond and on the transaction cost that may occur at that time. These variables are unknown but it is reasonable to assume that investors factor in the current transaction cost. The sensitivity of the LRP to current transaction cost is allowed to vary from day to day, and is estimated by linear regression. The CRP follows once the CRF and the LRP are estimated.

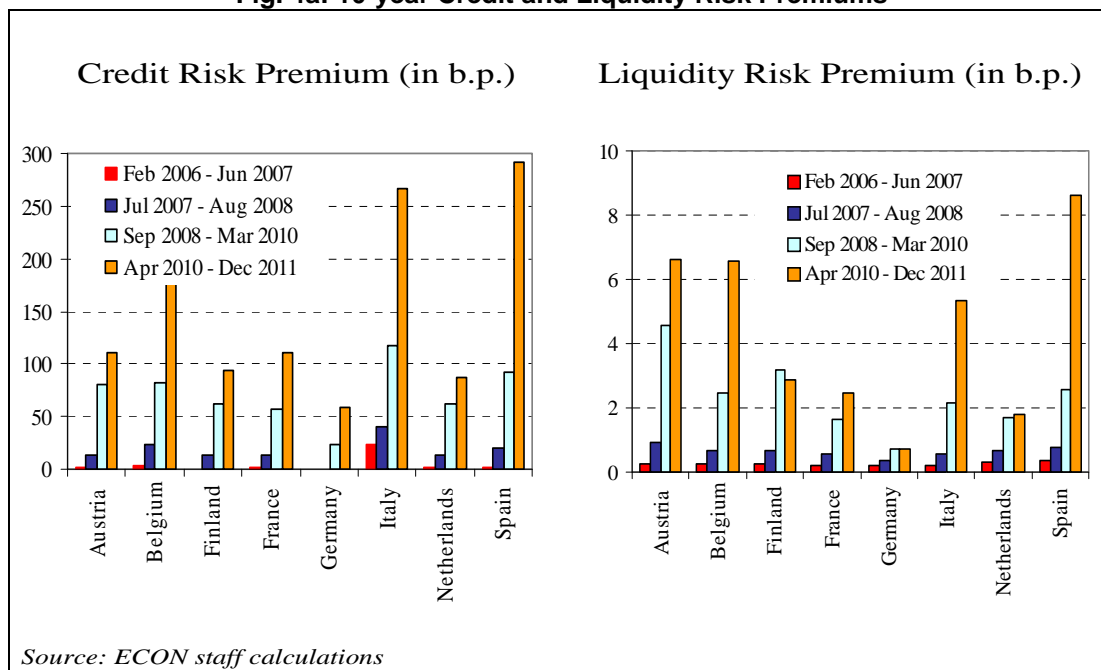
Figure 4a shows the evolution in the estimated CRP and LRP across the different stages of the crisis. Again, Greece, Ireland and Portugal are left out. The left panel contains credit risk whereas the right panel contains liquidity risk. We note that the two panels do not have the same scaling.

Credit risk is clearly dominant. For the countries shown in Figure 4a, the LRP on 10-year bonds remained on average below 10 b.p. in the four periods that we distinguished above. In contrast, for some of these countries, such as Italy and Spain, the average CRP exceeded 250 b.p. in the last period, i.e. during the

<sup>4</sup> The methodology used to estimate the CRF is explained in Economic and Financial Report (EFR) 2010-05.

sovereign debt crisis. For some countries, the CRP was thus more than 15-times as large as the LRP. Liquidity risk is more important on 5-year than on 10-year bonds.<sup>5</sup> For most issuers, 5-year LRP are more than twice as high as 10-year LRP.<sup>6</sup> However, even when liquidity risk is more important on 5-year bonds, credit risk remains the main driver of bond yields for countries that so far have not needed official assistance.

**Fig. 4a: 10-year Credit and Liquidity Risk Premiums**



The averages of Figure 4a however hide the acute crisis episode at the end of 2011, and do not show results for the assisted countries. Let us therefore look more closely at the most recent numbers. Table 1a shows the bond yield decomposition on the last trading day of 2011 for all countries. The second column contains the bond yield, which is then broken down in the CRF, the CRP, and the LRP. As indicated by the table, the LRP is much more important for Greece, Ireland and Portugal than for the other countries. For example, in the case of Greece, the LRP is almost as high as the CRP.

Furthermore, at the end of 2011, liquidity risk was non-negligible for some of the triple-A rated borrowers: For example, the LRP was 26 b.p. for Austria and 8 b.p. for France. On 5-year bonds, the French LRP exceeded 30 b.p. (see Table 1b of the Annex).

In sum, compared to the pre-crisis situation, both credit and liquidity risk have substantially increased. The CRP rose faster than the LRP for all issuers. Credit risk is thus the most important driver behind the increase in bond spreads. That said, liquidity risk also contributed to the divergence in bond yields, in particular for assisted countries.

<sup>5</sup> Figure 4b in the Annex shows the 5-year credit risk and liquidity risk premiums.

<sup>6</sup> Interestingly, the opposite holds for CDS: The 5-year CDS market is more liquid than the 10-year market (not shown by the Figure).

Table 1a: 10-year Bond yield decomposition (end 2011), in b.p.

	Moody's credit rating	Bond yield	Common risk-free rate	Credit Risk Premium (CRP)	Liquidity Risk Premium (LRP)	Systemic Risk Premium (SRP)	CRP – SRP
Austria	Aaa	302	81	195	26	105	90
Belgium	Aa3	413	81	312	20	105	208
Finland	Aaa	245	81	156	9	105	51
France	Aaa	324	81	235	8	105	130
Germany	Aaa	187	81	105	2	105	0
<b>Greece</b>	<b>Ca</b>	<b>3384</b>	<b>81</b>	<b>1739</b>	<b>1564</b>	<b>105</b>	<b>1634</b>
<b>Ireland</b>	<b>Ba1</b>	<b>835</b>	<b>81</b>	<b>654</b>	<b>100</b>	<b>105</b>	<b>550</b>
Italy	A2	690	81	583	27	105	478
Netherlands	Aaa	231	81	145	5	105	41
<b>Portugal</b>	<b>Ba2</b>	<b>1431</b>	<b>81</b>	<b>1067</b>	<b>283</b>	<b>105</b>	<b>962</b>
Spain	A1	544	81	438	25	105	334

Source: ECON staff calculations

Note: Countries in bold receive official assistance from the IMF/EC/ECB.

The Systemic Risk Premium is measured by the Credit Risk Premium on the Bund.

Liquidity and credit risk are strongly positively correlated over time, meaning that liquidity is more valued during episodes of higher aggregate risk. This raises the question whether investors chase credit quality, liquidity or both?

#### 4. Flight-to-quality and flight-to-liquidity

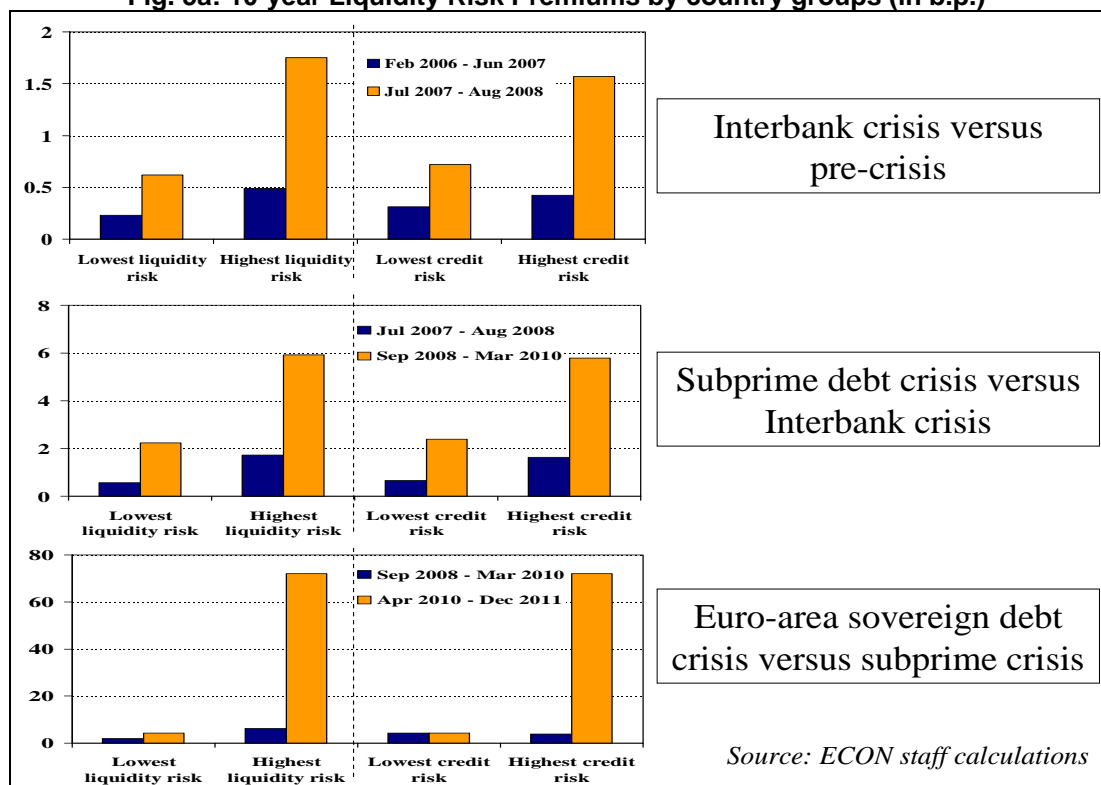
A recent study affirms that investors chase liquidity and not credit quality.<sup>7</sup> While not contesting that credit risk is more important than liquidity risk for the absolute level of the sovereign bond yields in the euro area, the authors provide some evidence for the hypothesis that, in times of market stress, investors chase liquidity, and not credit quality. The authors argue that large bond trades are almost exclusively driven by liquidity since liquidity has a positive impact on trade inflow, and a negative impact on the trade outflow, whereas credit quality has the opposite effect, suggesting a “free-from” rather than “flight-to” credit quality. Based on pre-crisis data, the study hence rejects the flight-to-quality hypothesis.

To test for the different flight hypotheses, we analyse what happens to liquidity risk premiums rather than to trade flows. One can expect a significantly larger increase in the LRP of bonds that are deserted by investors than on safe-haven bonds. The sample of twelve issuers is divided twice in two sub samples. In the first comparison, the average liquidity risk of the six issuers with the lowest *ex ante* liquidity risk is compared with the six issuers with the highest *ex ante* liquidity risk. In the second comparison, the average liquidity risk of the six issuers with the lowest *ex ante* credit risk is compared with the liquidity risk of the six issuers with the highest *ex ante* credit risk. The two comparisons are different because the issuers of the sample with lowest liquidity risk issuers are not necessarily the same as the sample with lowest credit risk issuers (see the notes of Figure 5a).

While the cross-sectional relationship between the liquidity risk premium and credit risk premium is not one-to-one, countries with lower liquidity risk yet tend to have lower credit risk. For example, Dutch, French, and German bonds have both the lowest liquidity and credit risk. On the other side, both liquidity and credit risk are relatively high on Irish and Greek bonds. EIB bonds are rather exceptional in the sense that they have the highest liquidity risk but, at the same time, are among the group of lowest credit risk issuers. At the beginning of the sample period, Italy was exceptional as it had low liquidity risk but high credit risk.

<sup>7</sup> See Beber, Brandt and Kavajecz, 2009, Review of Financial Studies, vol. 22, pp. 925-957.

**Fig. 5a: 10-year Liquidity Risk Premiums by country groups (in b.p.)\***



\* Groups are selected on *ex ante* liquidity risk or *ex ante* credit risk:

Lowest *ex ante* liquidity risk:

- (i) Pre-crisis (February 2006 – June 2007): Austria, Belgium, France, Germany, Greece, and Italy
- (ii) Interbank crisis (July 2007 – August 2008): Belgium, France, Germany, Greece, Italy and Netherlands
- (iii) Subprime debt crisis (September 2008 – March 2010): Belgium, France, Germany, Italy, Netherlands and Spain

Lowest *ex ante* credit risk:

- (iv) Pre-crisis (February 2006 – June 2007): Finland, France, Germany, Ireland, Netherlands and Spain
- (v) Interbank crisis (July 2007 – August 2008): Austria, Finland, France, Germany, Netherlands and Spain
- (vi) Subprime debt crisis (September 2008 – March 2010): Austria, Finland, France, Germany, Netherlands and EIB

Figure 5a demonstrates for both comparisons that liquidity risk on 10-year bonds increases faster for the group with the highest risk, were it liquidity risk or credit risk, suggesting that investors chase both liquidity and credit quality.<sup>8</sup> The chart is organised as follows. First, there are three crisis stage comparisons. In the upper panel, the interbank crisis period is compared to the pre-crisis period. In the middle panel, the subprime debt crisis is compared to the interbank crisis, and in the bottom panel, the Euro-area sovereign debt crisis is compared to the subprime debt crisis. Second, in the parts on the left of the dashed lines, the sample is divided in *ex ante* low liquidity risk and *ex ante* high liquidity risk. For example, in the upper chart, the blue bar at the left-end shows the 10-year LRP of the 6 borrowers with the lowest liquidity risk before the crisis. The orange bar at its immediate right shows the liquidity risk of these borrowers in the period after. The next blue and orange bars show the LRP of the group of borrowers with the highest *ex ante* liquidity risk before the crisis.

As shown by the areas to the left of the dashed lines, the LRP increased much faster for the group of *ex ante* highest liquidity risk borrowers compared to the group of *ex ante* lowest liquidity risk borrowers.

The parts on the right of the dashed lines also show the change in the LRP, but here the issuers are grouped according to their *ex ante* credit risk. It is interesting to observe that in the right bottom panel, which compares the sovereign debt crisis with the subprime debt crisis, the LRP does not change for the lowest credit risk borrowers while it increases significantly for the highest credit risk borrowers.

<sup>8</sup> Figure 5b in the Annex shows the LRP comparisons on 5-year bonds.



In sum, Figure 5a clearly shows that the liquidity risk premium increases much faster for both *ex ante* high credit risk and *ex ante* high liquidity risk borrowers. Hence, both high liquidity risk bonds and high credit risk bonds have become less attractive in comparison to low liquidity and low credit risk bonds respectively. Investors thus chase both liquidity and credit quality.

## 5. Systemic risk

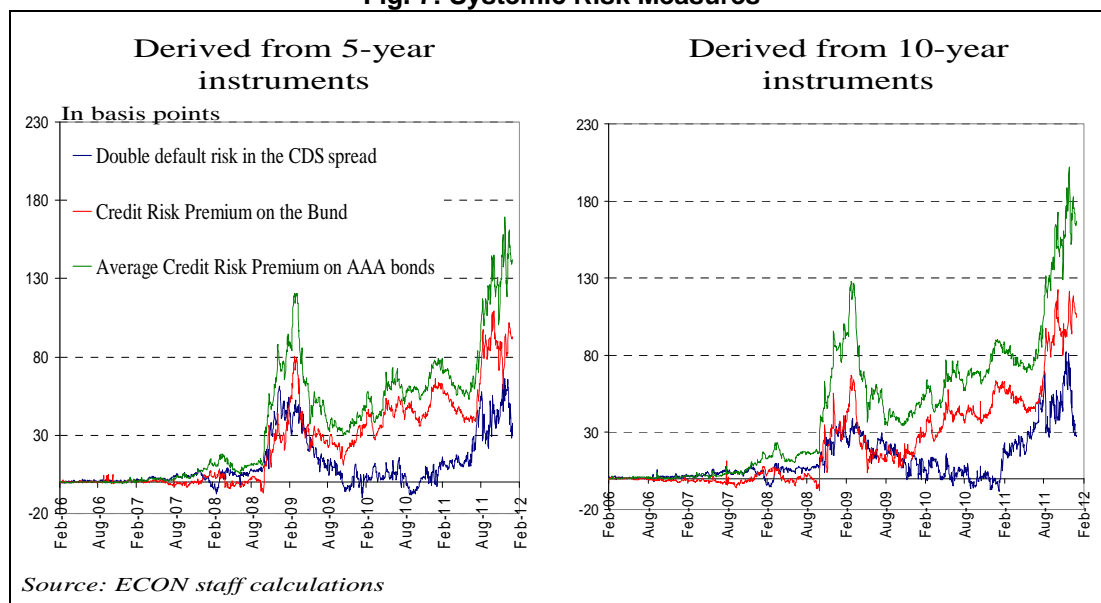
The next topic is systemic risk. Systemic risk is the risk of collapse of an entire financial system, as opposed to risk associated with any one individual entity of a system. It refers to the risk imposed by interdependencies in a system, where the failure of a single entity or cluster of entities can cause a cascading failure, which could potentially bankrupt or bring down the entire system. While an in-depth analysis of systemic risk is beyond the scope of this note, it is worthwhile looking at different measures of systemic risk.

Our first measure of systemic risk is double default risk contained in CDS prices, and corresponds to a simultaneous collapse of both the sovereign and the financial sector. Double default risk is priced in the CDS of most countries. CDS prices are thus lower than one could expect in a situation in which there is no double default risk. The double default risk premium follows once the CRP on the bond and the LRP on the CDS are estimated:

$$\text{Double default risk premium} = \text{CRP} + \text{CDS Liquidity Risk Premium} - \text{CDS price}$$

One caveat is worth mentioning. Voluntary Private Sector Involvement (PSI) in debt restructuring reduces the probability of default (i.e. breaking of contracts), and may lead to a lower CDS price. To the extent that the cost of debt restructuring is still priced in the CRP on the bond, the left-hand side variable of the equation may over-estimate systemic risk. It is not straightforward to correct for a change in perception of the CDS.

**Fig. 7: Systemic Risk Measures**



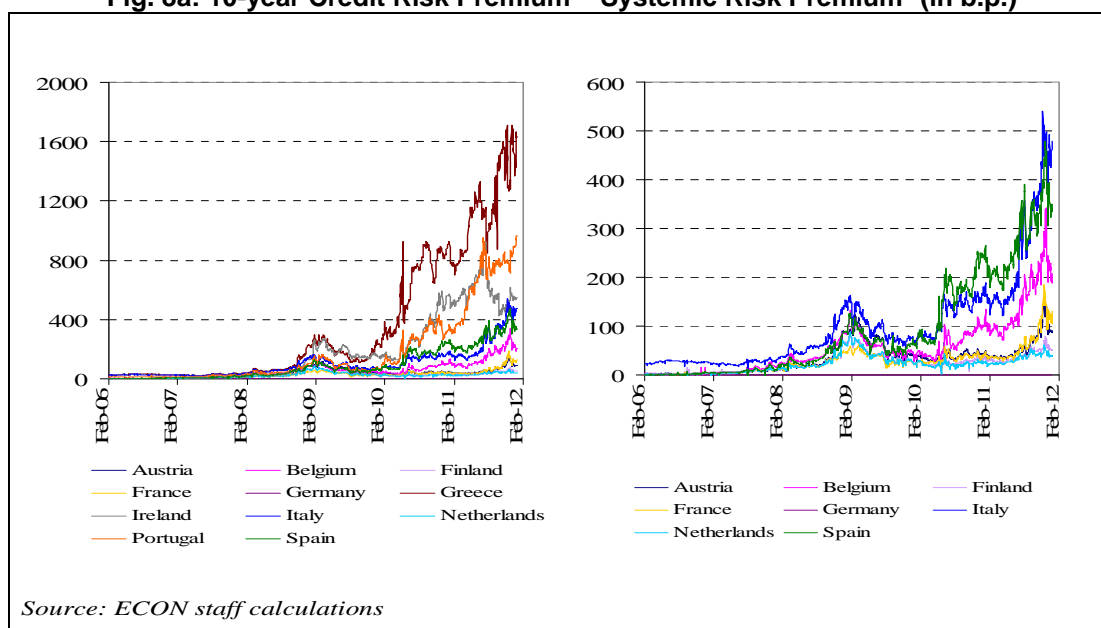
In this note, the systemic risk measure based on double default is computed as the median of the double default risk premiums contained in the countries' CDS prices, and is shown by the blue lines of Figure 7.<sup>9</sup> The left panel contains systemic risk measures derived from 5-year instruments whereas the right panel contains systemic risk measures derived from 10-year instruments. Other systemic risk measures could be considered, such as the CRP on the Bund (red lines of Figure 7) or the average CRP of triple-A countries (green lines). It is difficult to envisage a situation in which Germany defaults without systemic consequences. The double default measure is most of the time below the other two measures as it takes into account the simultaneous collapse of the financial sector.

<sup>9</sup> Greece, Ireland, and Portugal are excluded as CRP on off-par bonds can be far from the CDS price even in the absence of double default and liquidity risk.

All three systemic risk measures in Figure 7 show the same pattern, making it unlikely that the PSI is the only story behind the increase in our double default risk measure. Systemic risk was higher at the end of 2011 than during the height of the subprime debt crisis. The most severe crisis measure, i.e. including default of the financial sector, reached about 80 b.p. last November. Since the sovereign debt crisis, the German CRP lies between the other two measures and is close to the common component in the CRP of AAA-rated countries (not shown in Figure 7). The Systemic Risk Premium (SRP) based on the Bund CRP can therefore be interpreted as a measure of the simultaneous default of Euro area sovereigns.

The systemic risk measures in Figure 7 do not necessarily adequately capture the extent of financial contagion in the Euro area. Financial contagion refers to a scenario in which small shocks, which initially affect only a few financial institutions or a particular region of an economy, spread to the rest of financial sectors and other countries whose economies were previously healthy, in a manner similar to the transmission of a medical disease. Co-movement is not necessarily an indication of financial contagion as there are strong interdependencies between Euro area countries and many were in unhealthy fiscal situations already before the crisis began.<sup>10</sup>

**Fig. 8a: 10-year Credit Risk Premium – Systemic Risk Premium\* (in b.p.)**



\* Note: The Systemic Risk Premium is measured by the Credit Risk Premium on the Bund.

In a follow-up note financial contagion will be considered in greater depth. A first shot at the issue however is given in Figure 8a, which shows the difference between the (10-year) CRP and the SRP (based on the Bund CRP). As above, Greece, Ireland, and Portugal are left out in the right panel. Results for 5-year bonds are shown in Figure 8b of the Annex. Interestingly, the CRP adjusted for SRP still display very strong co-movements, even for AAA-rated borrowers. Whether or not these co-movements in the non-systemic component of the CRP can be ascribed to contagion will be investigated in a follow-up note.

This brings us to discussing common Euro-bonds as Euro-bonds may insulate countries from financial contagion and therefore lower systemic risk.

<sup>10</sup> Forbes and Rigobon define financial contagion as a significant increase in cross-market linkages after a shock to one country (or group of countries). See, the Journal of Finance, 2002, "No Contagion, Only Interdependence: Measuring Stock Market Comovements", Vol. 57, No. 5, pp 2223 – 2261.

## 6. Common Euro-bond

The issuing of debt that is guaranteed by a group of sovereigns is seen by several politicians and newspaper columnists as an additional and appropriate tool to combat the crisis. Academic scholars have also brought forward several arguments in favour of common Euro-bonds. The opposite camp is equally vocal in raising their concerns. Not surprisingly, at this point there is no consensus about the desirability of common Euro-bonds and their political feasibility remains even less clear. Different names have been used to indicate common Euro-bonds. The European Commission employs the term stability bonds in their Green Paper released just before Christmas.

Common Euro-bonds may have many advantages. They may (i) foster financial market integration, (ii) facilitate the transmission of monetary policy, (iii) deepen capital markets, (iv) reinforce financial stability, (v) and, perhaps most importantly, reduce the funding costs of the euro-area members.

One can think of two possible ways in which Euro-bonds issued with joint and several guarantees can lead to lower funding costs: Firstly, Euro-bonds may lower systemic risk through diversification as long as the aggregate fiscal space is sufficient. Secondly, Euro-bonds may demand lower liquidity risk premiums. The obvious counter argument against Euro-bonds is that they may take away the effect of market discipline on fiscal policies. Some economists have indeed warned that Euro-bonds would not cure the fiscal problems of its weakest members, but would instead prolong their over-reliance on debt.

Whether or not issuing Euro-bonds is attractive for all depends on the empirical importance of the different types of risk premiums. Some researchers argue that German Bunds do not suffer from a lack of liquidity, and thus higher costs compared to US treasuries.<sup>11</sup> In its Green Paper, the EC estimates that the gain in the LRP would have been 7 basis points for Germany and 17 b.p. for triple-A and double-A rated issuers on average if Euro-area sovereigns would have issued common Euro-bonds in 2011. The results of this note indicate that the gain in the LRP would be smaller for non-assisted countries and marginal for Germany but substantially higher for assisted countries. For example, the average LRP on Greek, Irish and Portuguese 10-year bonds was, respectively, 249, 68, and 95 basis points during the Euro-area sovereign debt crisis. The LRP on 5-year bonds were nearly twice as high as these numbers. Therefore, Euro-bonds have the potential to considerably lower the aggregate liquidity risk premium paid by Euro-area members. Compensatory payments between states could redistribute the associated gains.

Perhaps the most important gain can be expected to come from lower systemic risk. During the sovereign debt crisis the average systemic risk premium based on double default risk in CDS prices was 17 and 21 basis points on 5-year and 10-year instruments, respectively. Alternative measures of systemic risk signal even more potential for yield reduction. All issuers, including the strongest countries, would benefit from the elimination of the SRP. Evidently, this only holds if Euro-bonds were to be accompanied by strict fiscal discipline and improved economic governance.

The credit risk premium on common bonds can only be lower than the default premium on the debt of the strongest countries if the probability of common bond default is lower. This is the case only if available fiscal space in all participating countries together is greater than the likely size of default and if countries' commitment to use their fiscal space is beyond doubt. It is not at all clear that these conditions are fulfilled at current time.

## 7. Conclusions

To conclude, the long-term risk-free rate is no longer equal to the Bund yield. Current risk-free rates imply negative real returns, reflecting the poor economic outlook for the Euro-area. Bund yields are above the risk-free rate because investors demand a significant credit risk premium on German debt. The cost of insurance against default of Germany has risen above 100 basis points, demonstrating that no country in the Euro-area is shielded from systemic risk. Systemic risk puts the Euro-area as a whole under pressure. Our systemic risk measure based on double default risk (associated with the collapse of both the financial and sovereign sector) indicates that systemic risk was higher at the end of 2011 than at the height of the subprime debt crisis in 2008.

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<sup>11</sup> See Favero and Missale, 2011, CEPR Discussion Paper Series, no. 8637.

Euro-bonds issued with joint and several guarantees have the potential to reduce this systemic risk component in the cost of funding of all Euro-area issuers, including the strongest countries, if the necessary pre-condition of fiscal discipline is put in place and economic governance is improved.<sup>12</sup> One may question however whether such instrument should be temporary or permanent, and whether it requires a re-definition of ECB roles as well, notably regarding the sovereign Lender of Last Resort function.

Credit risk is the most important driver of the rise in bond spreads. For most countries, only a relatively small part of their credit risk is systemic. High yield countries would benefit from a lower yield and credit risk on the Euro-bond. The strongest countries however could be disadvantaged if investors were to question the size of committed aggregate fiscal capacity and if Euro-bonds were expected to harm fiscal discipline. On the other hand, countries can only welcome higher yields if the rise in returns was mainly driven by a higher risk-free rate, and hence improved economic conditions.

The expected gain in the liquidity risk premium of Euro-bonds is marginal when compared to the LRP on the Bund but is substantial for assisted countries. For example, at the end of 2011 almost half of the risk premium on Greek bonds consisted of liquidity risk compensation. Euro-bonds thus also have the potential to lower the liquidity risk premium paid by the Euro-area members in total.

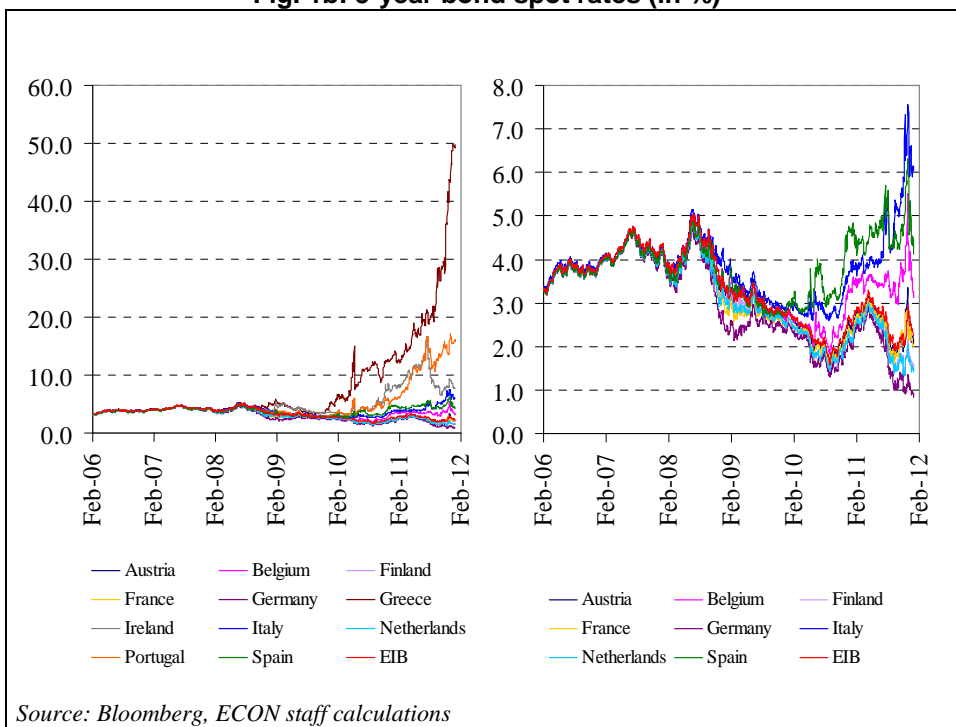
An in-depth examination of the LRP reveals that investors chase both credit quality and liquidity. Our results show that the liquidity risk premium increases much faster for both *ex ante* high credit risk and *ex ante* high liquidity risk borrowers. Hence, both high liquidity risk bonds and high credit risk bonds have become less attractive in comparison to low liquidity and low credit risk bonds respectively.

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<sup>12</sup> Euro-bonds are not to be confused with the so-called Europe 2020 Project Bond Initiative that provides EU support to project companies issuing bonds to finance large-scale infrastructure projects.

Annex

**Fig. 1b: 5-year bond spot rates (in %)**



**Fig. 2b: 5-year CDS prices (in %)**

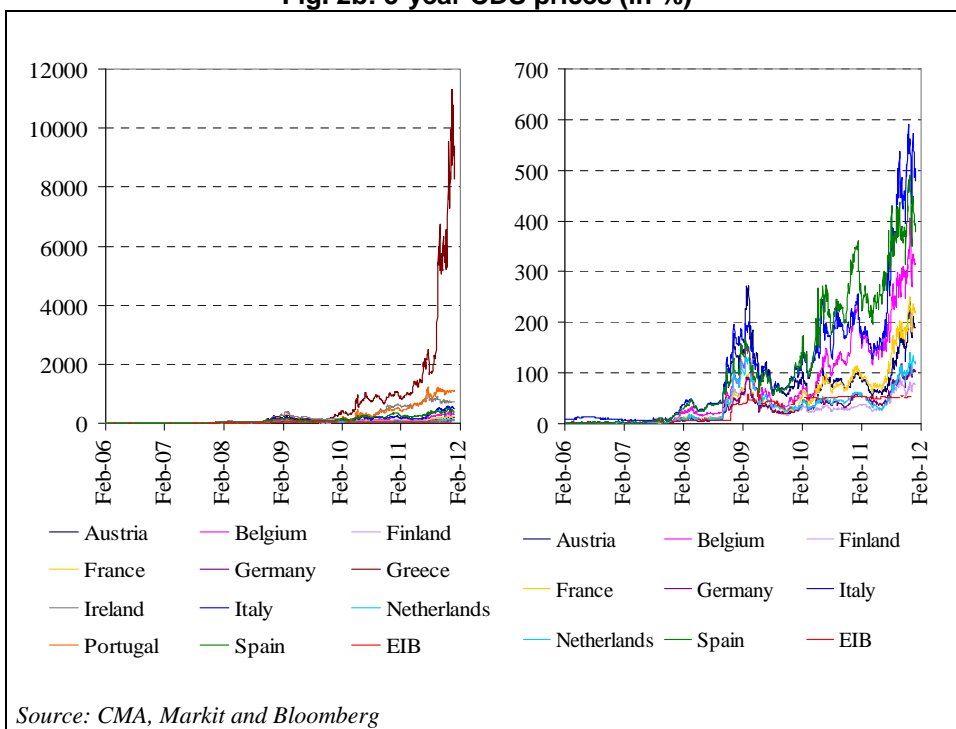


Fig. 4b: 5-year Credit and Liquidity Risk Premiums

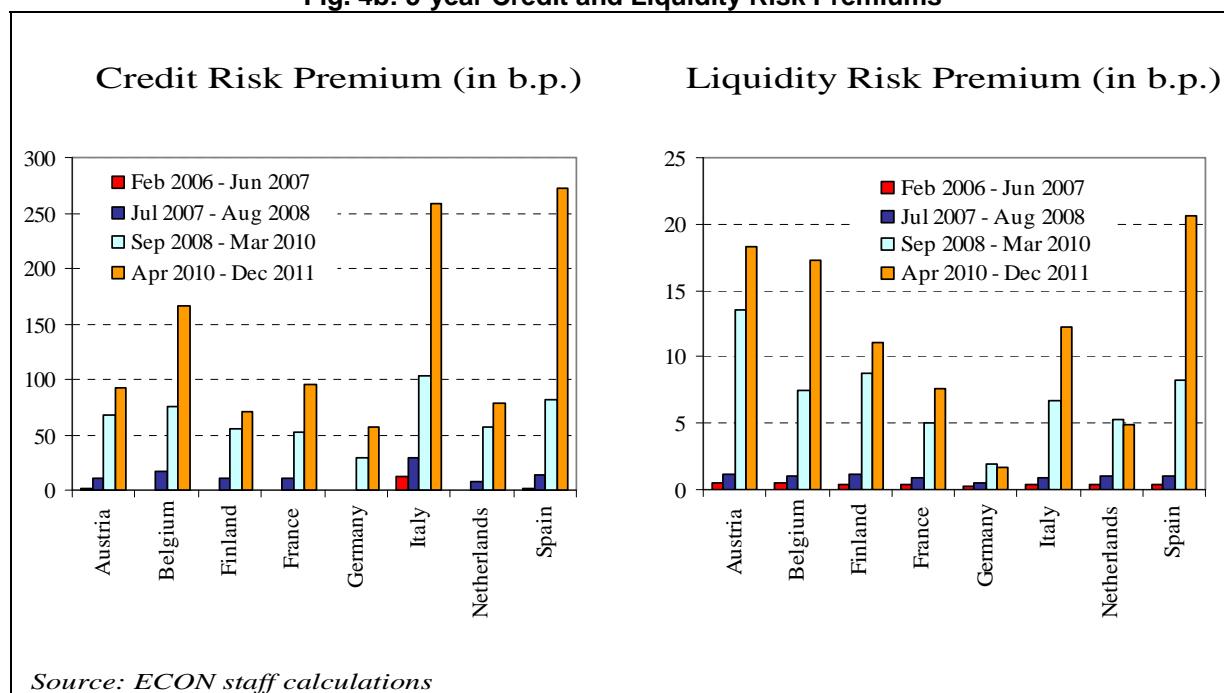


Table 1b: 5-year Bond yield decomposition (end 2011), in b.p.

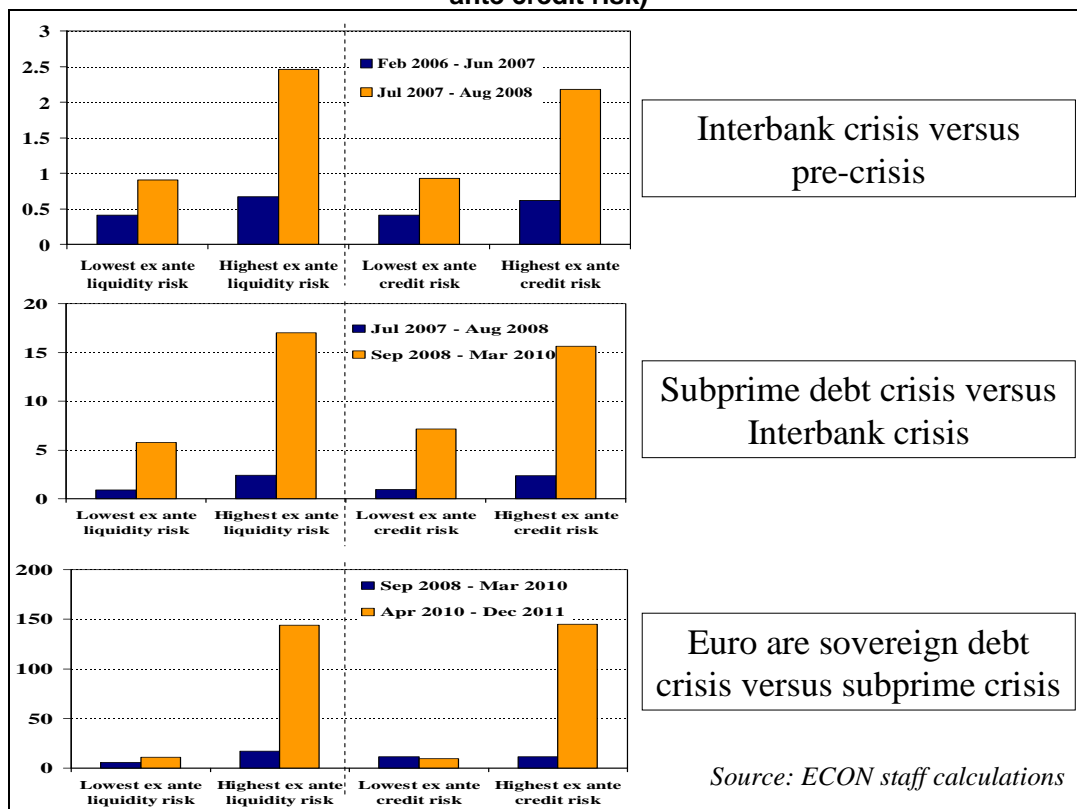
	Moody's credit rating	Bond yield	Common risk-free rate	Credit Risk Premium (CRP)	Liquidity Risk Premium (LRP)	Systemic Risk Premium (SRP)	CRP – SRP
Austria	Aaa	206	-11	166	51	92	74
Belgium	Aa3	326	-11	285	52	92	193
Finland	Aaa	151	-11	133	29	92	42
France	Aaa	206	-11	184	33	92	92
Germany	Aaa	84	-11	92	3	92	0
<b>Greece</b>	<b>Ca</b>	<b>4982</b>	<b>-11</b>	<b>2575</b>	<b>2417</b>	<b>92</b>	<b>2484</b>
<b>Ireland</b>	<b>Ba1</b>	<b>762</b>	<b>-11</b>	<b>558</b>	<b>214</b>	<b>92</b>	<b>467</b>
Italy	A2	602	-11	571	42	92	479
Netherlands	Aaa	142	-11	138	15	92	46
<b>Portugal</b>	<b>Ba2</b>	<b>1587</b>	<b>-11</b>	<b>1104</b>	<b>494</b>	<b>92</b>	<b>1012</b>
Spain	A1	414	-11	371	53	92	280

Source: ECON staff calculations

Note: Countries in bold have received official assistance from the IMF/EC/ECB

The Systemic Risk Premium is measured by the Credit Risk Premium on the Bund.

**Fig. 5b : 5-year Liquidity Risk Premiums by country groups (selected on ex ante liquidity risk or ex ante credit risk)**



Interbank crisis versus pre-crisis

Subprime debt crisis versus Interbank crisis

Euro area sovereign debt crisis versus subprime crisis

Source: ECON staff calculations

\* Groups are selected on ex ante liquidity risk or ex ante credit risk:

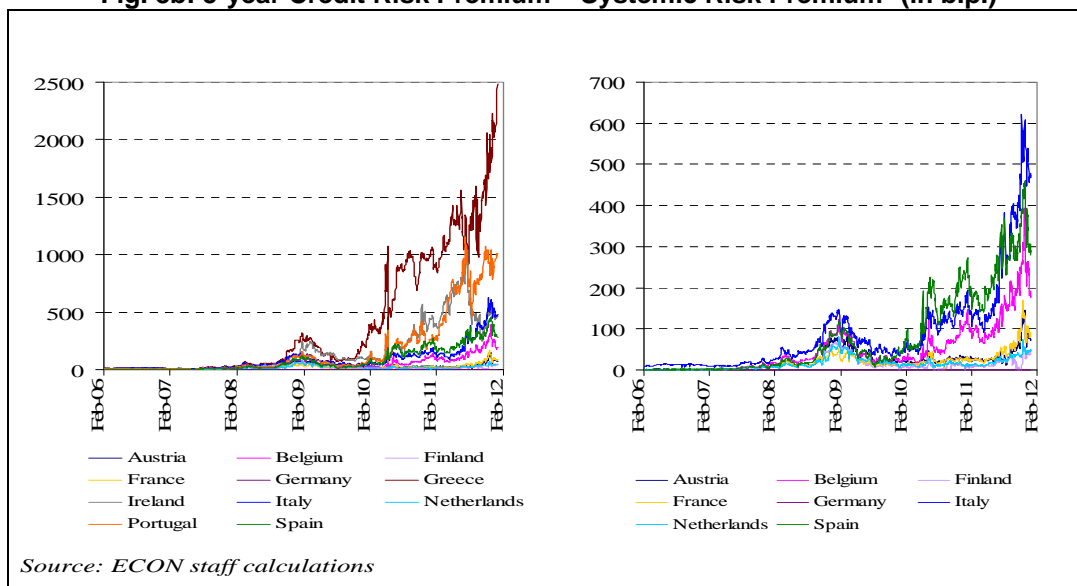
Lowest ex ante liquidity risk:

- (i) Pre-crisis (February 2006 – June 2007): France, Germany, Greece, Italy, Netherlands and Spain
- (ii) Interbank crisis (July 2007 – August 2008) and Subprime debt crisis (September 2008 – March 2010): Belgium, France, Germany, Italy, Netherlands and Spain

Lowest ex ante credit risk:

- (iii) Pre-crisis (February 2006 – June 2007): Belgium, Finland, France, Germany, Ireland and Netherlands
- (iv) Interbank crisis (July 2007 – August 2008): Austria, Finland, France, Germany, Netherlands and Spain
- (v) Subprime debt crisis (September 2008 – March 2010): Austria, Finland, France, Germany, Netherlands and EIB

**Fig. 8b: 5-year Credit Risk Premium – Systemic Risk Premium\* (in b.p.)**



Source: ECON staff calculations

\* Note: The Systemic Risk Premium is measured by the Credit Risk Premium on the Bund