

From late April 2011, amid speculation about the possibility of Greek sovereign debt restructuring, the Greek government bond yield curve inverted (see also Chart 2.14 in Section 2) and bonds tended to trade on a price rather than a yield basis, reflecting expectations of the recovery rate.

Adverse government bond price dynamics have been further exacerbated by credit rating changes for sovereign and bank bonds. In 2011 the credit ratings of euro area sovereigns under stress have been downgraded, which has triggered quasi-automatic bond sales by rating-constrained investors.

At the same time, a sequence of increases in haircuts applied by the international CCP for repo transactions collateralised with bonds issued by the Irish and Portuguese governments, while fully justified from a prudent risk management point of view after the bond spreads exceeded certain thresholds, have reduced the attractiveness of holding such bonds by prompting banks that extensively used such bonds to obtain private repo funding to resort to the ECB refinancing operations with relatively lower haircuts. Furthermore, it is also noteworthy that the same CCP imposes an additional initial margin call on members that reach the next-to-speculative-grade credit rating, meaning that some banks from the euro area countries under stress might be particularly affected if their credit ratings were to be downgraded as a result of the downgrading of the domestic government.

In addition, the new details with respect to the functioning of the European Stability Mechanism (ESM) that were unveiled in late March 2011 received mixed feedback from market participants and even contributed to some downgrades by credit rating agencies. While the announced measures were seen as helpful in that they might prevent a future crisis, they were also judged by some market participants as falling short of resolving the current crisis by raising the probability that sovereign debt restructuring might eventually occur for some countries under stress which were considered as likely candidates to request ESM support after its start in 2013. This partly stemmed from announcements suggesting that sovereign debt restructuring may accompany borrowing from the ESM. Moreover, the fact that senior unsecured government debt will be subordinate to ESM loans was also perceived as another negative factor for the prices of lower-rated euro area government bonds.

However, it is noteworthy that market participants increasingly viewed Spain as capable of withstanding macro-financial pressures and this higher confidence had a very positive impact on activity in the Spanish government bond market. The impact on euro area government bond spreads of speculation about the possibility of Greek sovereign debt restructuring that intensified in late April 2011 has been largely confined to government bond spreads of euro area countries with EU/IMF programmes (see also Chart 2.14, Chart 3.4 and Box 5).

#### Box 5

#### COMMON TRENDS IN EURO AREA SOVEREIGN CREDIT DEFAULT SWAP PREMIA

The tensions in euro area sovereign debt markets are currently considered one of the major risk factors for financial stability. Looking back at the developments in euro area sovereign credit spreads since 2008, one may distinguish two different types of driving forces. First, there are “common factors”, such as investors’ risk aversion that tends to lift all credit spreads for a given perceived “amount” of credit risk. In a similar fashion, a worsening global macroeconomic outlook would tend to increase all spreads – albeit likely to a varying extent – via the expected adverse impact on a country’s public expenditures and tax base. Second, there are country-specific

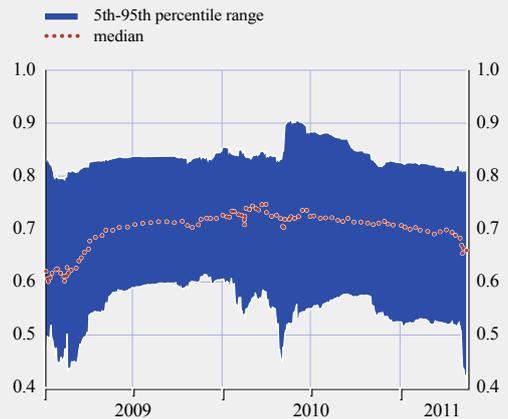
influences such as political developments or the sudden requirement to support certain financial institutions. Such country-specific developments have the potential to change investors' outlook concerning the success of fiscal consolidation and thereby affect the respective country's sovereign credit spreads. If country-specific influences are more (less) important than common factors, the correlation between different countries' sovereign credit spreads would tend to be low (high). This box attempts to quantify these aspects: it measures the tightness of co-movement across euro area sovereign credit spreads and sets out to gauge the relevance of common driving forces versus idiosyncratic influences.

As shown in Chart A, there has been a tight connection among sovereign credit spreads (measured as five-year credit default swap (CDS) premia) of the eleven euro area countries considered.<sup>1</sup> For a moving window of 260 business days, all (i.e. 55) pair-wise correlations of daily changes in CDS premia were computed. The chart shows the median of those correlations, together with their 5th and 95th percentiles. Average correlations turn out to be as high as 0.7. Moreover, even the 5th percentile of country pairs is still showing a correlation above 0.5 most of the time, and the highest pair-wise correlations (95th percentile) are ranging around 0.8. In addition, since mid-2009, correlations have been remarkably stable over time. One notable exception is observed around May 2010, when the sovereign debt crisis reached a peak in intensity: during the week of 7 May 2010 some spreads rose to exceptionally high levels, which was followed by the introduction of the European Financial Stabilisation Mechanism, the European Financial Stability Facility and the ECB's Securities Markets Programme, sending spreads down considerably in the following days.<sup>2</sup> Another slight drop in the median and a discernible decrease in the 5th percentile figure are observed in Chart A at the end of the sample, which is due to the disproportionately large increase in Greek CDS premia in April 2011.<sup>3</sup> Overall, however, the results suggest that there has been a bundle of common driving forces that induced even daily changes in sovereign CDS premia to move fairly synchronously.

In order to shed some more light on the relative importance of common versus idiosyncratic influences on sovereign credit spreads, a principal component analysis – examining the potential for common driving forces – was conducted. The first two principal components were extracted from standardised daily changes in sovereign CDS premia. With the aim of quantifying the proportion of variance explained by common factors, the individual CDS premia were regressed on the first principal component, and alternatively on the first two principal components. This

**Chart A Time-varying correlation between pairs of euro area sovereign CDS premia**

(Jan. 2009 – May 2011; senior debt; five-year maturity)



Sources: Thomson Reuters and ECB calculations.

Notes: For eleven euro area countries, all 55 pair-wise correlations between daily changes of sovereign CDS premia are computed over moving windows of 260 business days.

1 The countries included in the analysis are those with a long time series for CDS premia available, namely Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

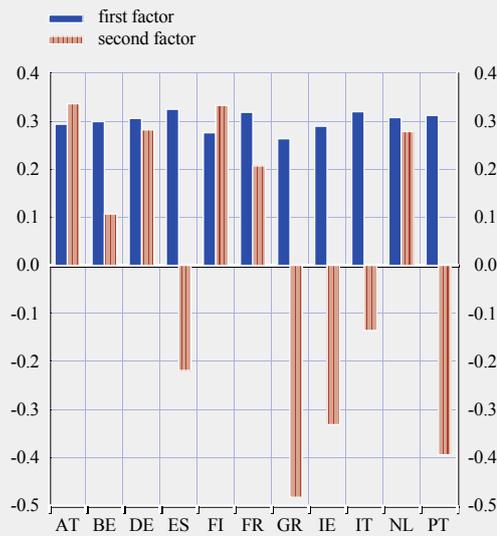
2 This period of extreme turbulence implied that there were country pairs with negatively correlated spread movements and others that showed strong simultaneous jumps. These effects are "averaged out" through the moving-window analysis, but still leave their traces in the trajectory of extreme correlation pairs (5th and 95th percentiles in Chart A).

3 In fact, looking at the individual pair-wise correlations, it turns out that it is primarily the low correlations of Greek CDS premia changes with those of other countries that are behind the described decrease in summary measures of correlation.

exercise was performed over three different sub-samples: from January to September 2008 (first bouts of moderate increases in sovereign spreads), from October 2008 to March 2010 (perceived risk transfer from the financial to the public sector, followed by strong volatility), and from April 2010 to late May 2011 (most recent period). For the last two sub-periods, it turns out that the first principal component alone already accounts for between 55% and 84% (depending on the country) of the variance of daily changes in CDS premia. The average variance proportion captured across countries amounts to 70%. Adding a second factor raises the proportion of variance explained to magnitudes between 69% and 91% depending on the country and to almost 80% on average across countries. Only for the first three quarters of 2008, during which variation in CDS premia was much more subdued, was the importance of common factors relative to idiosyncratic (i.e. country-specific) influences smaller (36% on average with one factor, and 60% on average with two factors).

**Chart B Coefficients in regressions of euro area sovereign CDSs on first two principal components**

(Apr. 2010 – May 2011)



Sources: Thomson Reuters and ECB calculations.

Notes: For eleven euro area countries, the first two principal components are drawn from the time series of standardised daily changes in sovereign CDS premia. The bars depict the loadings (regression coefficients) of the standardised CDS premia on the two principal components.

These two factors could probably be thought of as representing a bundle of influences that jointly drive the whole set of country credit spreads or at least the spreads of certain groups of countries. By design, the principal component analysis cannot be used to single out specific economic driving forces. At the same time, it comes with the advantage of being robust against the choice of specific variables to explain spread variation. Moreover, one can still give some interpretation to the role of the factors by looking at their “loadings”, i.e. the coefficients in regressions of individual CDS premia on the factors. Chart B displays these loadings for the first and second factor as estimated for the most recent sub-period. The coefficients are all positive for the first factor; hence it could be labelled an “overall crisis factor” as its increase tends to lift CDS premia of all countries. The second factor is a discriminatory factor that loads with different signs on CDS premia of euro area countries perceived by market participants as exhibiting higher sovereign risk.<sup>4</sup> That is, whenever this factor moves down, CDS premia of countries with high perceived sovereign risk would rise, while those of the remaining countries would tend to decrease.

Summing up, this statistical analysis of sovereign CDS premia has shown that the relevance of common driving forces has been high since end-2008: the daily ups and downs of sovereign credit spreads in major euro area countries tend to point in the same direction. A single common factor explains the bulk of spread movements, but a second factor that discriminates between countries viewed as having higher sovereign risk and other euro area countries has been found to be likewise important.

<sup>4</sup> Recall that the analysis is conducted based on standardised CDS premia, so one would need to scale back with the respective standard deviations to obtain the absolute effect of a change in the factors on the CDS premia in their original measurement units.