No. 1 | 2009

Economic commentaries

Higher risk premiums on government debt

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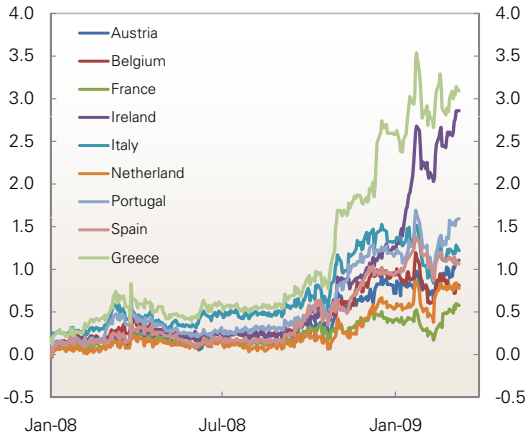
Higher risk premiums on government debt

In this commentary we examine liquidity and credit premiums in euro-area government securities markets. For countries with a common currency and monetary policy, differences in government bond yields largely reflect different risk premiums across countries. The tendency is that higher government debt, higher government budget deficits, weaker current account balances, lower credit ratings and higher credit premiums have resulted in higher government bond yields in the euro area.

The global financial crisis and downturn have led to the need for substantial intervention by government authorities. Both measures focused directly on the financial industry and more general stimulus measures have weakened government finances and increased government debt. In addition, the so-called automatic stabilisers have had an effect on government finances – through reduced government revenues and increased government expenditure.

Larger government budget deficits, weaker government finances and higher current account deficits may lead to higher government bond yields, and thereby higher borrowing costs. Nominal government bond yields reflect factors such as inflation expectations, expected future real interest rates and a range of risk premiums relating to the country's financial position (see box on decomposition of nominal interest rates). The euro-area countries provide a good basis for studying recent developments in risk premiums in government bond yields. Since these countries have a common currency and monetary policy, differences in government bond yields largely reflect different risk premiums across countries.

Chart 1 Five-year government bond yield spreads between euro-area countries and Germany. Percentage points. 1 January 2008 – 9 March 2009



Source: Thomson Reuters

Previously, developments in government bond yields across various countries in the euro area were fairly similar. Investors did not distinguish to any great extent between borrowers according to quality. However, we have recently seen tendencies towards increasing differences across countries (see Chart 1, which shows five-year government bond yield spreads between euro-area countries and Germany). It is likely that the increase in the spread between the euro area and Germany reflects higher liquidity and credit risk. An investor who fears that a country will not repay its debt as agreed will demand extra compensation – a credit premium. Liquidity premiums reflects investors' demand for extra compensation for investing in markets with limited liquidity, i.e. markets where prices may be affected by the investors' own transactions. Liquidity premiums may also reflect a country's need to offer a higher yield in order to be able to sell the volume of government paper necessary to finance government packages. If a government wishes to offer a large volume of government paper to investors who, in principle, do not wish to increase their portfolio holdings of government paper, liquidity premiums can be high.

In practice, it is difficult to distinguish between the various premiums. Prices for credit default swaps (CDS) show the cost of hedging against default on government debt and are in principle an expression of credit premiums in government securities markets. Prices for hedging against default on German five-year government bonds through the CDS market, for example, have increased from around 5 basis points last summer to around 90 basis points now.[1] For other euro-area countries, credit premiums have increased even more (see Chart 2, which shows CDS prices for five-year government bonds in various countries compared with the equivalent CDS price in Germany).

Another measure of risk in the fixed income market is the spread between government bond yields and swap rates.[2] Government bond yields and swap rates usually move in tandem reflecting expected inflation and developments in the real economy (and thereby expected monetary policy). Government bond yields are normally lower than swap rates since credit risk is normally lower. However, the spread between government bond yields and swap rates has recently increased (see Chart 3), probably reflecting

1 For example, a CDS price of 1 per cent means that hedging against default costs 1 per cent of the underlying value per year.

2 An interest rate swap is an agreement to exchange cash flows for a period. One of the counterparties pays a fixed rate, while the other pays a floating rate. The swap rate is the fixed rate in the agreement.

Box: Decomposition of nominal interest rates

In general, nominal yield is determined by required real returns, compensation for expected inflation and various risk premiums. The yield on a government bond can be expressed more precisely by the following equation

$$i = \pi^e + r^e + rp_{\pi} + rp_{liq} + rp_{cred} + rp_{term}$$

where π^e is expected inflation, r^e is the expected real yield in the money market, rp_{π} is an inflation risk premium, rp_{liq} is a liquidity premium, rp_{cred} is a credit premium and rp_{term} is a term premium.

Expected real yield in the money market depends on expected future key rates via prospects for inflation and for the real economy and can be regarded as a benchmark for required real returns.[1] If there are prospects for higher inflationary pressures and greater pressures in the real economy, the key rate, and thereby money market rates, are expected to increase. When there is confidence in monetary policy, inflation expectations (π^e) are approximately on target, with the result that the expected real yield is the component that drives the nominal yield in the equation above.

Inflation risk premiums compensate for uncertainty with regard to future inflation and thereby the real value of future nominal payments. The more volatile and uncertain inflation is, the higher inflation risk premiums are. In a regime of low and stable inflation, inflation risk premiums are likely to be small.

Liquidity premiums are the extra expected return required by investors to invest in markets with limited liquidity. These premiums compensate for the affect of investors' own transactions on securities prices. An increase in government bond yields as a result of a higher supply of government bonds (for example to finance packages of government measures) can be regarded as an increase in liquidity premiums: the relevant government cannot sell the desired volume unless the bidders are offered a higher price.

Credit premiums are the extra expected return required by investors because the issuer may fail to redeem (or may only partially redeem) a security. When a country's government debt becomes substantial, the government may have an incentive to avoid repayment, or to reduce the real value of the debt by inflating the economy. This can raise credit premiums on government bonds (higher inflation also influences inflation expectations and inflation risk premiums).

Term premiums are the extra expected return required by investors to invest in long-term securities. This is usually assumed to be positive, reflecting the extra compensation required by investors to invest in long-term securities. If it is negative, term premiums can be regarded as the expected return the investor is willing to relinquish in order to invest in long-term securities.[2] Two theories are commonly used to explain term premiums:

- *The term premium theory* states that the term premium is positive and rises in line with the term of the bond. Due to uncertainty with regard to future yields, the investor risks a capital loss if the bond is sold on the secondary market before the end of the term. Risk-averse investors can demand compensation for this. The longer the investment horizon, the large the potential loss is, and the higher the term premium, according to this theory.
- *The market segment theory* states that there are segregated markets along the yield curve. For example, some investors may prefer to – or for various reasons be forced or obliged to – invest in long-term securities. This may have an effect on yields that is not due to changes in prospects for growth or inflation. The market segment theory can – in contrast to the term premium – explain why yields are low and why term premiums can be negative.

In the text, we examine five-year government bond yield spreads between euro-area countries and Germany. If expected inflation and real yields are the same in all the euro-area countries, the spread can be expressed as follows

$$(i_k - i_G) = (rp_{k,\pi} - rp_{G,\pi}) + (rp_{k,liq} - rp_{G,liq}) + (rp_{k,cred} - rp_{G,cred}) + (rp_{k,term} - rp_{G,term})$$

where i_k is the yield in countries k and i_G is the yield in Germany. The other variables are similarly defined. The analysis in the text is based on the assumption that it is the spread in liquidity and credit premiums that has driven the spread in government bond yields in recent months.

1 There are normally also premiums on money market rates in relation to the key rate.

2 According to the expectations theory of the term structure of interest rates, the term premium is zero. The expected return on investment in long-term securities is the same as the expected return from rolling over short-term investments. If the term premium is positive (negative), expected returns on investment in long-term securities will be higher (lower) than expected returns from rolling over short-term investments.

Table 1. Estimates of gross government debt, government budget deficits and current accounts at end-2009 and country credit ratings, and CDS prices and government bond yields compared with Germany at the beginning of March 2009.

	Gross govt. debt % of GDP	Govt. budget deficit % of GDP	Current account balance % of GDP	Credit rating	CDS price, compared with Germany	5-year govt bond yields, compared with Germany
Belgium	91.2	3.0	-1.0	AA+ (2)	53.5	77
Ireland	54.8	11.0	-3.5	AAA (1)	263.5	261
Greece	96.2	3.7	-12.8	A- (4)	178.5	300
Spain	46.9	6.2	-7.1	AA+ (2)	56.5	108
France	72.4	5.4	-4.0	AAA (1)	4	49
Italy	109.3	3.8	-1.2	A+ (3)	95.5	118
Netherlands	53.2	1.4	6.5	AAA (1)	41.5	75
Austria	62.3	3.0	2.5	AAA (1)	173.5	103
Portugal	68.2	4.6	-9.7	A+ (3)	50.5	153
Finland	34.5	-2.0	2.7	AAA (1)	3.5	59
Germany	69.6	2.9	5.2	AAA (1)		

Sources: The European Commission, Bloomberg and Reuters.

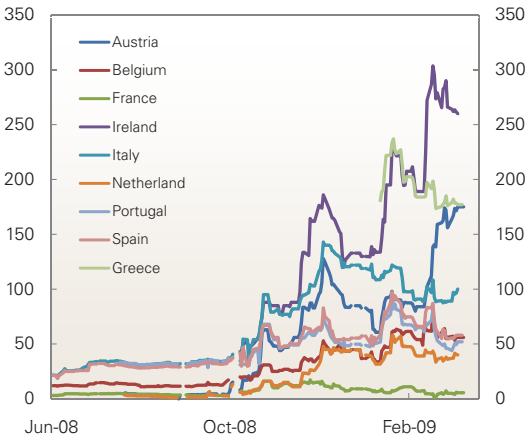
higher liquidity and credit premiums in government securities markets.[3]

Risk premiums in government bond yields and a country's borrowing costs depend on a country's economic situation and expectations with regard to economic developments. Table 1 provides an overview of estimates of economic variables in euro-area countries. The first three columns show estimates at end-2009 for the following structural variables: (i) gross government debt, (ii) government budget deficit, and (iii) current account balance, all as a percentage of GDP. Column 4 shows the countries' credit ratings as assessed by Standard & Poor's. Credit ratings are based on an assessment of future economic developments and are more forward-looking than the figures provided in columns 1-3. In order to be able to use country credit ratings directly in quantitative calculations, we have assigned a number to each credit rating, where AAA is assigned the number one, while the lowest rating in the group is assigned the number four. Columns 5 and 6 show five-year CDS prices and five-year government bond yields respectively, both compared with Germany at the beginning of March 2009.

Our hypothesis is that higher government debt, higher government budget deficits, lower current account ba-

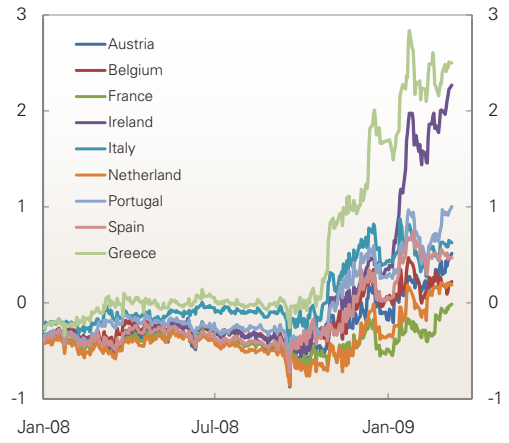
3 While CDS prices reflect credit premiums, the spread between government bond yields and swap rates reflects all supply and demand factors in government securities and swap markets, including both credit and liquidity premiums.

Chart 2 CDS prices for five-year government bonds in euro-area countries compared with the equivalent CDS price in Germany. Basis points. 1 January 2008 – 9 March 2009



Source: Bloomberg

Chart 3 Spread between government bond yields and swap rates. Percentage points. 1 January 2008 – 9 March 2009



Source: Thomson Reuters

Table 2. Estimation of relationship between government bond yield spread between euro-area countries and Germany and structural variables *

		Gross govt. debt	Govt. budget deficit	Current account balance	R^2
a *debt* + b *budget* + c *curr acc balance*	*(1)*	1 (0.5)	11 (1.1)	-6.4 (-1.3)	0.51
b *budget* + c *curr acc balance*	*(2)*		9.54 (1.0)	-7.36 (-1.73)	0.49
a *debt* + b *budget*	*(3)*	1.17 (1.08)	17.2 (1.83)		0.37
a *debt* + c *curr acc balance*	*(4)*	0.2 (0.2)		-9 (-2.0)	0.41

* T-values in brackets indicate to what extent the coefficients are, in statistical terms, significantly different from zero. When the absolute value of the t-value is greater than 1.64, there is at least a 90 per cent probability that the unknown underlying coefficient is different from zero. R2 is a statistical measure of how well explanatory variables explain the yield spread. When R2=0.5, the explanatory variables explain 50 per cent of the variation in the yield spread.

lances, lower credit ratings and higher CDS prices result in higher government bond yields. Charts 4-8 show the spread in government bond yields between euro-area countries and Germany (horizontal axis) against each of the variables in columns 1-5 (vertical axis). The graph shows a cross-section of countries at a given time and does not show developments over time.[4] A line has been drawn in each chart to show the linear trend. All the graphs support (visually) the hypothesis presented above.

The information in the graphs may be represented more systematically using quantitative methods. The relationship between structural variables in the economy and government bond yields is particularly interesting. We have therefore quantified a model as follows:

$$(i - i_G) = constant + a\ debt + b\ budget\ deficit + c\ current\ account$$

where $(i - i_G)$ is the five-year spread in government bond yields between euro-area countries and Germany (column 6 in Table 1) and where the explanatory variables are the first three columns in Table 1. The coefficients a, b and c must be estimated and indicate the average effect of the relevant variable on the spread in government bond yields between euro-area countries and Germany.

Table 2 shows the estimation results for different variants of the model. Since the number of observations is small (10), precise estimates are difficult to obtain. When the three structural variables are all included in the model, the relevant coefficients are therefore not, in statistical terms, significantly different from zero. The sign of the coefficients is nevertheless in line with the hypothesis presented above and a closer study of their size is therefore of interest. The first equation (which includes all three variables) indicates that if government debt as a percentage of GDP increases by one percentage point, the spread in government bond yields between euro-area countries and Germany increases by one basis point. If the government budget deficit as a percentage of GDP increases by one percentage point, the spread increases by 11 basis points. If the current account balance as a percentage of GDP increases by one percentage point, the spread is reduced by 6.4 basis points. The table also shows the estimation results when the model is estimated with only two of the three explanatory variables (equation 2-4).

This quantitative presentation should not be taken too far. The estimated coefficients represent an average of all the countries. There are probably considerable differences between countries, confirmed by the spreads shown in Charts 4-8. The presentation nevertheless supports the general impression from the charts, providing evidence that higher government debt, larger government budget deficits and lower current account balances may result in higher risk premiums and thereby higher borrowing costs for these countries.[5]

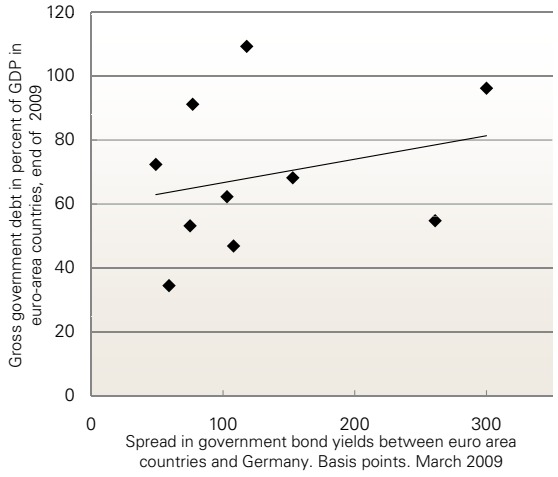
4 The frequency of structural variables makes it difficult to analyse developments over time.

5 An alternative might be to quantify the relationship between the spread in government bond yields on the one hand and the spread in CDS prices and credit ratings on the other (columns 4 and 5 respectively in Table 1), resulting in the following model:

$$(i - i_G) = constant + \underset{(3.4)}{30}\ credit\ rating + \underset{(5.1)}{0.7}\ CDS\ spread$$

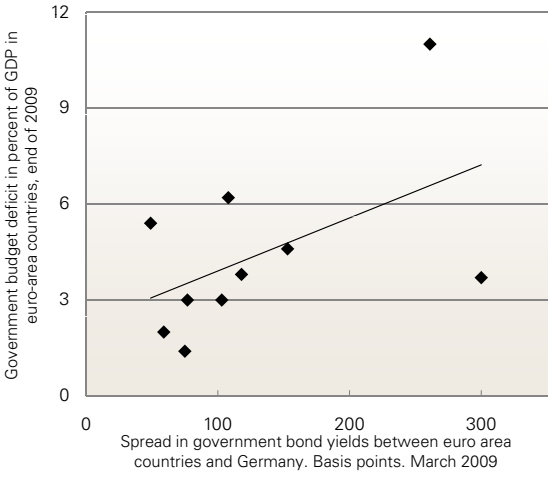
where the figures in brackets show the t-values (see footnote in Table 2 for explanation). *Credit ratings* and particularly *CDS spreads* are not, however, purely structural variables, but are variables that, like the spread in government bond yields, are affected by structural variables. This complicates the interpretation of the quantification. If we disregard this type of problem, credit ratings and CDS spreads have a clear, statistically significant effect on the spread in government bond yields (as measured by t-values). This is as expected. The level of the estimated effect of credit ratings on the spread in government bond yields, in this case 30, is entirely dependent on how the quantitative credit rating is scaled and is without interpretation (what is important here is that the t-value indicates that credit ratings have a significant effect on the spread). The estimated effect of CDS spreads on the spread in government bond yields is, however, interesting and indicates that an increase in the CDS spread of 100 basis points results in an increase in the spread in government bond yields of 70 basis points.

Chart 4 Spread in government bond yields between euro-area countries and Germany (horizontal axis) against gross government debt in percent of GDP in euro-area countries (vertical axis)



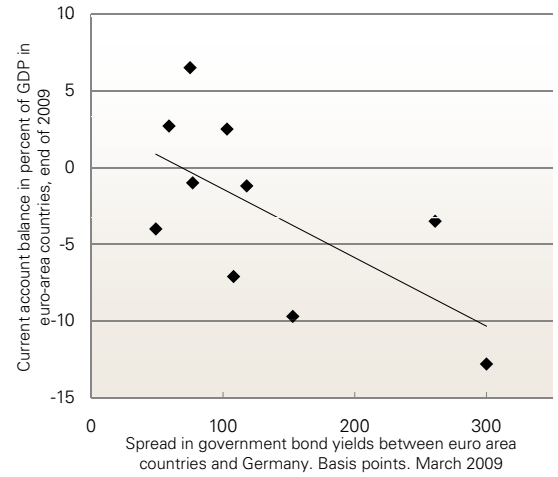
Sources: Thomson Reuters, The European Commission

Chart 5 Spread in government bond yields between euro-area countries and Germany (horizontal axis) against government budget deficit in percent of GDP in euro-area countries (vertical axis)



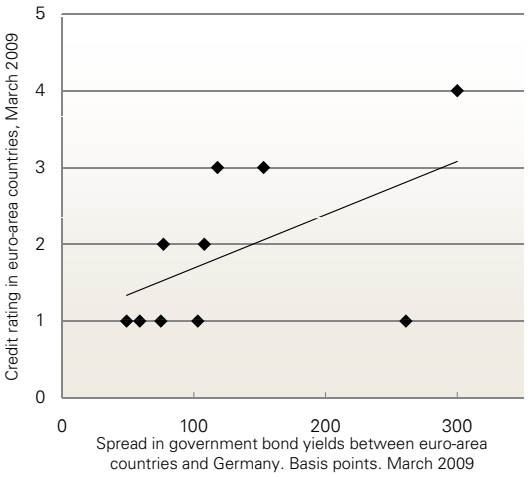
Sources: Thomson Reuters, The European Commission

Chart 6 Spread in government bond yields between euro-area countries and Germany (horizontal axis) against current account balance in percent of GDP in euro-area countries (vertical axis)



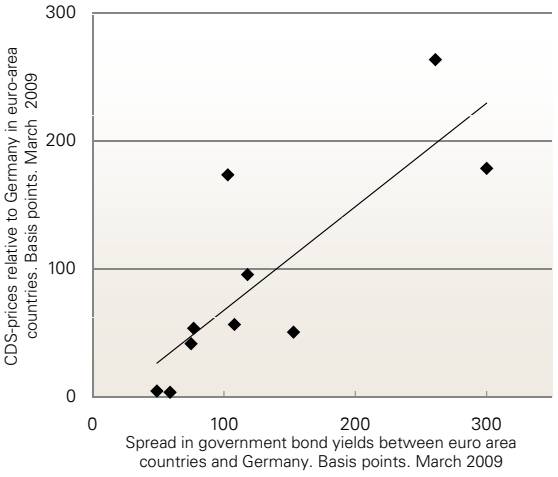
Sources: Thomson Reuters, The European Commission

Chart 7 Spread in government bond yields between euro-area countries and Germany (horizontal axis) against credit rating in euro-area countries (vertical axis)



Sources: Thomson Reuters, Bloomberg

Chart 8 Spread in government bond yields between euro-area countries and Germany (horizontal axis) against CDS-prices relative to Germany in euro-area countries (vertical axis)



Sources: Thomson Reuters, Bloomberg