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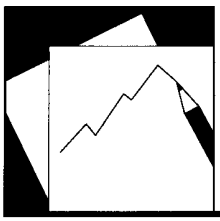

IMF Working Paper

Euro Area Sovereign Risk During the Crisis

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European Department

Euro Area Sovereign Risk During the Crisis[1]

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Abstract

While the use of public resources is critical to cushion the impact of the financial crisis on the euro-area economy, it is key that the entailed fiscal costs not be seen by markets as undermining fiscal sustainability. From this perspective, to what extent do movements in euro area sovereign spreads reflect country-specific solvency concerns? In line with previous studies, the paper suggests that euro area sovereign risk premium differentials tend to co-move over time and are mainly driven by a common time-varying factor, mimicking global risk repricing. Since October 2008, however, there is evidence that markets have become progressively more concerned about the potential fiscal implications of national financial sectors' frailty and future debt dynamics. The liquidity of sovereign bond markets still seems to play a significant (albeit fairly limited) role in explaining changes in euro area spreads.

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[1] The paper has benefited from useful suggestions by ECB and IMF staff, and comments by seminars participants at the European Commission, the European Central Bank, and the International Monetary Fund. All remaining errors are authors' responsibility.

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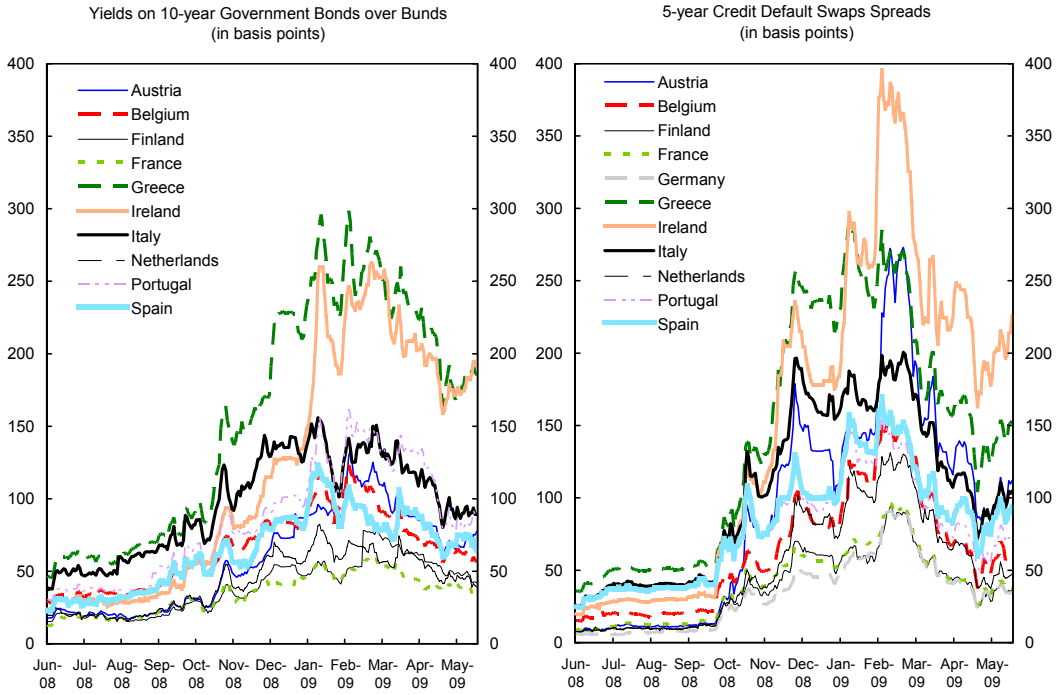
I. INTRODUCTION

Since the onset of the financial crisis, sovereign risk premium differentials in the euro area have been widening. Although the perceived risk of default for euro area countries remains generally low, financial markets appear to have been increasingly discriminating among government issuers while requiring overall higher risk premiums (Figure 1). In particular, the spreads on the yield on 10-year government bonds over Bunds spiked in January 2009 for various euro area members, accompanied by downgrades of sovereign debt ratings for three countries—Greece, Spain, and Portugal—and a warning for Ireland.

Figure 1. Selected Euro Area Sovereign Spreads, June 2008-09



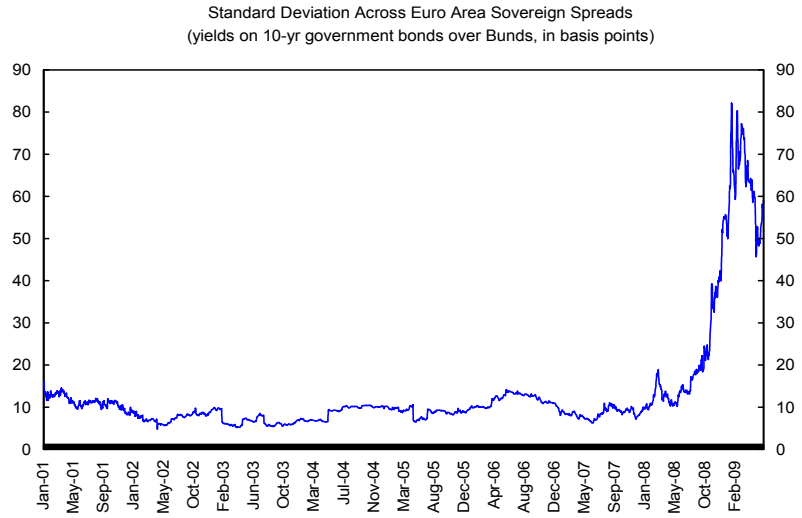
Source: Datastream.

The recent rebound of euro area sovereign spreads is even more noticeable from a historical perspective, as it follows a prolonged period of very modest differentiation across countries (Figure 2). Ever since the introduction of the single currency, the remarkable compression of sovereign risk premium differentials has raised doubts about financial markets' ability to provide fiscal discipline across euro area members—that is about their capacity to price higher default risk for governments pursuing unsound fiscal policies.[2] In this

[2] On this point, see also Garzarelli and Vaknin (2005), Debrun and others (2008), and Attinasi and others (2009).

context, the latest widening in euro area sovereign spreads provides a unique opportunity to re-examine the role played by fiscal conditions in explaining yield differentials.

Figure 2. Dispersion in Euro Area Sovereign Spreads, January 2001-June 2009



Source: Datastream; and staff calculations.

In addition to fiscal vulnerabilities and—hence—default risk concerns, discrimination among sovereign issuers may reflect considerations about the relative liquidity of different government bond markets. Indeed, the financial turmoil may have led to a flight to safety and liquidity, resulting in a decline in the yields of the most liquid sovereign bond markets—such as the benchmark Bunds. The literature tends to recognize the importance of liquidity risk in explaining interest rate differentials within the euro area, although the size of this effect remains somewhat controversial.[3]

Following the start of the financial crisis, government exposure to weakness in the financial sector may have also become a factor in explaining sovereign spreads in the euro area.[4] In this respect, some countries have committed large resources to guarantee financial institutions, thereby establishing a potentially important link between financial sector distress and public sector bailouts.

[3] Codogno and others (2003) find that liquidity has a role in explaining interest rate differentials but that this effect is usually dominated by general risk aversion. Bernoth and others (2004) find that, while liquidity has historically had a role in explain spreads, this effect is no longer apparent following EMU. Schuknecht and others (2008) also could not find a significant role for their liquidity measure in explaining spreads. In contrast, Pagano and Von Thadden (2004), Jankowitsch and others (2006), and Gomez-Puig (2006) find that liquidity matters and is related with the bond market's size. Recently—and in line with Beber and others (2009), Schwarz (2009), and ECB (2009)—Manganelli and Wolswijk (2009) find that liquidity can explain nearly half the spread and that the liquidity premiums tend to be high when interest rates are high.

[4] Mody (2009) finds that while exposure to financial sector weakness was not an important determinant of sovereign spreads prior to the collapse of Bear Sterns in March 2008, it has become increasingly more significant as the financial crisis has progressed.

Global risk repricing may have also contributed to the widening of the sovereign risk premium differentials, in a sign of discrimination among different classes of default risk. Owing to the abrupt reversal in market sentiment and the severe liquidity squeeze, euro area sovereign bond markets have certainly come under strain. Previous empirical studies have indeed found that spreads tend to co-move over time and are mainly driven by a single time-varying common factor, typically identifying international risk appetite and proxied by the spreads of US corporate bonds over Treasury bonds.[5] Appealing, however, to exogenous changes in investors' risk appetite to explain spreads in the euro area government bond market does not help much understand the behavior of these spreads.[6] If spreads are driven by changes in risk appetite, which forces are behind these shifts in market sentiment?

Understanding what has prompted recent developments in sovereign risk is particularly relevant for policymaking. Persistently higher spreads could, in fact, have a major impact on many euro area governments' marginal funding costs, possibly undoing the beneficial effects of declining risk-free interest rates. Most importantly, any loss of market confidence is deemed to lead to increases in long-term real interest rates and debt-service costs, partly offsetting the stimulus effects of measures taken to deal with the crisis and further adding to financing pressures.

The paper offers several contributions to the existing literature on the determinants of sovereign spreads. First, the study represents an original attempt to identify and estimate a time-varying common factor in euro area sovereign bond markets with the help of a theoretical model allowing for shifts in investors' risk appetite. Second, by using daily data between January 1999 and April 2009, the analysis looks into the dynamics of such a common factor—over both the long and the short run. Third, the paper tries to pin down significant changes in the behavior of sovereign spreads before and after the recent financial turmoil, both at regional and at country level. In this perspective, focusing on government bond spreads since the advent of the euro has the advantage of controlling for some other factors that may influence spreads outside a monetary union—such as exchange rate risk, expected inflation, and central bank credibility.

To anticipate final findings, the empirical analysis presented in this paper seems to confirm that changes in sovereign default risk premiums mainly mirror global risk repricing—which, in turn, is driven by shifts in cyclical conditions and uncertainty in

[5] The key role of international risk aversion in explaining spreads' behavior is highlighted, for instance, by Codogno and others (2003), Geyer and others (2004), and Favero and others (forthcoming). Recently, Haugh and others (2009) have shown that, in times of crises, investors' risk appetite may give rise to important nonlinearities, as the effects of fiscal variables on yield spreads are likely to be amplified through their interaction with risk aversion.

[6] On this point, see also Manganelli and Wolswijk (2009).

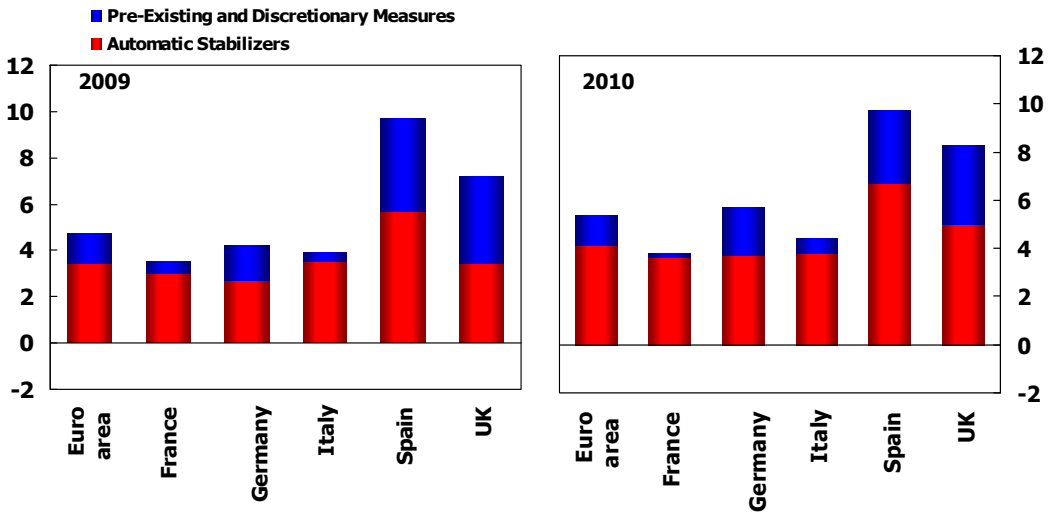
financial markets. This means that a big chunk of the widening in government bond spreads is likely to be reversed as soon as recession fears and uncertainty recede, and conditions in international financial markets normalize. Interestingly, though, there is also evidence that the sensitivity of sovereign spreads to projected debt changes has significantly increased since October 2008. In a few countries, markets also appear to be progressively more concerned about the solvency of national banking systems. Finally, the liquidity of sovereign bond markets still seems to play a significant (albeit quite limited) role in explaining spreads.

The remainder of the paper has the following structure. The next section describes fiscal developments in advanced European countries on the heels of the financial crisis. Section 3 discusses the empirical and theoretical links between euro area sovereign spreads and a common risk factor, while Section 4 presents the main econometric results. Section 5 concludes, highlighting the main policy implications of the paper.

II. Euro Area Sovereign Risk and the Crisis: Stylized Facts

On the heels of the global financial crisis, public finance is under unprecedented strain in most EU countries. Collapsing economic activity has sharply reduced tax revenues. Rising unemployment has led to increasingly large state benefit payments, with automatic stabilizers expected to continue to operate throughout 2010 to stem further job losses. To support the most vulnerable groups in society and underpin consumer spending, most EU governments are also offering stimulus packages while reducing certain taxes. For the euro area as a whole, the discretionary stimulus being provided is estimated to amount—on average—to 1.1 and 0.9 percent of GDP in 2009 and 2010, respectively. The result is a striking increase in deficits that may well take years to reverse (Figure 3).

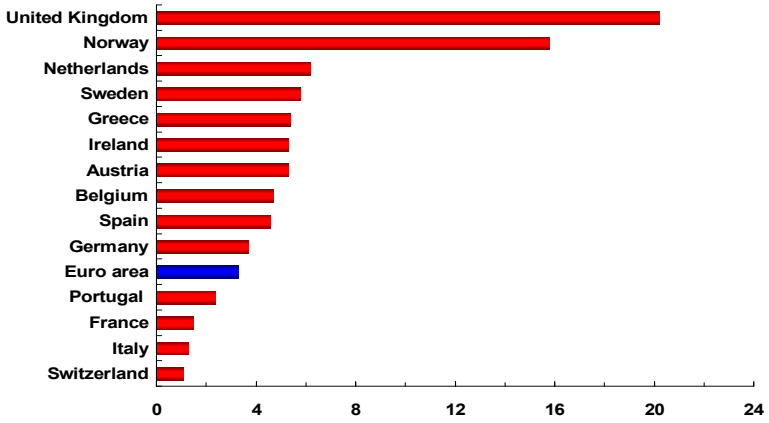
Figure 3. Headline Deficit: Contributions from Automatic Stabilizers and Discretionary Measures
(Fiscal deficit in percent of GDP; change from 2007)



Source: IMF, *World Economic Outlook.*

At the same time, fiscal policy has been providing important backing through the use of public balance sheets to shore up the financial system. Most EU governments have committed large resources to guarantee, recapitalize, and resolve financial institutions, as well as support certain asset markets. Some countries have provided capital injections and guarantees for financial sector liabilities. Others have purchased illiquid assets from financial institutions or extended direct loans.[7] Altogether, in the euro area, the immediate impact of these support measures on government financing has averaged around 3½ percent of GDP (Figure 4). Explicit guarantees provided so far are also quite large, especially in Ireland, although the ultimate costs of such guarantees are likely to be smaller.

Figure 4. Up-front Government Financing Need to Shore Up the Financial Sector 1/
(Percent of 2008 GDP)



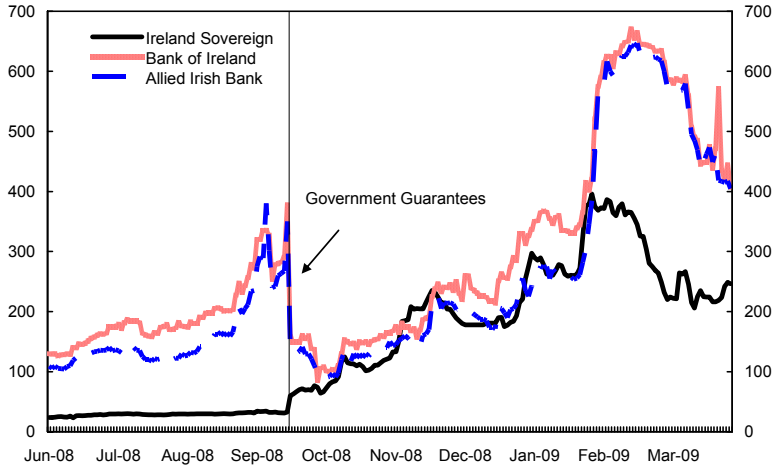
Source: IMF (2009a).
1/ Includes capital injections, purchase of assets, and lending by treasury that require up-front government outlays.

The medium-term net budgetary cost of financial support operations will ultimately depend on the extent to which the assets acquired by government or the central bank will hold their value, on future losses from explicit guarantees, and on additional costs from implicit guarantees to the banking sector. In this respect, estimates of the Expected Default Frequency (EDF) implied spreads can be regarded as indicative of the insurance premium for providing the guarantees. The approach—which accounts for market volatility and probability of default of individual institutions—provides an assessment of the cost of providing this "public insurance". For euro area economies, indicative estimates based on financial derivative pricing models suggest that outlays from contingent liabilities could average around 2–5 percent of GDP, cumulative for 2009–13.[8]

[7] In several countries central banks have also extended assistance to financial institutions through credit lines, purchase of assets, asset swap, and liquidity provisions without direct treasury funding. While such operations do not require upfront treasury funding, they could eventually generate fiscal costs.
[8] These estimates are obtained by applying the expected default frequency implied credit default swap spreads—which are indicators of the "insurance" premium for providing the guarantee—to the guaranteed amounts. For details, see IMF (2009a and 2009b).

The use of public balance sheets to shore up national financial systems has certainly created a link between financial sector distress and public sector bailouts. Rising EDFs of financial institutions can in fact trigger market concerns about the fiscal implications of the government support, thereby leading to higher default risk premiums on sovereign bonds.[9] In Ireland, for example, sovereign spreads started to increase after the government extended a guarantee to the banking system (Figure 5). It is, hence, not surprising to observe that—since the onset of the financial crisis— the EDF of the median domestic financial institution generally tends to co-move with the sovereign bond spread of the corresponding issuer (Figure 6).

Figure 5. From Credit Risk to Sovereign Risk: The Case of Ireland
(5-year CDS spreads, in basis points)

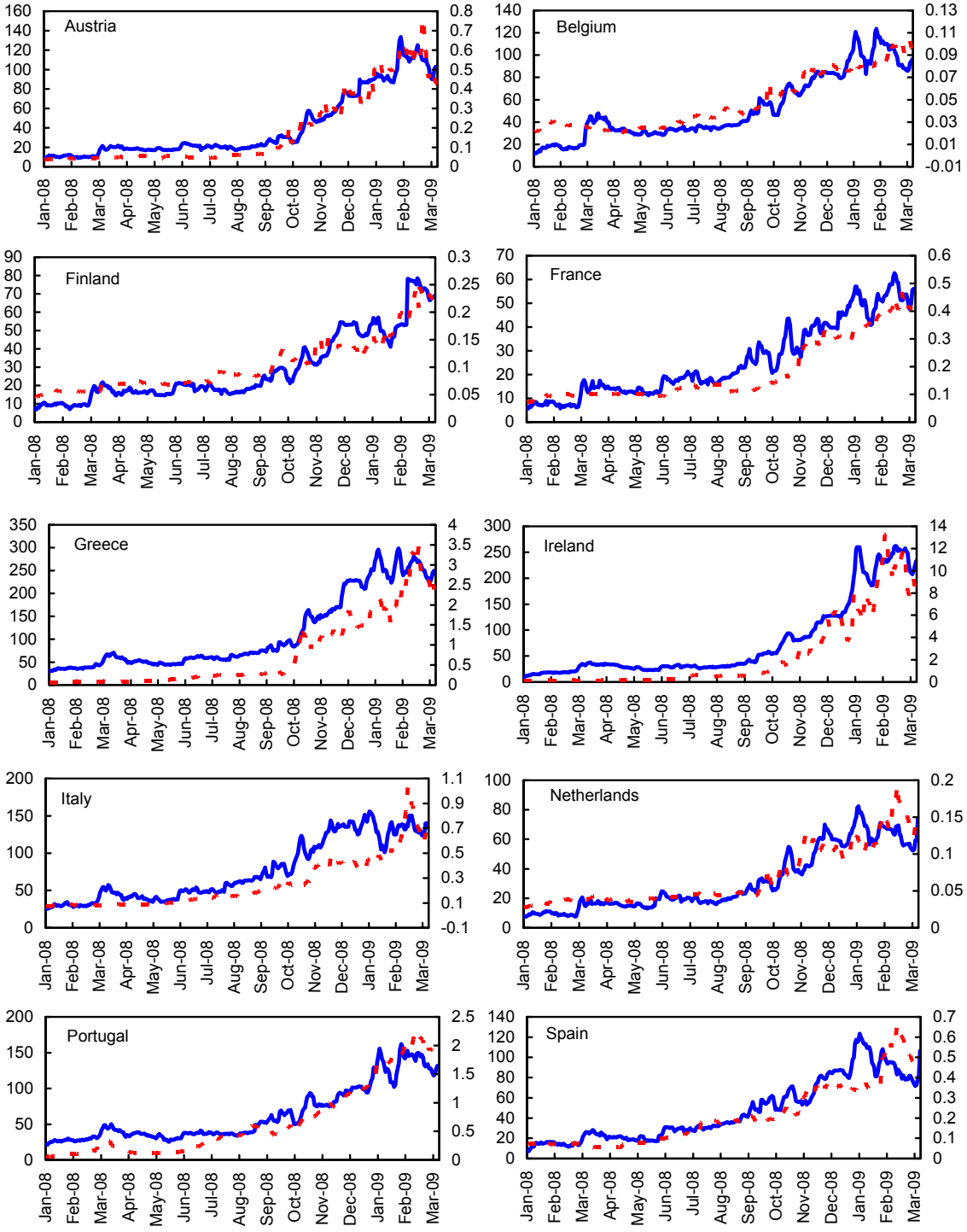


Source: Datastream.

While the aforementioned fiscal interventions have been critical to prevent a further fall in demand and the risk of adverse feedback loops from the financial sector to the euro area economy, they have also implied a significant deterioration in the budget positions of most euro area members and ballooning government debts. From this viewpoint, the observed widening of sovereign spreads might well reflect financial markets' concerns about the solvency of national banking systems and their consequences for fiscal sustainability.[10] If that is the case, investors will keep requiring higher sovereign default risk premiums for most countries and discriminating among different sovereign issuers until a credible financial system restructuring plan and a clear commitment to long-run fiscal discipline are envisaged.

[9] The relation between decreasing banks' CDS spreads and increasing sovereign credit risk after the announcement of public support measures is also analyzed in Ejsing and Lemke (2009).
[10] The call for coordinated policy actions aiming at sustaining the recovery of the euro area economy while ensuring a clear and credible commitment to long-run fiscal sustainability is discussed in greater detail in IMF (2009c and 2009d).

Figure 6. Sovereign Spreads and Financial EDFs in Euro Area Countries 1/



1/ Solid blue line denotes the country's 10-year bond sovereign spread vis-a-vis Germany (basis points, left axis). Dotted red line denotes EDF of the country's median financial institution (percent, right axis).

Source: Datastream; Moody's Creditedge; and staff calculations.

Else, if latest spikes in sovereign spreads mainly mirror an abrupt reversal in market sentiment due—for instance—to a severe liquidity squeeze, liquidity provision measures will prompt knock-on beneficial effects on governments' marginal funding costs. Understanding what drives recent developments in sovereign risk is, hence, of chief relevance for policymaking.

III. DISSECTING COMMON RISK

As outlined above, there is unanimous consensus in the literature that euro area government bond spreads are mostly driven by a single time-varying common factor, associated with shifts in international risk appetite. In theory, risk appetite—the willingness of each investor to bear risk—depends on both risk aversion—a "deep" parameter representing the degree to which agents dislike uncertainty—and the level of macroeconomic uncertainty itself. Periodic shifts in risk appetite are generally more likely to respond to changes in uncertainty than to changes in investors' risk aversion.[11] In practice, shifts in investors' risk appetite are not directly observable. What is observable is the (asset-specific) risk premium—the expected return required to compensate investors for holding one specific asset: this is jointly defined by a common component—the common price of risk, that is the inverse of investors' risk appetite—and the inherent riskiness of that asset.

To estimate the extent to which (unobservable) shifts in international risk appetite may have contributed to the (observed) increase in sovereign spreads for the individual countries, we rely on a very simple asset pricing model.[12] Specifically, by assuming that risk premiums embedded in country-specific sovereign yields are determined jointly in the market and influenced by both the riskiness of the specific asset and the common price of risk, the latter component can be identified and—thereby—filtered out.

Empirically, spreads on the yield on 10-year government bonds over Bunds for 10 euro area countries are assumed to be simultaneously determined within a multivariate generalized autoregressive conditional heteroskedasticity framework, capturing fat-tail noise. The corresponding econometric model can thus be specified as follows:

$$
\begin{aligned}
& s_{it} = \varphi_i s_{i,t-1} + \gamma_i \lambda_t + \varepsilon_{i,t}, && \varepsilon_{i,t} \sim N(0, h_{i,t}),\ i = 1..10, \\
& h_{i,t} = \varpi_i + \alpha_i \varepsilon_{i,t-1}^2 + \beta_i h_{i,t-1} && \\
& \lambda_t = \lambda_{t-1} + \eta_t, && \eta_t \sim N(0, \sigma_\eta)
\end{aligned}
$$

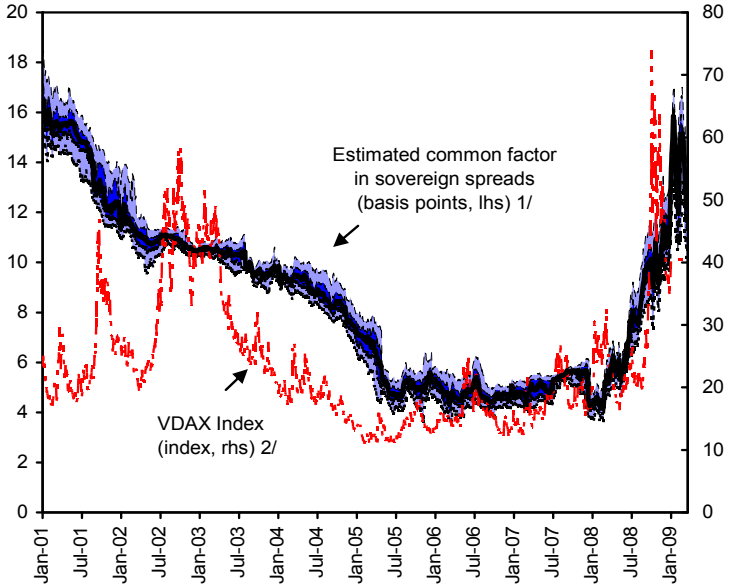
[11] On this point, see also Gai and Vause (2006).

[12] The theoretical and empirical underpinnings of the model are explained in greater details in Lombardi and Sgherri (forthcoming).

where spreads (s_{it}) are believed to depend upon their past according to an AR(1) process, while innovations (ε_{it}) are supposed to follow a GARCH(1,1) mechanism with variance h_{it}. The unobservable common factor driving euro area sovereign spreads' dynamics is captured by a stochastic component (λ_t), which is assumed to evolve as a random walk. The relative riskiness of different sovereign issuers is portrayed by the country-specific parameter γ_i. Given that the model is nonlinear, Kalman filtering techniques cannot be employed. Instead, a Bayesian estimation technique is used based on the model's likelihood function, which is evaluated using a particle filter on *daily* observations from January 2001 to April 2009.[13]

The estimated dynamic common factor in sovereign bond spreads is plotted in Figure 7. For the sake of comparison, the estimated common factor is pictured along with an index measuring the implied volatility in the German stock market—a variable extraneous to the filtering procedure used to extract the component itself.

Figure 7. Estimated Common Component in Sovereign Spreads
(in basis points)



1/ The fan chart plots, at each point in time, the 5th, the 50th and the 95th percentile of the estimated probability distribution for the expected common component across euro area sovereign spreads. Hence, there is a 90 percent chance that the common spread will be inside the blue-shaded range. The central thick black line denotes the estimated median common spread.
2/ Implied volatility of German stock market.
Sources: Datastream; Bloomberg L.P.; and IMF staff calculations.

[13] The particle filtering approach is an extremely powerful framework for inference in state-space models (Doucet and others (2000)). The method has been recently employed also for financial (Pitt and Shephard (1999)) and macroeconomic applications (see, among others, Fernández-Villaverde and Rubio-Ramírez (2007), An and Schorfheide (2007), and Lombardi and Sgherri (2007)).

To a first approximation, the estimated stochastic component seems able to capture four distinct developments in euro area sovereign bond spreads: the narrowing of risk premiums differentials due to EMU convergence over 2001-02; the decline in financial market volatility over 2003-05; the abundant liquidity and muted risk aversion characterizing international financial markets over 2005-07; and the jarring risk repricing commencing end-2007 and receding at the very end of the sample. Estimates also reveal that the time-varying risk factor which is shared by the ten euro area sovereign bond spreads tends, in itself, to be generally small: indeed, even at its peak—at the beginning and at the end of the sample—the common factor in euro area sovereign spreads remains below 20 basis points.

Which economic forces are behind the changes in such a time-varying common factor associated? To provide an answer to this question, an error correction model is fitted through our estimated time-varying common factor. Results are reported in Table 1. Over the long run, a common widening of euro area sovereign bond spreads is likely to be associated with expected *de*flationary risks and *declining* interbank rates. On average, inflation and wholesale money market developments appear to account for more than half of the changes in the common component of euro area sovereign spreads. In addition, common shifts in euro-area risk premium differentials tend to be *positively* correlated with volatility—and, hence, uncertainty—in stock, currency, and emerging markets. Over the short-run, only 12 percent of the *daily* variation in the common component of euro area risk premium differentials can be explained—most of which is induced by endogenous dynamic adjustments.

These findings seem to confirm previous evidence from the finance literature: time-varying risk aversion is typically associated with expectations about the state of the economy and uncertainty in financial markets. Risk aversion increases as economic downturns loom on the horizon—that is, when inflation is expected to decline and monetary policy to be accomodative—while it decreases in periods of forthcoming expansion—when the opposite holds true. The intuition behind this is certainly not new (see also Manganelli and Wolswijk, 2009). As the economy enters into recession, investors will take less risky positions in financial markets, as their income is already at risk. The results are robust—both in terms of signs and in term of explanatory power—to the use of alternative measures of euro-area monetary policy stance (Overnight Indexed Swaps, Libor, or Libor-OIS Spreads) and to different contract maturities (overnight, three-, six-, nine-, or twelve months). In addition, estimates are basically unchanged if a break at the onset of the crisis is allowed for: this seems to strengthen the argument that in crisis times spreads react to the increased uncertainty triggered by the economic slowdown, rather than to incentives linked to monetary policy.[14]

[14] Although sensitivity analysis results are not show in Table 1, they are available from the authors.

IV. EXPLAINING DEVELOPMENTS IN EURO AREA SOVEREIGN RISK DURING THE CRISIS

To assess the determinants of spreads during the crisis, a simple panel model of the spread between the yield on ten-year sovereign bonds between ten euro area countries and Germany is estimated over the period January 2003 to March 2009 using *monthly* data. In order to appreciate possible evolutions in spreads dynamics over recent months, we also estimate the model over the sub-period January 2003 to January 2009.

A general-to-specific approach is adopted, commencing with a general equation encompassing a range of explanatory variables on the basis of existing empirical work and theory. The general degree of risk aversion is proxied by our previously estimated common factor. Variables used to proxy for investor assessments of country-specific credit risk include expected changes in debt stock and future fiscal balances, obtained from the Economist Intelligence Unit. In addition, the possible effect on spreads arising from vulnerabilities in national financial systems is captured by the Expected Default Frequency of the median financial institution of each country, obtained from Moody's Creditedge. The market value of a country's traded euro denominated long-term government bonds is included among the regressors as a proxy for the liquidity of the country's bond market. Finally, projected growth and current account imbalances, also from the Economist Intelligence Unit, are additional explanatory variables.[15]

The key development in the estimation period is a substantial widening of spreads since October 2008. Also, expectations of fiscal deficits and debt levels have ballooned as the crisis has unfolded. On the contrary, the liquidity of country bond markets has not changed much over the sample. A preliminary look at the determinants of spreads and how they have changed before and after the crisis is provided in Figure 8. Strikingly, Greek and Irish sovereign bonds appear to have been severely punished by the markets. This is out of line with evidence before the crisis, and cannot be fully explained neither by expected debt developments nor by bond markets' liquidity measures. What accounts for such dramatic shifts in sovereign risk premium differentials?

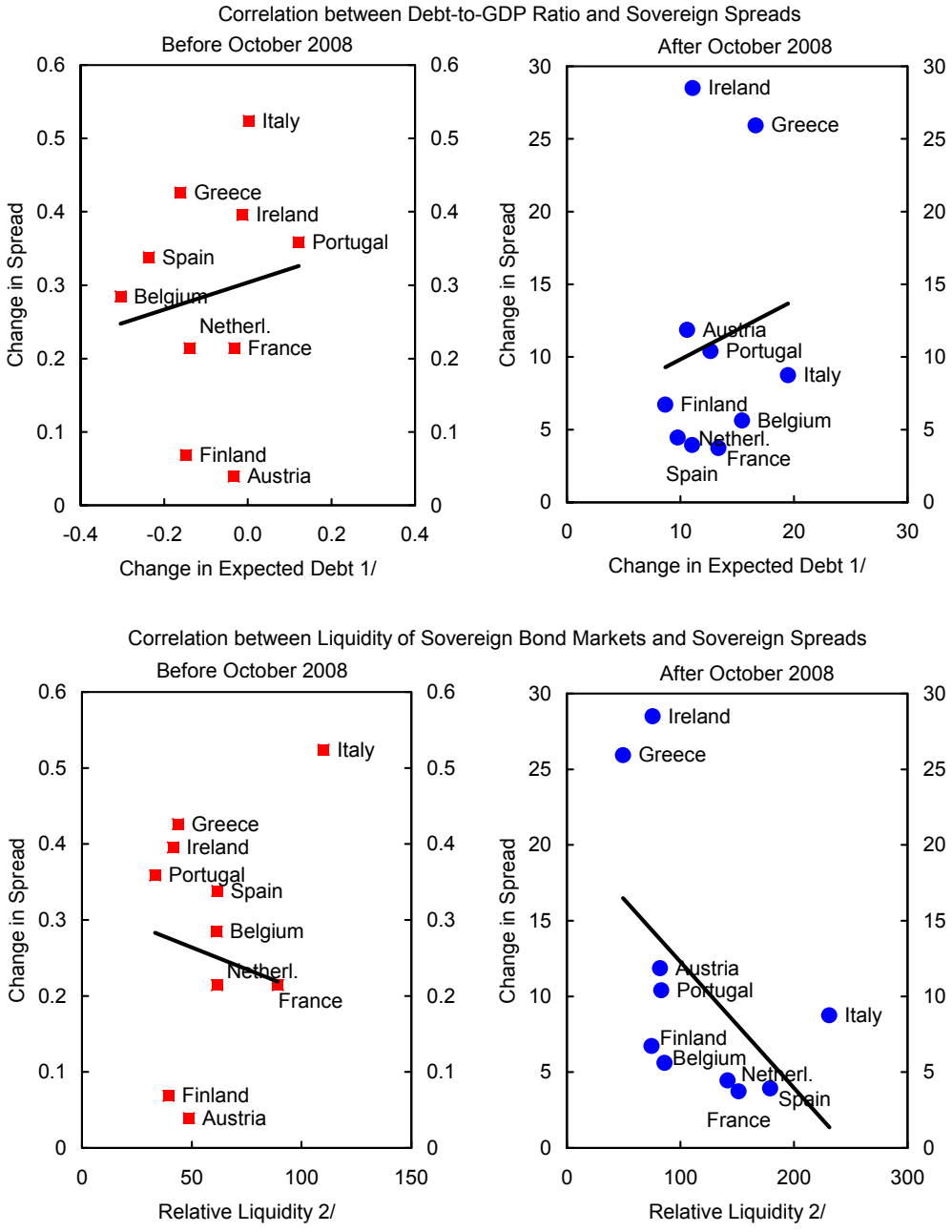
Overall, panel estimates show that changes in sovereign default risk premiums continue to reflect mainly global risk factors—such as shifts in risk aversion in financial markets (Table 2).[16] There is also evidence, however, that the sensitivity of sovereign spreads to projected debt changes has significantly increased after September, suggesting that the markets may now be able to provide more fiscal discipline than in the early years of the

[15] Spreads, projected debt, and EDF were differenced to achieve stationarity. The correlation between changes in projected debt and projected fiscal balances is not very high, ranging from -0.1 and -0.5.

[16] Given that the possible problem of reverse causality between sovereign spreads and EDFs, the panel was estimated with two-stage least squares, using lagged EDFs as instruments. OLS estimates give similar results.

common currency. In a few countries, markets also appear to be progressively more concerned about the solvency of national banking systems. Finally, the liquidity of sovereign bond markets—proxied by traded volumes—appears to remain a relevant factor in explaining spread behavior.

Figure 8. A Preliminary Look at the Determinants of Spreads Behavior

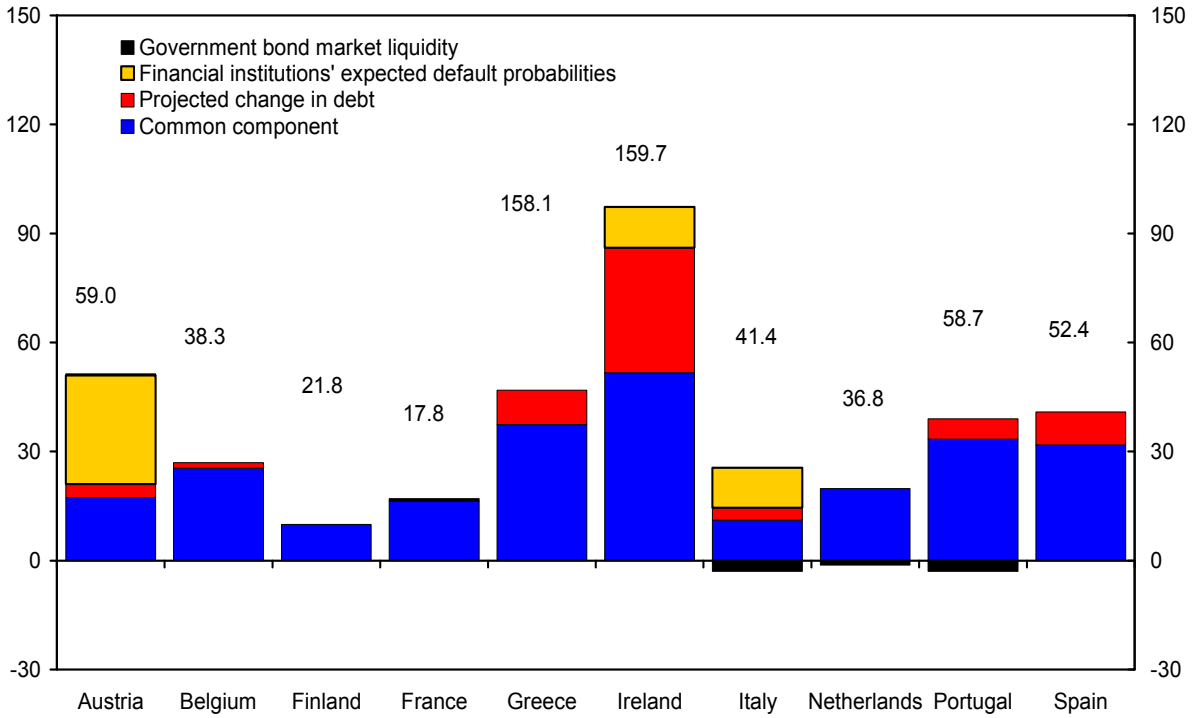


1/ Projected change in the debt-to-GDP ratio over the next year (percent).
2/ Traded volume of government debt relative to the German bond market (percent).

Source: Datastream; Moody's Creditedge; Economist Intelligence Unit; and staff calculations.

Seemingly-unrelated regression estimates highlight that country-specific issues also matter (Figure 9 and Table 3). Decomposing the contributions to the actual change in country-specific sovereign spread between end-January 2009 and end-September 2008 indicates that concerns about fiscal sustainability are significant for countries like Greece, Ireland, Spain, and—to a lesser extent—Austria, Italy, and Portugal.[17] The extent to which rising EDFs in the financial sector translate into increases in government spreads is found to be large and significant in Austria, Ireland, and Italy. Finally, *ceteris paribus,* the liquidity of the sovereign bond market appears to lessen Italian government's financing costs. Nonetheless, it is important to stress that a sizable part of the actual change in spreads since September 2008 remains unexplained, notably in the case of Greece.

Figure 9. Contributions to the Change in Spreads, January 2003-January 2009 1/ 2/
(change end-January 2009 over end-September 2008, in basis points)



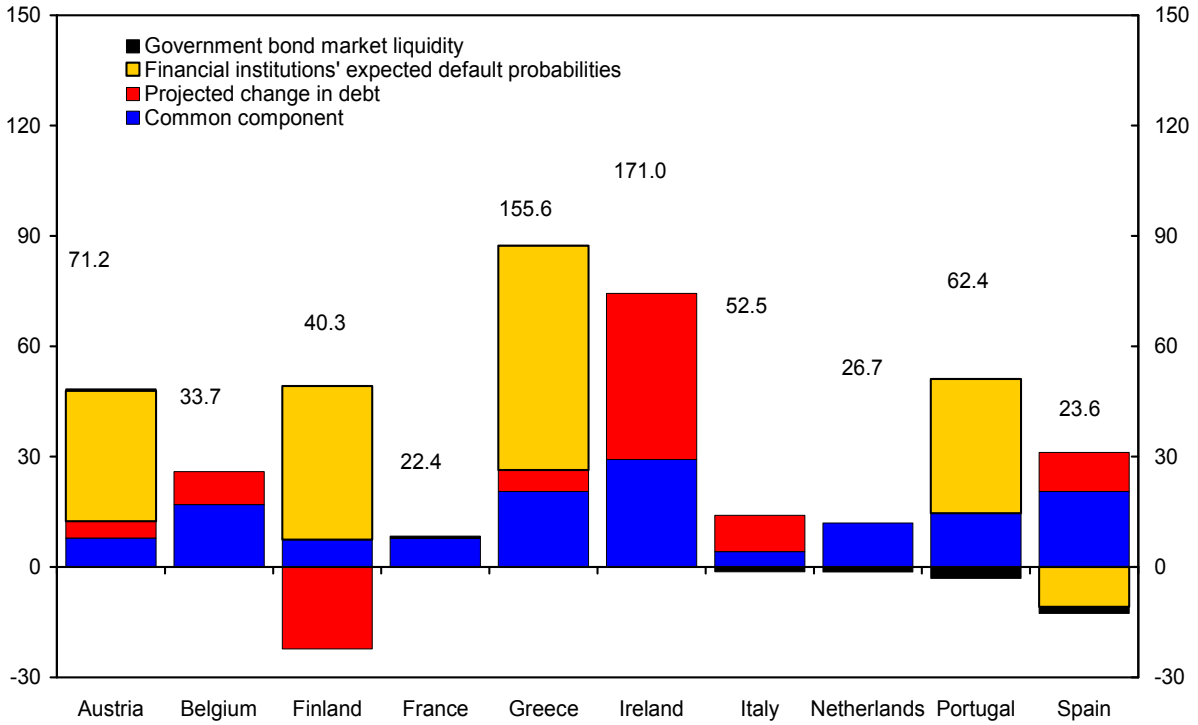
1/ For each country, the explanatory variables included in the model are the changes in: the common factor, the EDF of the median financial institution, the projected debt-to-GDP ratio over the next year; and the traded volume of government debt.
2/ For each country, the actual change in spread over the period is reported above the corresponding histogram.

Source: Datastream; Moody's Creditedge; Economist Intelligence Unit; and staff calculations.

[17] Contributions were calculated by multiplying the relevant coefficient for changes in the corresponding variables between September 2008 and January 2009 (or March 2009 for Figure 10 below). Variables whose coefficient were found to be statistically insignificant were imposed a zero coefficient.

The picture has changed substantially, though, from January to March (Figure 10 and Table 4). Investors' risk appetite appears to play a much smaller role in March, while concerns about the solvency of the national financial sectors have risen, particularly in Austria, Finland, Greece, and Portugal. On the other hand, concerns about domestic fiscal sustainability have risen in Belgium, Ireland, and Italy. This seems to indicate an improvement in market's perception of the euro area cyclical outlook starting from 2009Q2 but, at the same time, it suggests that markets have become progressively more concerned about the potential fiscal implications of national financial sectors' frailty and future debt dynamics. The liquidity of sovereign bond markets still seems to play a significant (albeit fairly limited) role in explaining changes in euro area spreads in few countries..

Figure 10. Contributions to the Change in Spreads, January 2003-March 2009 1/ 2/
(change end-March 2009 over end-September 2008, in basis points)



1/ For each country, the explanatory variables included in the model are the changes in: the common factor, the EDF of the median financial institution, the projected debt-to-GDP ratio over the next year; and the traded volume of government debt.
2/ For each country, the actual change in spread over the period is reported above the corresponding histogram.

Source: Datastream; Moody's Creditedge; Economist Intelligence Unit; and staff calculations.

V. CONCLUSIONS

In response to the deepening financial crisis, fiscal policy is providing important backing through the use of public balance sheets to shore up the financial system and to support activity in the face of the current unprecedented slowdown. While the use of public resources is critical to bolster aggregate demand and to break the adverse loop between the financial system and the real economy, it is key that the entailed fiscal cost not be seen by markets as undermining fiscal sustainability.

Financial markets seem to have responded to the significant deterioration in fiscal positions by requiring higher sovereign default risk premiums for most countries, and differentiating across sovereign issuers much more than before. While global risk factors continue to play a significant role in explaining movements in euro area sovereign interest rate differentials, country-specific developments—in particular rapidly rising projected debt levels as well as concerns about the solvency of national banking systems and their budgetary consequences—are becoming increasingly more evident.

The increasing importance played by national fiscal and financial market policies and, particularly, their effect on future government liabilities in explaining bond yield spreads in the euro area suggests that governments are currently facing greater financial market discipline than they used to prior to the crisis. Increasing sovereign spreads, in turn, could have a major impact on governments' marginal funding costs in the euro area, possibly undoing the beneficial effects of declining risk-free interest rates. Indeed, any loss of market confidence is deemed to lead to increases in long-term real interest rates and debt-service costs, partly offsetting the stimulus effects of measures taken to deal with the crisis and further adding to financing pressures.

Evidence of increased financial market's awareness—and, thereby, discrimination ability in the face of country-specific policy actions—is extremely compelling from a policy viewpoint. In particular, it seems to support the position that restoring trust in the financial system is key—not only to shape the recovery, but also to increase the effectiveness of fiscal stimulus measures while reducing future governments' financing costs. At the same time, it strengthens the argument for a credible commitment to long-run fiscal discipline and a clear exit strategy from a supportive policy stance as the crisis abates. Casting short-term fiscal expansion within a credible medium-term framework and envisaging fiscal adjustments as economic conditions improve could conceivably help euro area governments curb solvency concerns in financial markets. Structural reforms—tackling aging-related public costs looming ahead and enhancing potential growth and, thereby, medium-term revenue prospects—are also likely to work in the same direction. Together, these measures maybe able to ensure that yesterday's global financial crisis does not sow the seed of tomorrow's vicious domestic debt dynamics.

Table 1. Explaining Common Factor's Dynamics 1/ 2/ 3/

(a) Long-run Relation

Dependent Variable: Common factor
Method: Least Squares
Sample: January 2001-April 2009
Included observations: 2153

Variable	Coefficient	t-Statistic
Constant	-8.46	-20.63
Expected inflation	-4.04	-36.56
Euribor spread	-1.40	-25.74
EMBI+ spread	0.06	16.80
VDAX	0.92	42.23
VG7 currencies	2.45	40.92
Adjusted R-squared	0.86	
Mean dependent variable	0.86	
S.E. of regression	1.27	
S.D. dependent variable	8.55	
Durbin-Watson statistics	0.07	

(b) Short-run Dynamics

Dependent Variable: D(Common factor)
Method: Least Squares
Sample: January 2001-April 2009
Included observations: 2143

Variable	Coefficient	t-Statistic
D(Common factor (-1))	0.25	11.60
D(Common factor (-2))	0.16	7.41
ECM(-10)	0.00	-2.85
D(Expected inflation)	-0.11	-2.17
D(Euribor spread)	-0.09	-1.57
D(VDAX)	0.00	3.00
D(VG7 currencies)	0.02	2.17
D(EMBI+ spread)	-0.06	-1.01
Adjusted R-squared	0.13	
Mean dependent variable	0.12	
S.E. of regression	0.09	
S.D. dependent variable	0.10	
Durbin-Watson statistics	2.01	

Source: Datastream; and staff calculations.
1/ Expected inflation is derived from 10-year inflation-linked government bonds; Euribor spread is the difference between the 12-month Euribor and the Overnight Indexed Swap; VDAX is the implied volatility of the German stock market; VG7 currencies is the implied volatility of G7 currencies.
2/ D indicates that the variable is expressed in first difference.
3/ ECM is the error correction term.

Table 2. Panel Estimates 1/ 2/ 3/

Dependent Variable: D(Spread)
Method: Two-stage Least Squares

Sample: January 2003 - January 2009

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant Pre October	**3.57**	0.02	**3.43**	0.02	**1.61**	0.00	**1.60**	0.00
Constant Post October	**16.44**	0.03	**16.37**	0.06	**14.83**	0.09	**14.08**	0.10
D(Spread(-1))	**-0.23**	0.03	**-0.22**	0.04	**-0.24**	0.02	**-0.20**	0.05
D(Common Factor)	**4.14**	0.00	**4.11**	0.00	**4.08**	0.00	**4.50**	0.00
D(Projected Debt Pre October)	**0.26**	0.02	**0.24**	0.03	**0.28**	0.02	**0.47**	0.07
D(Projected Debt Post October)	**0.58**	0.00	**0.57**	0.00	**0.57**	0.00	**0.73**	0.01
D(EDF Pre October)	1.83	0.62	1.60	0.66	1.74	0.61	1.00	0.77
D(EDF Post October)	1.34	0.88	1.54	0.86	3.97	0.43	**11.10**	0.02
Liquidity Pre October 4/	**-0.12**	0.00	**-0.14**	0.00	**-0.11**	0.00	**-0.09**	0.00
Liquidity Post October 4/	**-1.64**	0.06	**-1.68**	0.04	**-1.50**	0.01	**-1.04**	0.01
Projected Fiscal Balance Pre October	0.04	0.72	-0.08	0.30	-0.17	0.11		
Projected Fiscal Balance Post October	-1.47	0.41	-1.90	0.08	-2.25	0.12		
Projected Growth Pre October	-0.70	0.10	-0.61	0.10				
Projected Growth Post October	-3.60	0.60	-3.39	0.63				
Projected CAB Pre October 5/	-0.08	0.21						
Projected CAB Post October 5/	-0.51	0.41						
Adjusted R-squared	0.53		0.52		0.51		0.49	
Total observations	725		725		726		726	

Sample: January 2003 - March 2009

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant Pre October	**3.23**	0.05	**3.09**	0.05	**1.54**	0.00	**1.57**	0.00
Constant Post October	**13.04**	0.00	**13.16**	0.01	**12.22**	0.01	**14.73**	0.00
D(Spread(-1))	**-0.21**	0.00	**-0.20**	0.00	**-0.22**	0.00	**-0.19**	0.02
D(Common Factor)	**4.79**	0.00	**4.85**	0.00	**4.87**	0.00	**4.66**	0.00
D(Projected Debt Pre October)	0.26	0.19	0.24	0.22	0.23	0.19	0.33	0.19
D(Projected Debt Post October)	**0.56**	0.02	**0.55**	0.03	**0.51**	0.02	**0.58**	0.04
D(EDF Pre October)	0.89	0.79	0.67	0.84	0.36	0.91	-0.06	0.99
D(EDF Post October)	**6.89**	0.00	**6.77**	0.00	**7.39**	0.00	**8.66**	0.00
Liquidity Pre October 4/	**-0.12**	0.01	**-0.13**	0.01	**-0.11**	0.00	**-0.08**	0.00
Liquidity Post October 4/	**-1.21**	0.00	**-1.24**	0.00	**-1.18**	0.00	**-1.06**	0.00
Projected Fiscal Balance Pre October	0.00	0.97	-0.09	0.21	-0.18	0.10		
Projected Fiscal Balance Post October	-0.39	0.68	-0.59	0.46	-1.08	0.13		
Projected Growth Pre October	-0.60	0.20	-0.52	0.20				
Projected Growth Post October	-3.18	0.40	-3.26	0.40				
Projected CAB Pre October 5/	-0.06	0.34						
Projected CAB Post October 5/	-0.35	0.41						
Adjusted R-squared	0.50		0.50		0.49		0.47	
Total observations	745		745		746		746	

Source: Economist Intelligence Unit, Moody's Creditedge, Bloomberg, and staff calculations.
1/ White cross-section standard errors & covariance (d.f. corrected). Significant coefficients in bold.
2/ Lags of EDF are used as instrument for EDF.
3/ "Pre October" refers to the period January 2003-September 2008. "Post October" refers to the period October 2008-January 2009 or October 2008-March 2009.
4/ "Liquidity" is the market value of traded euro denominated 10-year government bonds.
5/ "CAB" is the current account balance.

Table 3 Seemingly Unrelated Regression Estimates, January 2003-January 2009 1/ 2/

Sample: January 2003-January 2009
Total observations: 726

	Constant	D(Common Component)	D(Projected Debt Pre October)	D(Projected Debt Post October)	D(EDF lagged)	Liquidity 3/	D(Spread (-1))	Adjusted R-squared
Austria	**4.94**	**3.43**	**0.73**	**0.89**	**79.97**	**-0.61**	**-0.19**	0.74
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Belgium	**2.81**	**5.03**	0.29	**0.47**	98.89	-0.18	**-0.25**	0.37
	0.05	0.00	0.20	0.05	0.21	0.20	0.00	
Finland	-2.17	**1.96**	-0.14	0.12	-28.31	0.44	-0.13	0.07
	0.51	0.01	0.47	0.60	0.67	0.42	0.18	
France	**2.32**	**3.24**	**-0.23**	-0.12	3.67	**-0.14**	**-0.23**	0.43
	0.00	0.00	0.03	0.30	0.76	0.00	0.00	
Greece	**5.77**	**7.39**	0.16	**0.90**	1.65	**-0.57**	-0.08	0.57
	0.01	0.00	0.34	0.00	0.58	0.05	0.23	
Ireland	-7.34	**10.20**	**0.69**	**1.47**	**2.40**	1.30	0.10	0.65
	0.59	0.00	0.02	0.00	0.04	0.53	0.32	
Italy	6.91	**2.16**	0.31	**0.66**	**45.67**	**-0.33**	**-0.30**	0.43
	0.00	0.02	0.28	0.02	0.03	0.00	0.00	
Netherlan	**5.24**	**3.92**	-0.08	0.41	19.27	**-0.48**	**-0.35**	0.55
	0.00	0.00	0.75	0.11	0.69	0.00	0.00	
Portugal	**8.13**	**6.59**	0.33	**0.68**	-2.08	**-1.34**	**-0.10**	0.44
	0.00	0.00	0.24	0.02	0.74	0.00	0.22	
Spain	**2.24**	**6.28**	0.14	**0.47**	-5.19	-0.12	**-0.23**	0.56
	0.01	0.00	0.31	0.01	0.79	0.13	0.00	

Source: Economist Intelligence Unit, Moody's Creditedge, Bloomberg, and staff calculations.
1/ For each country, coefficients are reported in the first row (significant coefficients in bold), and P-values in the second row.
2/ "Pre October" refers to the period January 2003-September 2008. "Post October" refers to the period October 2008-January 2009.
3/ "Liquidity" is the market value of traded euro denominated 10-year government bonds.

Table 4. Seemingly Unrelated Regression Estimates, January 2003-March 2009 1/ 2/

Sample: January 2003-March 2009
Total observations: 746

	Constant	D(Common Component)	D(Projected Debt Pre October)	D(Projected Debt Post October)	D(EDF Pre October (-1))	D(EDF Post October (-1))	Liquidity 3/	D(Spread (-1))	Adjusted R-squared
Austria	**4.66**	**2.63**	**0.87**	**0.80**	-31.87	**90.40**	**-0.55**	-0.03	0.71
	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.59	
Belgium	2.17	**5.73**	**0.54**	**0.57**	-19.75	190.93	-0.11	**-0.24**	0.42
	0.15	0.00	0.01	0.02	0.84	0.22	0.47	0.00	
Finland	-2.17	**2.46**	-0.02	**-1.03**	-31.46	**316.78**	0.46	-0.11	0.18
	0.51	0.00	0.92	0.00	0.62	0.00	0.39	0.19	
France	**2.58**	**2.59**	-0.07	0.05	32.26	18.06	**-0.15**	**-0.18**	0.37
	0.00	0.00	0.54	0.71	0.15	0.28	0.00	0.01	
Greece	**5.17**	**6.93**	0.11	**0.50**	0.19	**29.06**	**-0.49**	**-0.15**	0.60
	0.01	0.00	0.45	0.03	0.94	0.01	0.05	0.02	
Ireland	-11.14	**9.78**	**0.93**	**1.53**	-11.93	-0.05	1.92	**0.18**	0.64
	0.42	0.00	0.01	0.00	0.51	0.94	0.36	0.03	
Italy	**6.69**	**1.41**	0.17	**0.67**	**92.33**	13.86	**-0.32**	**-0.16**	0.46
	0.00	0.09	0.50	0.01	0.00	0.51	0.00	0.02	
Netherlands	**4.96**	**4.04**	**-0.42**	0.10	81.34	17.74	**-0.46**	**-0.28**	0.55
	0.00	0.00	0.04	0.50	0.26	0.71	0.00	0.00	
Portugal	**7.87**	**4.87**	0.41	0.48	0.69	**25.70**	**-1.31**	-0.11	0.47
	0.01	0.00	0.23	0.21	0.94	0.00	0.01	0.21	
Spain	**3.11**	**6.90**	0.09	**0.41**	-39.33	**-36.48**	**-0.22**	**-0.20**	0.59
	0.00	0.00	0.57	0.02	0.20	0.01	0.02	0.02	

Source: Economist Intelligence Unit, Moody's Creditedge, Bloomberg, and staff calculations.
1/ For each country, coefficients are reported in the first row (significant coefficients in bold), and P-values in the second row.
2/ "Pre October" refers to the period January 2003-September 2008. "Post October" refers to the period October 2008-March 2009
3/ "Liquidity" is the market value of traded euro denominated 10-year government bonds.

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