How do Financial Institutions Forecast Sovereign Spreads?*

Jacopo Cimadomo, Peter Claeys, Marcos Poplawski-Ribeiro

June 2015

Abstract

This paper assesses how financial market participants form their expectations about future government bond spreads. Using monthly survey forecasts for France, Italy and the UK between January 1993 and October 2014, we test whether respondents consider the expected evolution of the fiscal balance—and other economic fundamentals—to be significant drivers of the expected bond yield differential over a benchmark German 10-year bond. Our main result is that a projected improvement of the fiscal outlook significantly reduces expected sovereign spreads. This suggests that credible fiscal plans affect market experts' expectations and reduce the pressure on sovereign bond markets. In addition, we show that expected fundamentals generally play a more important role in explaining forecasted spreads compared to realized spreads.

JEL Classification Numbers: E62, G10, H30.

Keywords: market expectations, sovereign bond spreads, survey data, Consensus Economics Forecast.

Authors' E-Mail Address: jacopo.cimadomo@ecb.int; peter.claeys@vub.ac.be; mpoplawskiribeiro@imf.org

* We would like to thank Olivier Blanchard and Abdelhak Senhadji for helpful discussions and comments. We also would like to acknowledge Magnus Andersson, Lorenzo Forni, Jason Harris, João Jalles, and the participants at ECB and IMF-FAD seminars, the 2013 European Economic Association (EEA) annual meeting, the International Institute of Public Finance (IIPF) congress and the International Finance and Banking Society (IFABS) conference, 3rd UECE Conference on Economic and Financial Adjustments in Europe, the 19th Annual International Conference on Macroeconomic Analysis and International Finance (ICMAIF) for their suggestions. Nancy Tinoza provided excellent research assistance. The opinions expressed herein are those of the authors and do not necessarily reflect those of the ECB, the Eurosystem, or the International Monetary Fund.

Contents

Tables

Figures

I. INTRODUCTION

The global financial crisis fallout significantly unsettled European sovereign bond markets. Bond spreads jumped during the crisis in tandem with a deteriorating outlook for public finances, worsening macro-economic conditions, and rising international risk aversion.

Views diverge over the causes of this sovereign bond market turbulence. One interpretation is that markets paid little attention to fiscal and economic fundamentals before the crisis in the European Monetary Union (EMU), and thus spreads were excessively low. With the deterioration of the fiscal and economic outlook, bond investors rediscovered the role of those fundamentals (Ghosh et al., 2013). Another interpretation is that risk premia are in fact mostly driven by market sentiment and are mostly independent of the underlying expected fundamentals (Blommestein et al., 2012). Thus, uncertainty about policy outcomes could make investors sell sovereign bonds out of fear and lead to a mispricing in bond markets (see also Akerlof and Shiller, 2009).

Each of these views carries a different policy prescription. Under the former view, fiscal consolidation and improved economic conditions are necessary steps in narrowing bond spreads. Indeed, sound fiscal and macroeconomic plans that credibly anchor market expectations about the path of future policies are the most cost-effective way to restore trust in the long-term sustainability of public finances (Bi, 2012). Under the latter view, bond market reactions may be very difficult to predict as they are fueled by sentiment and instincts. Pledging to pursue sustainable fiscal policy may be insufficient to shift expectations and reduce spreads.

An extensive empirical literature has documented a reduced role for fiscal fundamentals in determining realized bond spreads, i.e., the actual spreads observed in the bonds markets. According to some authors, actual bond yield differentials are determined more by international financial market developments than by country-specific risk factors (Favero and Missale, 2012). Other studies argue that increased macroeconomic uncertainty has relaxed the relationship between macro- and fiscal fundamentals and realized bond spreads, with differentials being mostly driven by shifts in beliefs (De Grauwe and Ji, 2013). As they look into the reaction of realized spreads to actual fiscal fundamentals, however, most of these empirical studies do not treat expectations explicitly.

Another recent literature, in turn, includes the expected outlook for fiscal policy when explaining those realized spreads. They do that either implicitly by considering the fiscal overhang of bank-bailouts (Gerlach et al., 2010) or explicitly by using deficit forecasts (Laubach, 2009). The main idea behind this approach is that actual market prices incorporate the expectations of the future path of fiscal and economic fundamentals, rather than their current or past values. Overall, while some of these papers find that actual bond prices tend to react to expected developments in fiscal variables and other macroeconomic fundamentals

(Attinasi et al., 2009), others find a much weaker role for these variables (Arghyrou and Kontonikas, 2011). Yet, this strand of the literature does not investigate how market participants' expectations about future bond yields react to changes in their perception of future macroeconomic and fiscal developments.

Indeed, which variables underline the forecast of sovereign spreads by financial institutions is still unknown in the literature. In particular, it is not clear whether these institutions value predominantly fundamental or non-fundamental factors in their projections. In addition, the relative weight of each specific fundamental factor in predicting spreads is also not known. This paper addresses both unknowns. First, we test the importance of fundamental as well as non-fundamental factors (specifically, a global risk factor) in the forecasting of sovereign spreads. Second, we estimate the contribution of three key fundamentals (inflation, GDP growth and the government overall balance) in shaping the forecasted spreads.

Understanding how expectations about future sovereign spreads are formed directly relates to the need to anchor market expectations about fiscal policy and sovereign risk premia. According to a recent literature, credibly anchoring the market's fiscal expectations can significantly improve the effectiveness of macroeconomic policies (Leeper, 2009 and 2010) by, among others, alleviating the risk premium and ensuring government solvency (Bi, 2012).

Importantly, current (actual) financial variables—including bond spreads—do not necessarily reflect expectations about future fiscal and macroeconomic conditions in the same way as future (expected) financial variables. In fact, fundamentals are often found to play an important role in explaining the long-run predictability of financial variables and exchange rates, but generally have little power in accounting for current market developments.[1] In addition, a vast finance literature has also shown that other factors—including high frequency news and "irregular" trading behaviors (e.g., bandwagon effect, excess speculation, and major trading manipulation)—are important in explaining the short-term dynamics of financial variables and exchange rates;[2] whereas their role is less clear in

[1] Focusing on foreign exchange markets, for example, Cheung, Chinn, and Marsh (2000) and Cheung and Chinn (2001) survey UK- and US-based foreign exchange (FX) dealers and find that, at short horizons, exchange rate movements do not reflect changes in fundamentals. However, for medium-term horizons (up to six months), 60 percent of the US-based FX dealers responded to those surveys that exchange rate movements move according to fundamentals. For horizons over 6 months that proportion rose to 88 percent.

[2] De Bondt and Thaler (1985) and Barberis et al. (1998), for example, show that agents tend to over- or under-react to unexpected news about firms' profitability, leading to realized stock prices which are significantly different from those initially forecasted. In turn, using laboratory experiments, Hommes et al. (2005), Bao et al. (2012), and Bao, Duffy, and Hommes (2013) find that realized prices may differ significantly from expected values, typically exhibiting oscillations around or slow convergence to them.

explaining the medium or long-term forecasts of the same variables (e.g., Odean, 1999; Shleifer, 2000; Hirshleifer, 2001; Claessens and Kose, 2013; and Hommes, 2014).[3]

Overall, this literature suggests that fundamentals should affect the expectations and realizations of financial variables (including sovereign spreads) in substantially different ways.[4] However, instead of directly inquiring about such differences via a survey to sovereign bond traders (Cheung and Chinn, 2001) or by designing a laboratory experiment (Hommes et al., 2005), we look into the forecasters predictions itself and "let the data speak" to investigate how these variables influence forecasted and actual sovereign bond spreads.

We employ a survey-based monthly dataset of individual forecasters to analyze how financial markets price future fiscal policy and macroeconomic developments into expected bond spreads. These forecasters are mainly financial institutions and (private and public) research centers. We focus on France, Italy, and the UK on a large sample from January 1993 until October 2014 including, therefore, a substantial part of the recent financial crisis.

For each of these market experts, we calculate the one-year-ahead spread between the forecasted benchmark 10-year government bond yield in each of these three countries versus the forecasted 10-year German government bond yield. Using GMM methods to address possible reverse causality issues, we then estimate whether market experts' projections for the overall balance, GDP growth and inflation—as well as a global risk factor—play a significant role in explaining their forecast of the government bond spreads. To the best of our knowledge, this is the first analysis attempting to understand how market experts form sovereign bond spread projections, which factors play a role in shaping such forecasts, and how they differ from the determinants of actual spreads.

Our main finding is that fiscal and other macroeconomic fundamentals projections significantly explain the one year-ahead expectations of the French, Italian and UK sovereign spreads over Germany. In particular, an improvement in the one-year-ahead projected fiscal outlook reduces expected spreads. This is especially the case for the Italian spread: a 1 percent rise in the expected surplus ratio to GDP reduces forecasted spreads by 36 basis points; whereas the effect is smaller—but still significant—for the French and UK spreads. The projected overall balance and real GDP growth have a substantially larger effect on the expectations of future government spreads compared to regressions based on realized

[3] Related work has also been done in macroeconomics. For example, Mankiw and Reis (2002), Woodford (2001), Sims (2003), or Coibion and Gorodnichenko (2015), analyze how sticky information or rational inattention can explain the lack of adjustment of expectations to news about the economy.

[4] In Europe's specific case some papers have estimated the impact of market sentiment on realized spreads (Aristei and Martelli, 2014). More recently, the European ban on naked short sales of euro-zone government cash bonds and related CDS in 2012 have further restricted the dealers' abilities to make markets, exacerbating price moves at times of stress (see Citibank, 2012; and Shearman and Sterling, 2012).

spreads. For the UK spread, the sign of the effect of forecasted growth on expected spreads even changes compared to realized spreads. These results are robust to a number of checks as, for example, the inclusion of several measures aimed at capturing the distance of an economy from its fiscal limit, i.e., from its level of unsustainable public finances (Bi et al., 2013).

Our results also show that, until the recent financial crisis, a weaker growth outlook was associated with a reduction in forecasted spreads. This might reflect a flattening of the yield curve in bad economic times, possibly due to the expectation of easier monetary policy. Nevertheless, this relationship is reversed for Italian spreads during the financial crisis. During this period, expectations of higher growth considerably reduce the expected Italian 10-year bond spread, suggesting that markets perceive future growth as a crucial to the future sustainability of public finance. Finally, the expectation of higher inflation tends to increase expected spreads. This is particularly true for the UK spread across the full sample.

Our findings confirm the importance of transparency and anchoring fiscal expectations (Leeper, 2009; and Bi, 2012). They also corroborate the claim that providing credible signals of sound fiscal and macroeconomic policies—consistently oriented to long-term sustainability—helps to anchor market expectations about future developments in the sovereign debt market and risk premia. These results further indicate some degree of discipline exerted by financial markets on fiscal policymakers.

The rest of the paper is structured as follows. Section II reviews the literature on the determinants of sovereign bonds spreads. Section III describes the dataset used in this study, Section IV presents the methodology and Section V the results. Conclusions and policy implications follow in section VI.

II. LITERATURE REVIEW

The literature on the determinants of sovereign bond yields and spreads has expanded substantially in recent years, mainly reflecting heightened concerns about European sovereign debt markets during the recent crisis. Most of this literature studies the effects of fiscal (and other) economic fundamentals on the realized spread of sovereign bonds. Some papers attribute a role to the sovereign's fiscal position in determining realized bond spreads in industrialized and emerging economies (e.g., Codogno et al., 2003; Bernoth et al., 2004; Akitoby and Stratmann, 2008; Schuknecht et al., 2010; Poghosyan, 2012; Aizenman et al., 2013), but most papers fail to find fiscal variables and default risk among the main determinants of bond spreads for advanced economies. Liquidity risk only appears to be relevant in times of severe economic or fiscal stress (Pagano and von Thadden, 2004; Beber et al., 2009). These papers also tend to find that other economic fundamentals are weakly significant in explaining government bond spreads.

The prime reason invoked for this lack of response to country-specific factors and, in particular, to fiscal developments is that bond yield spreads are increasingly driven by international factors that reflect global investor risk aversion (Codogno et al., 2003; Geyer et al., 2004; Favero et al., 2010; Manganelli and Wolswijk, 2009). Financial integration has made investor portfolios co-move more strongly, such that portfolio adjustments tend to more uniformly shift in one direction (in times of uncertainty, that generally implies towards safe havens). This evolution has made bond yields increasingly sensitive to global conditions, rather than on country-specific risk factors (Caceres et al., 2010; Alper and Forni, 2011; Kumar and Okimoto, 2011). Global risk nonetheless seems to catalyze domestic risk: investors have been particularly sensitive to the worsening of fundamentals at times of increased turbulence in global financial markets (Favero and Missale, 2012).

More recently, some authors have suggested directly relating realized sovereign spreads to some proxy for expectations on fiscal developments (Laubach, 2009). In this context, some papers have employed future implicit or explicit liabilities, such as the size of bank rescue packages and the position of the domestic banking sector, in the analysis of government bond spreads (Ejsing and Lemke, 2009; Attinasi et al., 2009; Gerlach et al., 2010). It emerges that actual bond yield differentials strongly respond to these indicators. Other studies use deficit forecasts like those produced by the European Commission (EC) or other international institutions, such as the OECD or the IMF (Heppke-Falk and Hüfner, 2004; De Santis, 2014).

In the past, datasets containing forecasts of fiscal and other macroeconomic variables were limited to governments and international institutions. More recently, survey forecasts—like the Survey of Professional Forecasters (SPF) in the US, the Survey of Professional Forecasters in Europe, or the Consensus Forecasts for a set of OECD and emerging economies—have become publicly available. Such databases allow for the scrutiny of a large set of individual forecasters like financial institutions and research institutes.

A few papers have also started to use fiscal variable forecasts from survey data. D'Agostino and Ehrmann (2014), for example, use Consensus Forecast data to investigate the time-varying relationship between (realized) sovereign bond spreads of the G7 countries, and expectations about macroeconomic fundamentals. Their results show that several risk factors downplayed in the years preceding the global financial crisis, but an over-pricing of the same factors occurred during the European sovereign debt crisis. [5]

[5] Poplawski-Ribeiro and Rülke (2011) use survey forecasts as well. They employ survey data from Consensus Forecast to analyze whether financial market expectations of government budget deficits changed in France, Germany, Italy, and the UK under the Stability and Growth Pact (SGP). Dick et al. (2013) exploit the macroeconomic projections from the US.'s Survey of Professional Forecasters to study the determinants of US government bond yields.

All of these papers focus on the determinants of realized spreads. In this context, the observed sovereign bond yield differential reflects the equilibrium market price after financial market participants have formed their expectations and acted accordingly. The studies reviewed above use only a single forecast of the fiscal stance: either the one produced by an institution, or the average of a survey of forecasters.[6]

III. DATA: FINANCIAL MARKET PARTICIPANTS' FORECASTS

A. Consensus Economic Forecasts

We use Consensus Economic Forecast data to investigate the relationship between the projections of macroeconomic fundamentals and of sovereign bond spreads. Consensus Economics Forecasts, Inc. (CEF) conducts a survey in some OECD countries among professional economists working for commercial or investment banks, industry, government based agencies, and university departments. Most of the surveyed experts are at domestic institutions that provide forecasts for only a single country; a few work for international financial institutions or research institutes that provide forecasts for several countries simultaneously. As most forecasters work at financial institutions, forecasts likely reflect market expectations better than forecasts issued by public institutions (D'Agostino and Ehrmann, 2014).

Unlike other surveys, individual forecasts in the CEF should not suffer a bias owing to the release of strategic forecasts, as often happens for official forecasts released by governmental agencies (Ottaviani and Sorensen, 2006). CEF data are public, which prevents a participant from reproducing others' forecasts and also limits the possibility of herding (Trueman, 1994). Analysts are bound in their survey answers by their recommendations to their clients, and discrepancies between the survey and their private recommendation would be hard to justify (Keane and Runkle, 1990). In addition, and unlike other surveys, professional economists who participate in the CEF poll take both a stance on the direction of the expected change of a macroeconomic variable, and also forecast the level of the macroeconomic variable. Evidence shows that CEF forecasts are less biased and more accurate than other surveys.[7]

---

[6] Wieland and Wolters (2011) compare the predictions of forecasters to the projections derived from large macro-economic models in order to test if the macro models perform as well as private sector forecasters. Franses et al. (2012) attribute prediction errors from large macro-models partly to modeling problems and partly to judgment mistakes.

[7] Batchelor (2001) shows that CEF forecasts are less biased and more accurate in terms of mean absolute error and root mean square error than OECD and IMF forecasts. Dovern and Weisser (2011) also find that the participants in the CEF poll provide rational and unbiased inflation and growth forecasts for the G7 countries.

Hence, we can reasonably argue that the CEF survey data broadly reflect the spectrum of expectations of market participants.

CEF has gradually expanded the scope and coverage of the survey by including several variables for some OECD countries. We focus on Italy, France and the UK, with data covering January 1993 to October 2014. Apart from Germany, these are also the only European Union countries for which fiscal forecasts are included in the CEF survey for a long time span. By including the UK, we also allow for the study of a non-euro area country and benefit from the extensive UK dataset included in the CEF.

Overall, CEF includes 52 forecasters in France, 42 in Italy, and 86 in the UK. Our sample is a subset of these respondents. Despite the gradual expansion of the dataset, fiscal forecasts have not always received the same attention from forecasters over time. Some forecasters stopped producing projections for the overall balance over time, while others that were initially included, left the sample owing to closure, mergers, or other reasons. Moreover, new forecasters joined the CEF survey only at a later stage. Therefore, we do not consider those forecasters that have participated for fewer than 12 consecutive months in the CEF survey. This reduces the panel to 32 forecasters in France, 29 forecasters in Italy, and 61 in the UK.[8] The Appendix provides an overview of the forecasters we use in our sample.

B. Data description and stylized facts

The survey enquires respondents every first week of each month about current and year-ahead forecasts for a number of macroeconomic variables. The forecasts are then published early in the second week of the same month.[9] The forecasts require some transformations before they can be used in the empirical analysis.

Bond yield spreads

In each month *m* of year *t*, the CEF survey provides the forecast of the 10-year government bond rate (and of the other relevant variables) for year *t* and *t+1*. The monthly update implies a shrinking horizon of the forecast. Hence, we compute an interest rate forecast at a constant horizon of 12 months, following Dovern et al. (2012). We calculate the bond rate as a weighted average of the same-year and the year-ahead bond rate with arithmetic weights $\left(1-\frac{m}{12}\right)$ and $\frac{m}{12}$ respectively. Hereafter, we refer to this "hybrid" bond rate as a "fixed horizon" bond rate.

[8] We also apply stricter selection criteria and exclude those forecasters that did not participate in the CEF for at least 24 or 48 months from the sample. The findings do not change substantially.

[9] Further information on how the survey is conducted is available via the Internet: www.consensuseconomics.com.

From this fixed horizon forecast, we then construct the spread based on the average of all fixed horizon forecasts for Germany. In other words, for each French, Italian and UK forecast, we take the difference between the fixed horizon bond rate forecast and the mean of all German forecasters' fixed horizon bond rate predictions in the same month.

This bond spread still includes an exchange rate premium for the UK over the full sample and, for France and Italy, an exchange rate premium exists in the pre-EMU period. To filter out this effect, we subtract the forward swap spread from the forecast spread. The forward swap spread is the difference in the 10-year fixed interest rate from forward swap contracts denominated in the two currencies. Since swap contracts are free from default risk, the difference purely reflects exchange rate risk.

Figure 1 summarizes the information of all spread forecasts by plotting the first and the third quartile of the forecasters' distribution—and comparing them with the actual spread for the three countries under investigation. The figure highlights a large degree of disagreement among forecasters on the one-year-ahead spread. The range between the upper and the lower quartile in forecasted spreads is generally not less than 50 basis points.

The 1999-2007 period has been characterized by higher consensus among forecasters, and the forecast distribution tends to track quite closely the actual spread. However, for France and Italy, the range in forecasts increased to about 100 basis points during the recent crisis. For the UK, despite the less pronounced increase in actual spreads after 2008, there is also a rise in the dispersion of forecasts. During the global financial crisis, actual spreads appear to be generally under-predicted, revealing that market participants tended to be *ex-ante* overly optimistic about developments in sovereign debt markets.

The size (and persistence) of the forecast errors during the global financial crisis is also evident from plotting the Root Mean Square Error (RMSE).[10] Figure 2 shows that forecast errors are relatively small in all three countries at least until the financial crisis. At the start of the financial crisis, forecast errors began to diverge, particularly for Italy. In the summer and autumn of 2011, the RMSE spiked for Italy as respondents largely underestimated the rise in bond spreads in this highly tense period for the Italian sovereign debt market . RMSEs also increased for French and British bond spreads, but to a lesser extent.

[10] These RSMEs are based on forecasters providing a forecast in each time period.

Fiscal balance ratio

CEF asks respondents for a forecast of the overall fiscal balance in nominal terms.[11] In order to transform this forecast into one of the overall balance as a ratio to GDP, we divide the forecast of the nominal balance (surplus) for year *t+1* in a certain month *m* by the GDP forecast for the same year. As the CEF only provides forecasts of GDP *growth rates*, we compute the year-ahead nominal GDP level forecast by applying the CEF growth rate to the latest available estimate for the same year GDP level. The latter is taken from IMF WEO (see Appendix A for more details).

Figure 3 displays the quartile-distribution of the year-ahead fiscal balance ratio forecasts. This range between the first and third quartile is generally rather small and contained in an interval of just 0.5 percentage points around the median for all three countries under examination. The range increases to 1 percentage points when there are major turning points in the actual fiscal balance. This strong consensus among forecasters continues even during the global financial crisis.

This agreement does not imply accurate forecasting. On the contrary, the actual fiscal balance—i.e., the annualized quarterly balance to GDP ratio—deviates from the forecasted balances quite considerably. This is corroborated by Figure 4 showing the RMSEs for the fiscal balance in each period. Values are much higher than the RMSEs for bond spreads, especially for an initial period up until 2002 and starting again in 2009. Between 2002 and 2009, budget forecast mistakes were less common. Since the global financial crisis, they have once again risen. Figures 3 and 4 show that, during the recent crisis, there has been a tendency to overestimate (underestimate) the overall balance (deficit) for all three countries in our sample, and especially for the UK.

IV. METHODOLOGY

In this section, we present the econometric model used in the analysis and the estimation approach. Our empirical model follows the standard specification adopted by the literature on sovereign spreads in the EU, in which the dependent variable (the sovereign spread) is generally assumed to depend on a set of domestic variables, foreign variables and other controls, often including a global risk factor (see, e.g., Manganelli and Wolswijk, 2009, Schuknecht et al., 2010; Poghosyan, 2012, Favero and Missale, 2012; Favero 2013). We use a similar set of explanatory variables although, given that we focus on private sector

[11] For France or Italy, specialists forecast the (nominal) overall balance for the current and subsequent year. For example, in each month of 2014 they release their forecast for the overall balance for 2014 and 2015. For the UK, specialists forecast the overall balance for the current and next fiscal year. For example, in each month of 2014 they release their forecast for the overall balance for the fiscal years 2014/2015 and 2015/2016.

expectations, our choice is limited by the data availability of the Consensus Forecasts dataset. Differently from the above-mentioned papers, given that our aim is to relate financial market experts' predictions of the long-term 10-year bond spread to the forecasted fiscal balance ratio to GDP while controlling for other variables, we use the one-year-ahead forecast of the sovereign spreads for France, Italy and the UK as dependent variables in our regressions.

In particular, based on private sector participants' projections as reported in the Consensus Forecast, we test whether expectations of the year-ahead *(t+1)* fiscal balance $E_{i,t,m}\left[surplus_{t+1}\right]$ for a certain forecaster *i* in some month *m* of year *t* influence the expected year-ahead bond spread $E_{i,t,m}\left[spread_{t+1}\right]$. In addition to the fiscal balance, other economic developments may also matter to the one-year-ahead forecasted government bond yield. Therefore, we control the relationship between the forecasted spread and forecasted overall balance for the expected one-year-ahead economic growth $E_{i,t,m}\left[growth_{t+1}\right]$, and the inflation rate $E_{i,t,m}\left[inflation_{t+1}\right]$.

Low expected growth may have a negative impact on expected spreads as forecasters are likely to expect longer term rates—and spreads on sovereign securities vis-à-vis a "risk-free" asset as the German Bund—to fall in the future. Low growth tends to be associated with a flattening of the yield curve due to an expected future easing in monetary policy. Therefore, this channel would suggest a positive coefficient of growth on spreads. However, growth may also matter for the projected fiscal position: the expectation of lower future growth implies additional fiscal adjustments in order to keep the budget deficit under control (Alesina et al., 1992). If a permanently lower level of growth casts doubt on the long-term sustainability of public finances, higher risk premia on sovereign bonds may be the consequence. This risk factor is likely more important for high debt countries (Bi, 2012). This channel would therefore suggest a negative coefficient of growth on sovereign spreads. Overall, the effect of growth on spreads will depend on which of the two channels prevail: in "normal times" or for low-debt countries, we might expect the first channel to prevail, while in "crisis times" or for high-debt countries, the second channel might be stronger.

With respect to inflation, if market participants expect higher inflation in the future, they may foresee a higher interest rate on government bonds. Inflation expectations push up the term structure, as monetary policy is expected to react by tightening. Hence, the response of sovereign interest rates and spreads to higher expected inflation should be unambiguously positive.[12]

[12] A possibly indirect effect of higher inflation on the budget may come from the erosion of the real value of debt. In advanced economies, however, savings on interest payments are unlikely to be sufficiently large to offset the effect of investors demanding a higher return on compensate the inflationary risk.

Besides the macroeconomic variables, global risk factors can be important in determining the expectations on spreads as most studies analyzing realized spreads suggest. Inclusion of these global risk factors is important to avoid unbiased estimators (e.g., Dell'Erba and Sola, 2011). In the literature, global risk has been generally proxied with a common "global" factor, corporate risk premia in the US, or indicators of market volatility like the VIX Index. Other papers have used the bond rate of a reference country (Blommestein et al., 2012). In line with this approach, we include the forecast of the 10-year US government bond yield as a proxy of international developments and global risk.[13] Descriptive statistics of all variables are shown in Table 1.

Most studies that analyze actual bond yield differentials define all explanatory variables in relative terms to the benchmark country. Hence, we use CEF forecasts from surveyed experts in Germany, and take the difference between the forecast of the overall balance, GDP growth, and inflation of each forecaster, and the mean forecast of those variables for Germany as explanatory variables (see, Favero and Missale, 2012; and Favero, 2013, for a similar approach).

Against this background, the baseline specification to test the relationship between projections of the fiscal balance and the expected sovereign spread for our panel of forecasters can be described as follows:

$$E_{i,t,m}\left[spread_{t+1}\right] = \begin{array}{c}\beta_1 E_{i,t,m}\left[surplus_{t+1}\right] + \beta_2 E_{i,t,m}\left[inflation_{t+1}\right] + \beta_3 E_{i,t,m}\left[growth_{t+1}\right] \\ + \beta_4 E_{i,t,m}\left[Z_{t+1}\right] + \sum_{n=2}^{12} \theta_n month_n + \alpha_i + \varepsilon_{i,t,m}\end{array}. \qquad (1)$$

$E_{i,t,m}\left[x_{t+1}\right]$ is the forecast for year *t+1* and for variable *x*, released at month *m* of year *t* by respondent *i*. In model (1), *x* is therefore the government overall balance, inflation, and the growth rate of GDP. In addition, *Z* represents the global factor, i.e., the interest rate on the 10-year government bond.[14] Respondents may not continuously update their forecasts and may only revise the forecast at regular intervals. This may introduce month effects into the forecasts. An additional reason for including month dummies is that some common events may change all forecasters' views on the economic outlook. Major events, like elections or a budget announcement, may modify all forecasters' information set contemporaneously. Hence, we add to (1) time (month) dummies $\left(\sum_{n=2}^{12} \theta_n month_n\right)$ for each month but January represented by the index n (February, $n=2$; March, $n=3$;…; December, $n=12$) to control for this effect. Each of these dummies equals to one whenever $n=m$ and equals zero

[13] In Section V.B, we also control for other global risk factors.

[14] The Appendix presents a description of the variables as well as their sources.

otherwise. Finally, α_i is a forecaster specific fixed-effect to account for unobserved heterogeneity across forecasters, estimating (1) with panel fixed effects.[15]

Estimation of the panel (1) by fixed effects is not straightforward as the forecast surplus, inflation, and real GDP growth are all potentially endogenous. The reason is that, for each forecaster, all three variables are likely to be part of the same forecasting model for the spread. To address this possible endogeneity issue, we estimate (1) with GMM.

To construct strong and valid instruments, we exploit the fact that respondents are updating their forecast each month. The update reflects the 'news' that each forecaster receives over time and that is used for the forecast revision. We use this 'news' as the instrument. We define the news as the month-to-month change $\left(E_{i,t,m}\left[x_{t+1}\right]-E_{i,t,m-1}\left[x_{t+1}\right]\right)$, and the year-on-year change $\left(E_{i,t,m}\left[x_{t+1}\right]-E_{i,t-1,m}\left[x_{t}\right]\right)$ of the first three regressors in (1), i.e., the overall balance, economic growth and inflation.

This set of instruments is in our view appropriate for the following reasons. First, the news are likely to be highly correlated with the year-ahead forecasts of the explanatory variables. In fact, when forecasters construct their macroeconomic projections in any month *m*, developments over the last month (the 'news') are taken into account in updating the forecasts. Second, the news is fully exogenous to the explanatory variables, that is, there is no feedback of the forecast series to the news during that month. Third, there is no direct impact from the forecast spread (i.e., our dependent variable) on the news.

We perform a battery of tests to check the validity and strength of the chosen instruments. The validity of the instruments is tested with the Hansen J-test. A p-value of less than 0.05 implies a rejection of the validity of instruments (at the 95 percent significance level). In addition, we compute the (HAC robust first-stage) LM test for weak instruments of Kleibergen and Paap (2006). A low statistic on this KP-test indicates weak instruments, which causes a bias in the coefficient estimates and size distortion in hypothesis tests (Stock et al., 2002). The null of weak instruments is rejected if the statistic is larger than the Stock-Yogo critical values for a single endogenous regressor.[16]

[15] This choice is also supported by a Hausman test.

[16] We further estimate the panel model with alternative robust estimators such as the Continuously Updated Estimator (CUE) and the Fuller-k estimator. Results based on these estimators (not shown here, but available upon request) confirm our main findings.

V. RESULTS

A. Baseline Results

Table 2 reports the estimates for the baseline model for the three countries' spreads across the entire January 1993– October 2014 sample. The main result is that expectations of a higher government budget surplus significantly reduce forecasted spreads for all the three countries. This effect is particularly strong for Italian spreads: a 1 percent rise in the expected surplus to GDP ratio reduces forecasted spreads by 36 basis points. The effect is smaller for French and UK spreads (approximately 3 and 5 basis points, respectively), but the coefficient is still statistically significant.

The growth outlooks also matter to forecasters. Higher expected economic growth in all three countries leads to larger forecasted spreads. As previously discussed, in normal times, an expected improvement in the economic outlook is likely to be associated with expectations of tighter monetary policy in the medium-term and an upward shift in the term structure. For the full period sample, this effect outweighs the possible fall in spreads triggered by fading concerns over the sustainability of public finances in the event of better growth prospects.

The effect of expected higher inflation is positive and significant only for UK spreads. This might be explained by a higher premium on UK bonds—and possibly tighter future monetary policy—when investors expect higher future inflation. For Italy and France, the coefficient on expected inflation is not significant. This may be related to the fact that during our full sample period, and especially in the EMU period, realized inflation and inflation expectations were relatively low in these two countries. As Dick et al. (2013) argue, in such a specific environment, it may be that investors cared relatively less about inflation compared to real growth or uncertainty.

The external global-risk factor indicates that more risk in the US, as reflected in a higher interest rate on the 10-years US government bond, indeed raises forecasted spreads in all three countries in our sample. This market stress effect from global risk is particularly strong for Italian spreads, more moderate for French and especially weak for UK spreads. The regressions diagnostics also show that the model is well identified: the KP test for weak instruments validates the use of the chosen instruments. In addition, we highlight that regression results are based on a large number of observations, i.e., around 2000 for France, 1200 for Italy and 2700 for the UK.

How do these results compare to those arising from the use of *realized* instead of forecasted spreads? We substitute the forecast with the realized spread at time *t* as the dependent variable. This implies that the left hand side variable is identical for all forecasters, instead of being specific to each forecaster. Results are reported in Table 3. It emerges that, in general, the use of realized spreads yields to smaller coefficients (in absolute value) for the fiscal surplus and GDP growth, compared to the regression based on forecasted spreads. In

particular, it turns out that the expected surplus reduces the *realized* French and Italian sovereign bond spread. However, the size of the effect is significantly smaller than in the case of forecasted spreads, particularly in Italy. Expectations by experts of a one-percent cut in the forecast deficit implies, on average, a fall of about 28 basis points in the Italian *realized* spread, which is around 80 basis points less than what we found using the forecasted spread. The effect on the French spread appears to be almost halved. For the UK spread, the effect is positive but in absolute value smaller than the one based on the forecasted spread. For GDP growth, in all three cases the effect is smaller compared to Table 2. Interestingly, for France and the UK, the sign of the growth coefficient is now reversed: a positive growth outlook tends to reduce realized spreads. For Italy, the coefficient on growth remains positive but it is now not significant. With respect to inflation, the coefficient becomes not significant for UK and positive and significant at the 10% level for Italy. For France, the effect on inflation is now reversed and becomes negative. As regards the external global-risk factor, the coefficient in Table 3 is broadly similar compared to what is reported in Table 2 for forecasted spreads.

Overall, these results suggest that the expected evolution of fundamentals – in particular the fiscal surplus and GDP growth – is quantitatively more relevant in explaining spread projections. This indicates that, ex-ante, market participants seem to assign a bigger role to these factors than what is observed ex-post. This also suggests that *realized* spreads are likely to reflect factors beyond the expected evolution of fundamentals.

B. Additional Results

Alternative indicators for global risk

As a first additional set of results, we test whether sovereign bond spreads are affected by a different common factor, as a proxy for market experts' aversion to international risk. So far, we have used the forecasted US yield as an indicator of international market movements and found this variable to significantly influence forecasted spreads. The reason for adopting this measure is that the other indicators of global risk that have been commonly used are realized series, and not projections. Indeed, CEF forecasters (or other survey-based forecasters) are not asked to provide projections on future global risk.

At the same time, several studies argue that other financial factors may also play a role in explaining the dynamic of sovereign spreads, especially in periods of market turbulence. We therefore replace the forecasted US 10-years yield with some alternative indicators for global risk.

First, we include the AAA-BAA US corporate bond spread, which is frequently used in the related literature (Codogno et al., 2003). This spread reflects international liquidity and credit risks. The first block in Table 4 shows that the main findings of Table 2 remain broadly

unchanged. In particular, the AAA-BAA corporate spread appears to raise forecasted spreads. The impact is quantitatively similar in Italy and the UK. In Italy, however, such a strong impact may be due to a weak fiscal position which makes this country more vulnerable to global shocks whereas, in the UK, results may reflect the strong interlinkages between the US and UK financial markets.

As the global financial crisis has connected fiscal budgets to banking sector bailouts, financial stability is likely an important indicator of risk to fiscal sustainability. Therefore, we use the difference between the IMF's Financial Stress Index (FSI) for the US, and the French, Italian and British FSI, as an indicator of potential financial sector problems in the three countries. The second block in Table 4 reveals that higher financial instability in the US—or a lower financial instability in the three European countries—has been associated with lower expected spreads. The banking crisis that impacted US financial markets probably made forecasters anticipate a flight to safer bonds in Europe.

Moreover, financial instability also puts fiscal sustainability at risk, particularly if budgets are already under pressure. Expected spreads may increase quickly with the combination of a high estimated deficit and an unstable financial sector. To test if this effect is significant, we interact the FSI with the projected fiscal balance. In the third block in Table 4, we observe a negative and, indeed, highly significant effect: higher surpluses do get an additional beneficial effect on spreads in presence of high financial instability in the US. However, this effect appears to be quantitatively small. Finally, the interaction coefficient between the fiscal balance and the BAA-AAA US corporate spreads remains negative for France and the UK, but turns positive for Italy. However, the coefficients on the country-specific 'fundamentals' in this regression remain broadly consistent with the baseline findings.

Overall, we find that the impact of global-risk factors tend to be statistically significant but small. Moreover, the overall fit of the regression does not significantly improve when these factors are included. This might be due to the fact that forecasters do not really pay much attention to other financial elements than those in the baseline model when making their bond spread projections.[17]

Primary balance

Next, we test a panel model in which we use the expected primary balance—instead of the overall balance—on the right-hand-side of the regression equation. This variable may help to address the possible issue of reverse causality, given that interest payments depend on interest rates on sovereign securities. Therefore, a change in interest rate conditions could

[17] Given the limited role found for such factors in our estimations, for parsimony, we do not include them in the additional regressions reported in the rest of the paper.

have an effect on expectations of the overall balance for the next year. We correct the forecasted overall balance ratio by subtracting the actual interest payments to GDP ratio. Results reported in Table 5 broadly confirm the main findings from the baseline regression: the sign on the coefficient on fiscal and macro-economic fundamentals is preserved. The future primary balance still has the expected negative sign for the three countries, and it is statistically significant for Italy and the UK. The other coefficients also preserve the sign of the baseline ones in Table 2.

Debt limit and Fiscal Space

One goal of our analysis is to use the forecasted surplus to GDP ratio to investigate how forecast spreads react to fiscal concerns, including debt sustainability. The surplus ratio, particularly the primary surplus (tested in Table 5), should capture concerns of debt sustainability as in the framework established by Bohn (1998).

Nevertheless, such specification can be expanded to test more explicitely the distance of the economy from its fiscal limit, i.e. the level at which public finances in one country become unsustainable. Therefore, we have performed some additional estimations by including measures of fiscal limit provided by the related literature.

Results are presented in Table 6. The first six columns of the table present the results of a new specification using two debt limit variables constructed by Polito and Wickens (2014). The first one (columns 1-3) is defined as "Fiscal Limit" and is an adaptation to an open economy (with distortionary taxation on income from labor, capital, and consumption) of the fiscal limit derived by Davig, Leeper, and Walker (2011) and Bi (2012). It identifies the point where the government no longer has the ability to increase its borrowing capacity through unanticipated changes in tax policy. The second variable (used in the regressions reported in columns 4-6) is based on the debt-to-GDP ratio. It identifies the government's borrowing capacity based on the market's anticipation of the future evolution of fiscal and monetary policy. Polito and Wickens (2014) refer to this measure as "Intertemporal Government Borrowing Capacity Limit" (IGBCL).

We have entered these two debt limit variables separately to our baseline specification. In this way, we test whether the distance to fiscal limit is relevant in explaining forecasted spreads. In addition, this allows to test if the forecasted surplus to GDP ratio captures also short-term effects of fiscal policy on spreads (e.g., short-term cyclical fiscal stabilization), on top of a possible effect linked to long-term sustainability. The results in Table 6 show that the debt limit variables have the expected negative sign in all estimations: the higher the fiscal limit (or the distance to it), the lower the expected sovereign spread. This also indicates that forecasters take into account both short- and long-term fiscal considerations (surplus ratio and fiscal limits, respectively) when forecasting spreads. The other variables, except for inflation in Italy and France, have similar coefficients to the baseline equation.

In the second robustness check on the fiscal limit (reported in columns 7-12 of Table 6), we develop two variables per country related to the notion of fiscal space and the debt-stabilizing primary balance (following Escolano, 2010). We then take the difference of these two variables (fiscal space and debt-stabilizing primary balance) with respect to the values for Germany.

The estimations are performed again by including separately the fiscal limit variables in the regressions. With the exception of the UK in Column 9, all other estimations display the expected significantly negative value for the fiscal space variables (related to fiscal limit). The country-specific surplus ratio remains negative for all countries, and negative and significant for Italy and the UK. The other variables of the regression generally display the same results as in the baseline specification (Table 2).

Realized Spreads

The realized level of spreads may also be an important determinant of the one-year-ahead forecast of the spreads. Therefore, we have included the lagged realized spreads (for month *m-1*) in the regression to test if this variable is important in explaining forecasted spreads. We use the lagged value of the realized spread for month *m-1*, and not the value for the current month *m*, because the latter is not fully known by forecasters at the time of their forecast in month *m*.[18] It is important to notice that, contrary to the forecasted spread, the realized spread is the same for every single forecaster.

Table 7 shows that the lagged market spreads significantly enter in the regression and increase its fit. In addition, the coefficients on forecast fundamentals (surplus, growth, inflation) turn out to be overall robust to the inclusion of this additional regressor. This result shows there is a partial adaptation of the forecasted spread to the realized spread on the market. This is likely to be the result of news being incorporated gradually over time. This also shows that forecasters weigh both the role of fundamentals (expected surplus, inflation and output growth) and past financial conditions in preparing their forecasts.

Data in levels

So far, we have expressed all variables as a difference of the CEF forecast from surveyed experts for a particular country relative to the mean forecast of this variable from surveyed experts in Germany, a common practice in the literature analyzing *realized* spreads (e.g.,

[18] The CEF survey inquires every first week of each month *m* about current and next year forecasts for a number of macroeconomic variables. Therefore, when releasing their projections, the forecasters do not fully know the full realization of the spread for the current month *m*, as they do not observe the final three weeks of the month.

Favero and Missale, 2012). However, we have also estimated model (1) using the data in levels directly instead as in differences from the data for Germany. In other words, while we still use the expected spread against the Germany 10-year bond as the dependent variable, we now include separately the country specific variables and the German variables - all of them in levels - on the right-hand-side of the regression equation (see, e.g., D'Agostino and Ehrmann, 2014).

As highlighted in Table 8, the results for the country-specific fundamentals are similar to those in the baseline model. In particular, it is shown that a higher surplus significantly lowers expected spreads in Italy and the UK. Nevertheless, it also appears that German economic developments matter for the forecast bond yields of the other national countries, as reflected in the coefficients for German variables. This is in line with what one would expect: spreads should reflect events both from the country under analysis but also for the base country (Germany in this case). In particular, a higher surplus in Germany tends to decrease the yield for that country, thus increasing the spreads. In addition, a higher growth for Germany is accompanied by a higher yield for that country relative to other countries' yields, thus lowering the spread. The effect of German inflation is moderate for France and the UK and very strong for Italy: a one percent increase in expected inflation in Germany tends to decrease the Italian spread by about 50 basis points.[19]

C. Sub-Sample Analysis

The recent global financial crisis has been reflected in increased tension and turbulence in European sovereign bond markets. Bond spreads for the most vulnerable countries jumped to very high levels, and their increased volatility stood in sharp contrast with the stability of sovereign bond markets following the start of European Monetary Union (EMU).

The higher volatility and forecast errors in bonds spreads during the financial crisis (Figures 1 and 2) already suggest that there may have been significant changes in market participants' expectations over time. For the fiscal balance, Figure 3 also shows that the distribution of forecasts has deviated (even over prolonged spells) from the actual balance. Starting in 2009, forecast errors in all countries increased as observed by the high jumps in RMSEs in Figure 4, except for the UK.

[19] As a final robustness exercise, we re-run the baseline regressions of Table 2, but we drop one forecaster at a time. This is useful to address the possible presence of outliers in our sample that might drive the overall results. This test indicates that the estimated coefficients are broadly unchanged when regressions are run with n-1 forecasters, thus confirming the overall robustness of our results for each country (results not shown, available from the authors).

Therefore, this section analyses how market experts changed their spread predictions over time. As in D'Agostino and Ehrmann (2014), we look at three different subsamples for the relationship between expected spreads and expected fundamentals. A first sample is the pre-EMU period. We then focus on a subperiod from the start of EMU till August of 2008. Over this period, sovereign bond markets were particularly calm, as reflected in relatively flat spread over this period (Figure 1). The third subsample covers the financial crisis period - i.e., a subsample starting from September 2008 that coincides with the Lehman Brothers collapse - until October 2014.[20]

Table 9 presents the results of the panel estimates for these three periods. In the first subsample (1993–1999), forecasters consider the projected fiscal balance, macroeconomic projections, and global developments as relevent for the projected spread. These results are broadly in line with the full-sample estimates. For Italy and UK, expected deficits are significantly associated with higher projected sovereign spreads. For France, however, the coefficient has a positive and significant coefficient. Expectations of a higher US yield also reduce expected spreads in France and Italy.

Over the initial EMU period, the expected deficit is only significant for the UK. The role of the other macroeconomic projections is broadly similar although weaker compared to the full-sample estimates. This suggests that forecasters continue to attach some importance to macroeconomic fundamentals in their assessment of bond prices, although to a smaller extent than in the pre-EMU period.

In turn, the period covering the financial crisis provides some insights into how expectations about future spreads have been formed during periods of high market turbulence. The fiscal policy indicator seems to regain importance during the crisis: the expected fiscal surplus is again significant and negative for the three countries and especially sizeable for Italy. This suggests that concerns about fiscal sustainability have pushed expected spreads up during the crisis, especially in the most vulnerable countries. This also indicates that announcement of future fiscal consolidations were effective in anchoring private sector's expectations about spreads, as reflected in lower risk premia against Germany.

Expectations on the growth outlook become more important in this period. In particular, the coefficient for this variable decreases and becomes nill for France while it is still positive in the UK. It becomes negative, large and highly significant for Italy. This suggests that better economic prospects for Italy become very relevant to the evolution of expected spreads. In

[20] As in section IV.A, we have performed the analysis for the three different subsamples using *realized* spreads instead of the forecasted spreads. The results (not shown here, but available upon request) evince a similar finding of Table 3. The coefficients when using *realized* spreads as dependent variable have the same sign of those when using *forecast* spreads, but their magnitude is smaller. The minor role of expected fundamentals in explaining *realized* vs. *forecast* sovereign spreads is also observed for the different subsamples.

the view of market experts, higher growth would support fiscal sustainability and, therefore, lower expected spreads in this critical phase of the cycle. This is in line with Alesina et al. (1992) and Cottarelli and Jaramillo (2012). The different result between Italy on the one side, and the UK on the other side, might be due to a different perception about the sustainability of public finances for these countries. Markets might have perceived that sustainability was not an issue for the UK (and, partially, for France) during the crisis and, therefore, the link between growth and interest rate would be the one characterizing "normal times". Expected inflation now shows a high and positive coefficient in the regression for Italy. This may indicate that the prospects of low inflation, which have especially materialized since mid-2013, help to explain the drop in expected sovereign spreads in this country. [21]

VI. CONCLUSION

Expectations about macroeconomic and fiscal developments have triggered reactions in the sovereign bond market since the start of the global financial crisis. Some argue that bond markets are rediscovering fundamentals. Others claim that in a very uncertain economic environment, sentiments spurred by political events or contagion might have pushed financial markets into an equilibrium in which spreads are unrelated to fiscal or economic fundamentals.

In this paper, instead of analysing how realized spreads reacted to actual or expected macroeconomic fundamentals, we test how expectations about future government bond spreads are formed by market experts. This allows us to check whether expectations about macro and fiscal fundamentals matter to market experts' perception of future sovereign risk premiums, helping to ensure the sustainability of public finance (Bi, 2012). We employ a survey-based monthly dataset of individual forecasters (Consensus Economics Forecast) composed mainly of banks and other financial institutions, but also of private and public research centres. Our sample covers the period from January 1993 to October 2014, and therefore includes a substantial part of the recent financial crisis.

We focus on the spread between expected one-year-ahead 10-year government French, Italian and UK bonds,and the benchmark 10-year government bond for Germany as forecasted by each of the surveyed experts. We test if one-year-ahead projections for the government overall fiscal balance, inflation and GDP growth played a significant role in explaining these one-year-ahead projected government spreads.

[21] We have also tested another robustness check using a dummy for the entire euro area period, and further interacting it with the three fundamentals. The outcomes are in line with the average effect of the two subsamples during the euro area in the Table 9 above. (results not shown, available upon request).

Our findings suggest that forecasters significantly consider expected fiscal and other macroeconomic fundamentals in forming their expectations about the next year's evolution of sovereign bond spreads. A better expected fiscal outlook reduces expected spreads. While true for all countries, this effect is particularly strong and robust for Italian forecasted spreads, for which a 1 percent rise in the expected surplus ratio to GDP reduces forecasted spreads by 36 basis points. Higher expected GDP growth tends to be positively and significantly associated with forecasted spreads for the entire sample in analysis. International developments, as reflected in global risk factors, are also relevent to forecasted spreads. Moreover, we find that fundamentals tend to play a significantly more important role in explaining expectations about future government spreads, compared to regressions based on realized spreads, which are also likely to be influenced by trading and other contingent market conditions.

Further evidence on the importance of stable fiscal policies and expected economic growth emerges from the changing relationship between forecasted fundamentals and expected spreads over time. The fiscal policy outlook does remain important, especially during the financial crisis. However, during this period, market experts associate lower expected growth with larger forecasted spreads, particularly in Italy.

Overall, our results support the call to increase fiscal transparency and anchor fiscal expectations (Leeper, 2010). Besides significantly improving the effectiveness of fiscal policy (Leeper, 2009), our finding corroborates the claim that anchoring expectations about the future path of fiscal policy (and other macro-fundamentals) can ease financial markets' concerns about the long-term sustainability of public finances (Bi, 2012). A sound, stable and credible macro-fiscal framework implemented by fiscal authorities can lead to stable expectations of the evolution of sovereign bond markets, reducing the country's expected risk premium.

There are several directions for further research. In particular, this database could allow to explore the issue of forecasters' heterogeneity in different dimensions, such as the type of institution (e.g., domestic banks, international banks, or research institutions) preparing the forecast, which may have an impact on the forecasting behavior (Jaramillo and Zhang, 2013). The geographical location of the forecasting expert/institution may be another factor that could explain different forecasting patterns on spreads (Berger et al., 2009). These topics, which go beyond the scope of this paper, are left for future analysis.

TABLES AND FIGURES

Table 1. Descriptive Statistics, January 1993– October 2014

variable	France					Italy					UK				
	Mean	Stand. Dev.	Bottom Quartile	Median	Top Quartile	Mean	Stand. Dev.	Bottom Quartile	Median	Top Quartile	Mean	Stand. Dev.	Bottom Quartile	Median	Top Quartile
Forecast constant maturity swap corrected spread (t+1)	0.07	0.42	-0.18	0.06	0.28	0.44	0.90	-0.03	-0.24	0.66	-0.23	0.50	-0.52	-0.22	0.08
Forecast spread to Germany (t+1)	0.16	0.47	-0.13	0.13	0.43	1.38	1.81	0.10	0.46	2.44	0.83	0.78	0.29	0.73	1.31
Forecast spread to Germany (t)	0.26	0.44	-0.02	0.16	0.49	1.61	1.97	0.15	0.46	3.05	0.95	0.77	0.45	0.86	1.35
Realized spread	0.20	0.31	0.04	0.12	0.34	0.85	1.01	0.21	0.37	1.18	-0.09	0.26	-0.21	-0.12	0.12
Forecast surplus (t+1)[a]	-3.55	1.53	-4.22	-3.48	-2.77	-3.65	2.20	-4.54	-2.99	-2.26	-3.31	2.78	-4.75	-2.90	-1.37
Forecast surplus (t)[a]	-3.74	1.64	-4.27	-3.46	-2.90	-3.95	2.47	-4.99	-3.04	-2.37	-3.63	3.14	-5.24	-3.25	-1.54
Forecast surplus differential to Germany[a]	-1.46	1.68	-3.13	-0.66	-0.12	-1.46	1.69	-2.46	-1.17	-0.10	-0.91	2.83	-2.21	0.12	1.00
Forecast growth (t+1)[a]	1.91	0.97	1.30	2.00	2.55	1.62	0.92	1.00	1.70	2.30	2.22	1.07	1.80	2.40	2.80
Forecast growth differential to Germany[a]	0.10	0.74	-0.28	0.14	0.54	-0.23	0.65	-0.67	-0.17	0.23	0.31	1.12	-0.26	0.34	0.95
Forecast inflation (t+1)[a]	1.75	0.73	1.40	1.67	1.90	2.50	1.30	1.80	2.00	2.60	3.07	1.28	2.30	2.79	3.50
Forecast inflation differential to Germany[a]	-0.15	0.59	-0.45	-0.16	0.13	0.59	0.82	0.12	0.45	0.93	0.99	1.04	0.54	0.92	1.36
Forecast yield US	1.89	1.07	0.84	2.14	2.83	1.83	1.09	0.80	2.03	2.77	1.80	1.04	0.84	1.94	2.71
Financial Stress Index[b]	-1.17	2.22	-3.11	-1.06	0.62	-1.03	2.44	-2.71	-1.48	0.19	-0.36	3.39	-2.69	-1.23	1.40
Financial Stress Index (relative to US)[b]	-0.74	2.61	-1.37	-0.36	0.56	-0.49	2.68	-1.79	-0.29	0.86	0.20	1.76	-0.73	0.20	1.12
BAA-AAA US spread	0.95	0.44	0.70	0.85	1.03	0.94	0.42	0.70	0.85	1.03	0.91	0.40	0.67	0.83	1.01
Bid ask differential to Germany	1.46	10.56	-1.25	1.57	5.26	1.80	18.31	-2.25	0.24	3.00	-19.33	28.13	-25.77	-13.23	0.24

Source: Cardarelli et al. (2011), Consensus Economics, Datastream, ECB, and authors' calculations. Notes: [a] Percent of forecasted GDP. [b] Scalar.

Table 2. Panel Baseline Regressions, Jan. 1993–Oct. 2014[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	-0.030*	-0.363***	-0.047***
	(-1.897)	(-8.327)	(-5.240)
Growth (forecast t+1)	0.086***	0.413***	0.093***
	(2.663)	(3.958)	(5.718)
Inflation (forecast t+1)	-0.038	-0.089	0.122***
	(-1.169)	(-1.058)	(4.672)
Global factor: yield US (forecast t+1)	0.095***	0.244**	0.032**
	(8.718)	(9.012)	(2.300)
Adjusted R^2	0.19	0.06	0.26
F-test	14.06	12.05	33.68
J-test (p-value)	0.19	0.08	0.34
KP LM test[b]	115.76	19.21	121.22
Number of forecasting institutions	27	26	47
Number of observations	2,082	1,224	2,739

Notes: [a] All variables are forecasts for the year ahead and (apart from US yields) represent differences from the values for Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 3. Panel with Realized Spreads, Jan. 1993–Oct. 2014[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	-0.018**	-0.280***	0.024***
	(-2.238)	(-8.917)	(4.11)
Growth (forecast t+1)	-0.046**	0.058	-0.102***
	(-2.481)	(0.620)	(-7.40)
Inflation (forecast t+1)	-0.064***	0.107*	0.020
	(-4.134)	(1.679)	(1.47)
Global factor: yield US (forecast t+1)	0.089***	0.309***	0.138**
	(16.209)	(13.938)	(14.69)
Adjusted R^2	0.45	0.23	0.07
F-test	71.67	20.48	45.81
J-test (p-value)	0.01	0.09	0.08
KP LM test[b]	120.94	20.70	87.13
Number of forecasting institutions	27	26	41
Number of observations	2,266	1,448	2,280

Notes: [a] All variables (apart from the spreads) are forecasts for the year ahead and (apart from US yields) represent differences from the values for Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 4. Panel including alternative Global Risk variables, Jan. 1993–Oct. 2014[a]

	France	Italy	UK	France	Italy	UK	France	Italy	UK	France	Italy	UK
Surplus ratio (forecast t+1)	-0.036**	-0.385***	-0.013	-0.018	-0.372***	-0.048***	-0.026*	-0.465***	-0.026**	-0.030*	-0.342***	0.021
	(-2.321)	(-8.597)	(-1.238)	(-1.143)	(-9.463)	(-5.410)	(-1.898)	(-7.987)	(-2.435)	(-1.941)	(-8.897)	(1.155)
Growth (forecast t+1)	0.083***	0.359***	0.090***	0.062**	0.298***	0.081***	0.208***	0.175**	0.091***	0.086***	0.395***	0.107***
	(2.579)	(3.484)	(5.512)	(1.978)	(3.107)	(5.062)	(7.935)	(2.248)	(5.172)	(2.697)	(3.925)	(6.416)
Inflation (forecast t+1)	-0.046	-0.129	0.122***	-0.034	-0.219***	0.147***	0.039	-0.070	0.156***	-0.038	0.055	0.137***
	(-1.376)	(-1.625)	(4.690)	(-0.998)	(-2.963)	(5.609)	(1.189)	(-0.971)	(5.567)	(-1.168)	(0.651)	(5.046)
Global factor: yield US (forecast t+1)	0.088***	0.216***	0.055***	0.091***	0.220***	0.024*	0.075***	0.202***	0.021	0.094***	0.359***	0.052***
	(8.248)	(7.607)	(3.806)	(8.410)	(8.671)	(1.801)	(7.310)	(6.375)	(1.612)	(9.057)	(13.530)	(3.247)
AAA-BAA corporate US bond spread	0.049**	0.249**	0.154**									
	(2.195)	(2.973)	(6.096)									
Global factor: corrected fin. stab. index rel. to US				0.004	-0.095***	-0.009*						
				(1.111)	(-6.395)	(-1.783)						
Fundamental and FSI interaction							-0.003***	-0.035***	-0.003***			
							(-2.801)	(-5.853)	(-5.102)			
Fundamental and BAA-AAA US spread										-0.001	0.190***	-0.028***
										(-0.230)	(7.228)	(-5.837)
Adjusted R^2	0.21	0.08	0.22	0.17	0.16	0.26	0.12	0.04	0.21	0.19	0.09	0.17
F-test	13.60	11.82	30.43	12.32	16.34	30.13	13.43	7.81	22.58	13.17	15.04	30.63
J-test (p-value)	0.26	0.15	0.50	0.28	0.42	0.22	0.50	0.53	0.23	0.19	0.03	0.31
KP LM test[b]	122.20	19.44	66.64	102.52	20.58	131.00	125.97	16.35	50.20	115.99	24.75	27.67
Number of forecasting institutions	27	26	47	27	26	47	26	24	47	27	26	47
Number of observations	2,082	1,224	2,739	2,013	1,199	2,677	1,744	1,072	2,428	2,082	1,224	2,739

Notes: [a] All variables are year-ahead forecasts and (apart from the financial variables) represent differences from Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 5. Panel Using Primary Surplus, Jan. 1993–Oct. 2014[a]

	France	Italy	UK
Primary surplus ratio (forecast t+1)	-0.035	-0.291***	-0.008**
	(-1.280)	(-10.524)	(-2.063)
Growth (forecast t+1)	0.083**	0.298***	0.094***
	(2.261)	(2.948)	(5.540)
Inflation (forecast t+1)	-0.027	0.035	0.103***
	(-0.683)	(0.386)	(3.682)
Global factor: yield US (forecast t+1)	0.076***	0.053	0.085***
	(3.046)	(1.544)	(8.814)
Adjusted R^2	0.09	0.06	0.20
F-test	12.87	13.52	28.30
J-test (p-value)	0.12	0.08	0.22
KP LM test[b]	11.87	67.56	137.19
Number of forecasting institutions	27	26	47
Number of observations	2,082	1,224	2,739

Notes: [a] All variables are forecasts for the year ahead and (apart from US yields) represent differences from the values for Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 6. Results from Introducing Debt Limit Variables (based on Polito and Wickens, 2014) and Fiscal Space Variables, Jan. 1993–Oct. 2014[a]

	Polito and Wickens' (2014) Fiscal Limit Variables						Fiscal Space Variables					
	France	Italy	UK	France	Italy	UK	France	Italy	UK	France	Italy	UK
Surplus ratio (forecast t+1)	-0.019	-1.326***	-0.033***	-0.026	-1.343***	-0.042***	-0.007	-0.328***	-0.051***	-0.017	-0.370***	-0.023*
	(-1.082)	(-3.486)	(-3.443)	(-1.491)	(-3.500)	(-4.706)	(-0.404)	(-9.838)	(-4.718)	(-0.787)	(-4.032)	(-1.907)
Growth (forecast t+1)	0.157***	0.121	0.092***	0.150***	0.132	0.095***	0.050	0.409***	0.101***	0.091***	0.498***	0.074***
	(4.203)	(0.847)	(5.476)	(3.918)	(0.953)	(5.431)	(1.480)	(4.003)	(5.761)	(2.604)	(3.924)	(4.489)
Inflation (forecast t+1)	-0.099**	-0.363***	0.121***	-0.073*	-0.326**	0.125***	-0.021	0.055	0.129***	-0.041	-0.080	0.119***
	(-2.514)	(-2.663)	(4.479)	(-1.879)	(-2.442)	(4.612)	(-0.592)	(0.546)	(4.924)	(-1.145)	(-0.851)	(4.651)
Global factor: yield US (forecast t+1)	0.036***	0.544***	0.041***	0.052***	0.585***	0.023*	0.050***	0.275***	0.031**	0.078***	0.268***	0.029**
	(3.171)	(4.576)	(3.142)	(4.531)	(4.819)	(1.833)	(4.484)	(9.938)	(2.179)	(7.622)	(7.877)	(2.143)
Fiscal limit (FL)	-1.054***	-2.275***	-0.640***									
	(-8.090)	(-4.186)	(-5.880)									
Government borrowing capacity limit (IGBCL)				-0.538***	-1.231***	-0.331***						
				(-6.568)	(-3.049)	(-4.582)						
Fiscal space (t=10)							-0.375***	-0.310***	0.109*			
							(-9.104)	(-4.842)	(1.952)			
Debt-stabilizing primary balance (t=10)										-0.019**	0.063	-0.092***
										(-2.199)	(0.976)	(-6.254)
Adjusted R^2	0.15	0.10	0.28	0.12	0.09	0.27	0.14	0.04	0.26	0.01	0.39	0.39
F-test	14.88	4.81	32.75	12.40	4.39	30.22	18.59	13.18	31.84	10.55	21.37	31.55
J-test (p-value)	0.20	0.00	0.09	0.19	0.00	0.09	0.20	0.03	0.25	0.28	0.05	0.25
KP LM test[b]	113.59	2.19	95.12	112.23	2.18	111.10	104.32	55.02	97.42	5.27	24.00	16.65
Number of institutions	21	24	43	21	24	43	22	26	47	22	26	47
Number of observations	1,493	993	2,161	1,493	993	2,161	1,813	1,224	2,739	1,813	1,224	2,739

Notes: [a] All variables are year-ahead forecasts and (including the debt limit variables) represent differences from Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 7. Panel Adding Realized Spreads as Explanatory Variables, Jan. 1993–Oct. 2014[a]

	France	Italy	UK
Surplus ratio (forecast *t+1*)	-0.013	-0.204***	-0.018***
	(-0.840)	(-5.855)	(-4.285)
Growth (forecast *t+1*)	0.118***	0.258***	0.144***
	(4.364)	(4.349)	(8.500)
Inflation (forecast *t+1*)	0.018	-0.170***	0.131***
	(0.590)	(-3.819)	(4.720)
Global factor: yield US (forecast *t+1*)	0.020**	0.047**	-0.000
	(2.145)	(2.424)	(-0.046)
Realized spread (in month *m-1*)	0.888***	0.724***	0.852***
	(15.591)	(18.894)	(20.930)
Adjusted R^2	0.39	0.65	0.40
F-test	46.30	95.88	63.10
J-test (p-value)	0.79	0.14	0.00
KP LM test[b]	152.23	16.16	114.88
Number of institutions	27	26	41
Number of observations	2,082	1,224	2,172

Notes: [a] All variables are year-ahead forecasts and (apart from the financial variables) represent differences from Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 8. Panel Using Data in Levels, Jan. 1993–Oct. 2014[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	0.003	-0.278***	-0.022***
	(0.176)	(-8.550)	(-4.890)
Growth (forecast t+1)	0.039	0.083	0.087***
	(1.232)	(1.029)	(5.153)
Inflation (forecast t+1)	-0.060	-0.053	0.174***
	(-1.637)	(-0.788)	(6.108)
Global factor: yield US (forecast t+1)	0.113***	0.256***	0.107***
	(8.507)	(9.522)	(11.978)
Surplus ratio for Germany (forecast t+1)	0.106***	0.595***	0.084***
	(7.241)	(14.835)	(7.857)
Growth for Germany (forecast t+1)	-0.161***	-0.166**	-0.211***
	(-5.425)	(-2.033)	(-12.445)
Inflation for Germany (forecast t+1)	-0.012	-0.499***	0.080***
	(-0.417)	(-3.902)	(2.722)
Adjusted R^2	0.30	0.43	0.32
F-test	26.43	31.75	47.58
J-test (p-value)	0.79	0.55	0.01
KP LM test[b]	80.25	80.49	141.86
Number of institutions	27	26	47
Number of observations	2,082	1,224	2,739

Notes: [a] Significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

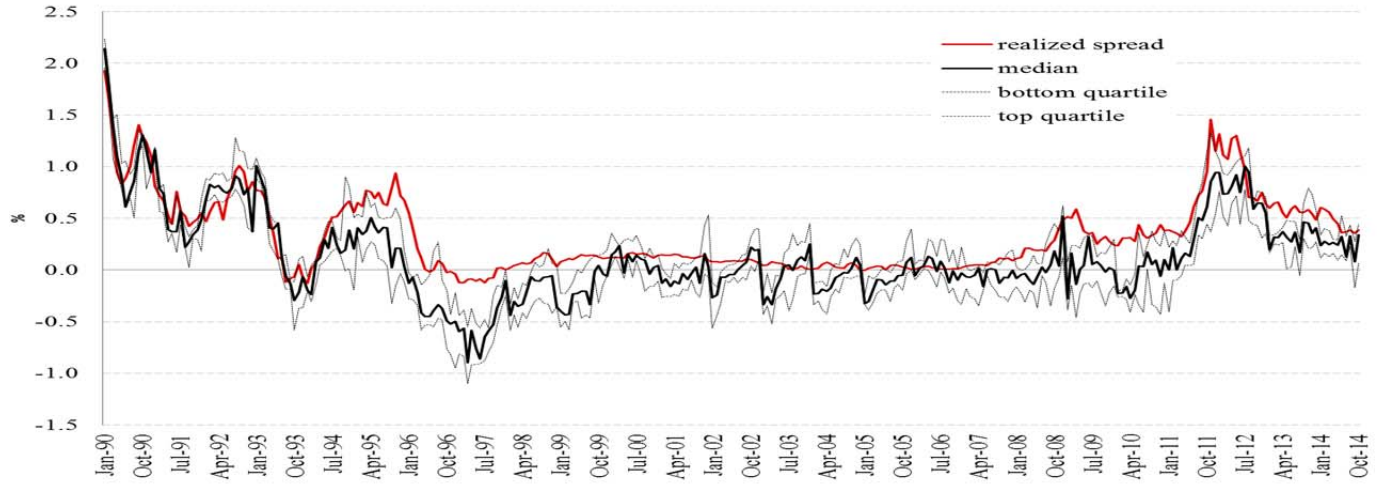
Table 9. Panel with Different Period Subsamples, Jan. 1993–Oct. 2014[a]

	Jan. 1993–Dec. 1999 (pre-EMU)			Jan. 1999–Sep. 2008 (EMU, pre-crisis)			Sep. 2008–Oct. 2014 (crisis)		
	France	Italy	UK	France	Italy	UK	France	Italy	UK
Surplus ratio (forecast t+1)	0.046	-0.338***	-0.080***	0.015	0.025	-0.053***	-0.094***	-0.281***	-0.060***
	(0.460)	(-13.778)	(-3.716)	(1.015)	(1.160)	(-3.357)	(-3.431)	(-3.971)	(-2.612)
Growth (forecast t+1)	0.319***	0.258***	0.139***	0.075**	0.082**	-0.028	0.044	-0.760***	0.296***
	(4.122)	(3.186)	(6.360)	(2.106)	(1.979)	(-0.590)	(0.869)	(-5.030)	(5.617)
Inflation (forecast t+1)	-0.059	-0.505***	0.085**	0.123***	0.111**	0.082**	-0.078	0.281**	0.178***
	(-0.535)	(-8.296)	(2.260)	(2.581)	(2.368)	(2.076)	(-1.276)	(2.018)	(3.566)
Global factor: yield US (forecast t+1)	-0.075	-0.884***	-0.161***	0.009	-0.097***	0.027*	-0.371***	-0.901***	-0.044
	(-1.088)	(-10.822)	(-4.330)	(0.653)	(-4.793)	(1.841)	(-9.282)	(-7.061)	(-1.222)
Adjusted R^2	0.12	0.42	0.25	0.08	0.02	0.11	0.26	0.59	0.06
F-test	4.47	22.20	4.47	3.35	2.36	8.60	12.96	18.14	5.30
J-test (p-value)	0.20	0.36	0.20	0.05	0.91	0.18	0.18	0.59	0.03
KP LM test[b]	22.42	89.71	22.42	47.28	32.20	11.24	40.72	45.37	16.61
Number of forecasting institutions	11	11	11	24	21	30	17	11	15
Number of observations	304	340	304	1,006	577	1,183	655	298	561

Notes: [a] All variables are forecasts for the year ahead and (apart from US yields) represent differences from the values for Germany; significance at *** p<0.01, ** p<0.05, * p<0.1; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

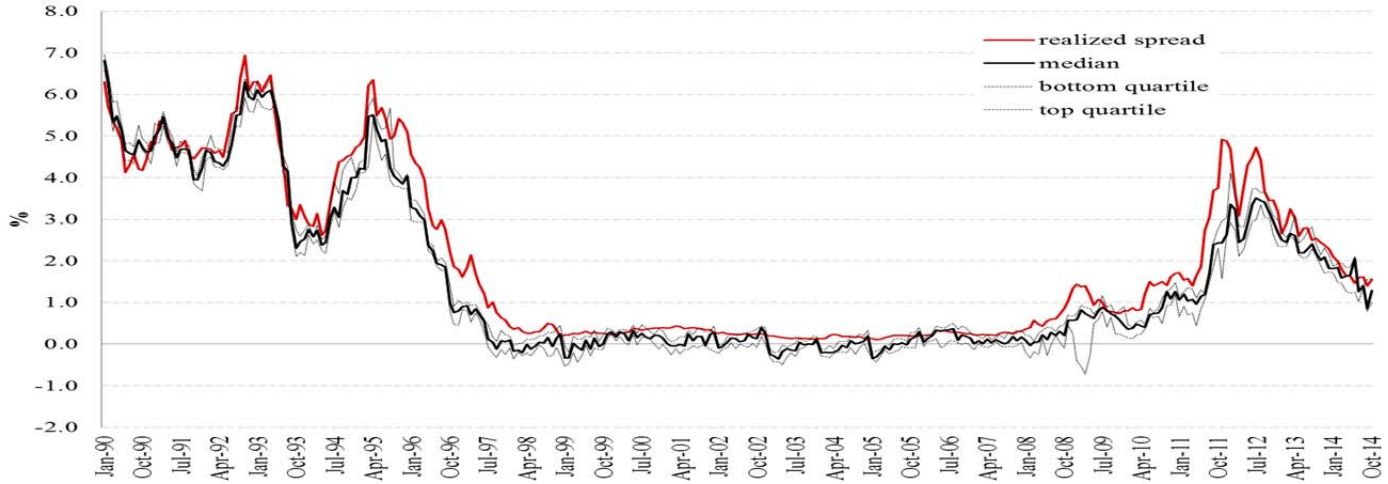
Figure 1. Realized Values and Market Forecast (One-Year-Ahead) of the 10-year Government Bond Spreads vs. Germany

Figure 1a: France



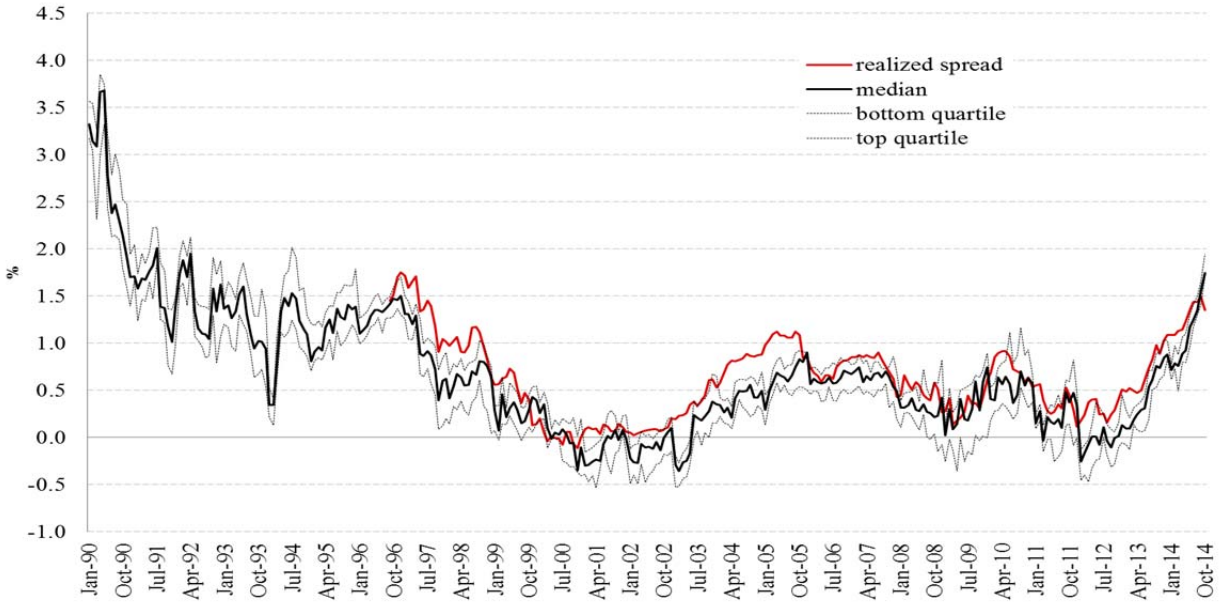
Source: CEF dataset (forecast spreads) and Datastream (realized spreads)

Figure 1b: Italy



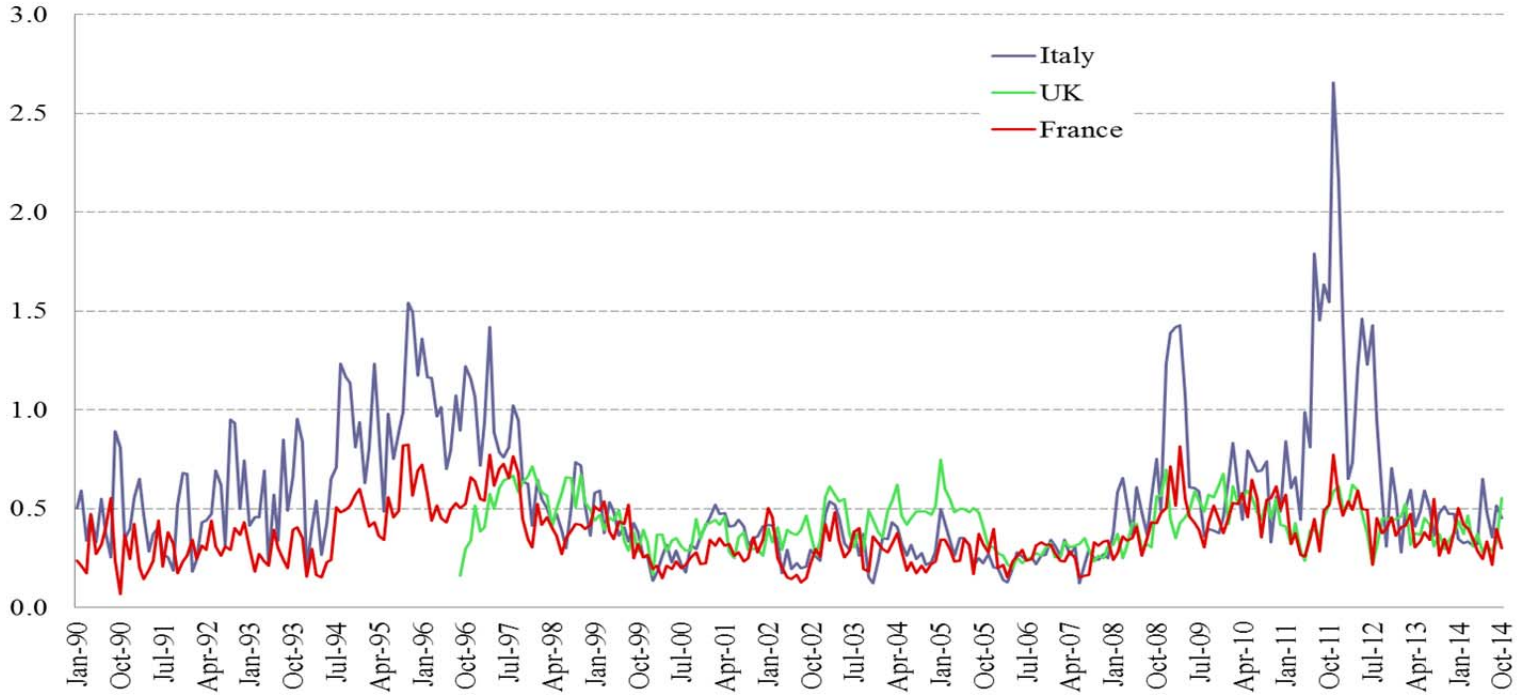
Source: CEF dataset (forecast spreads) and Datastream (realized spreads)

Figure 1c: United Kingdom



Source: CEF dataset (forecast spreads) and Datastream (realized spreads)

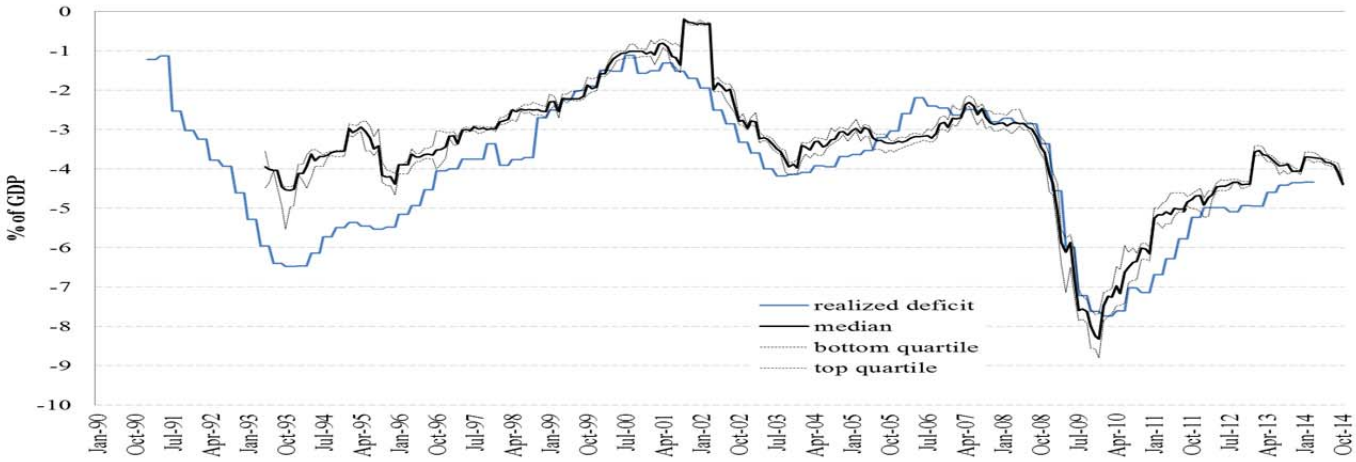
Figure 2. RMSE on the One-Year-Ahead 10-years Bond Spreads vs. the German Bund



Source: CEF dataset (forecast spreads) and Datastream (realized spreads)

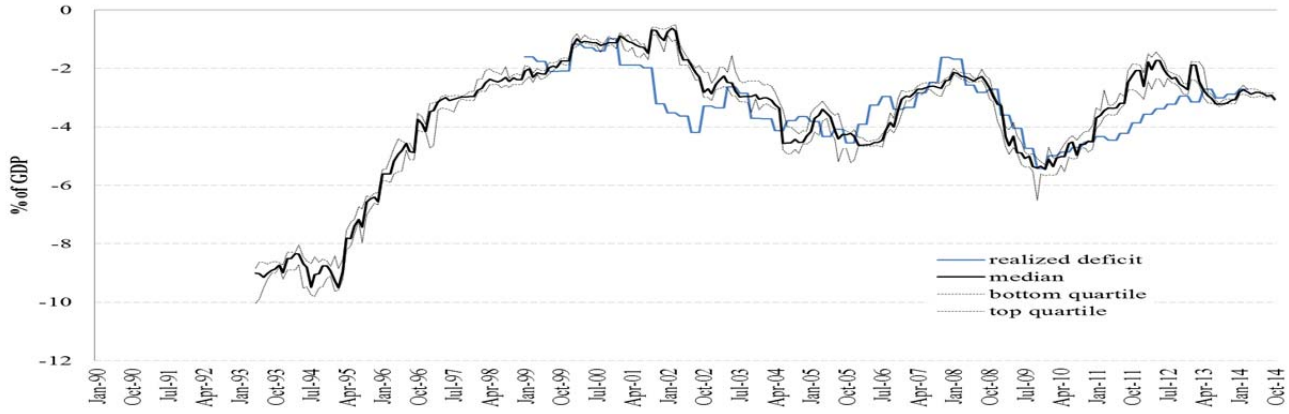
Figure 3. Realized Values and Market Forecast of Fiscal Overall Balance (as percent of GDP)

Figure 3a: France



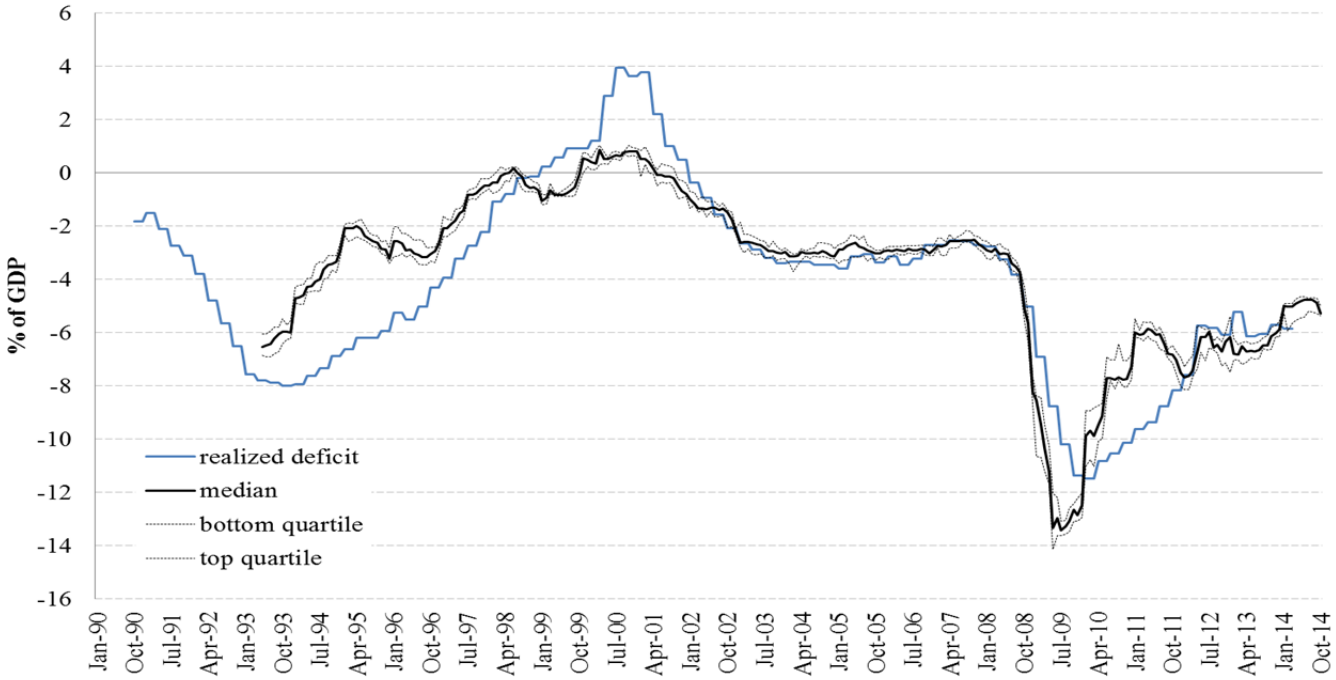
Source: Consensus Forecast and Eurostat

Figure 3b: Italy



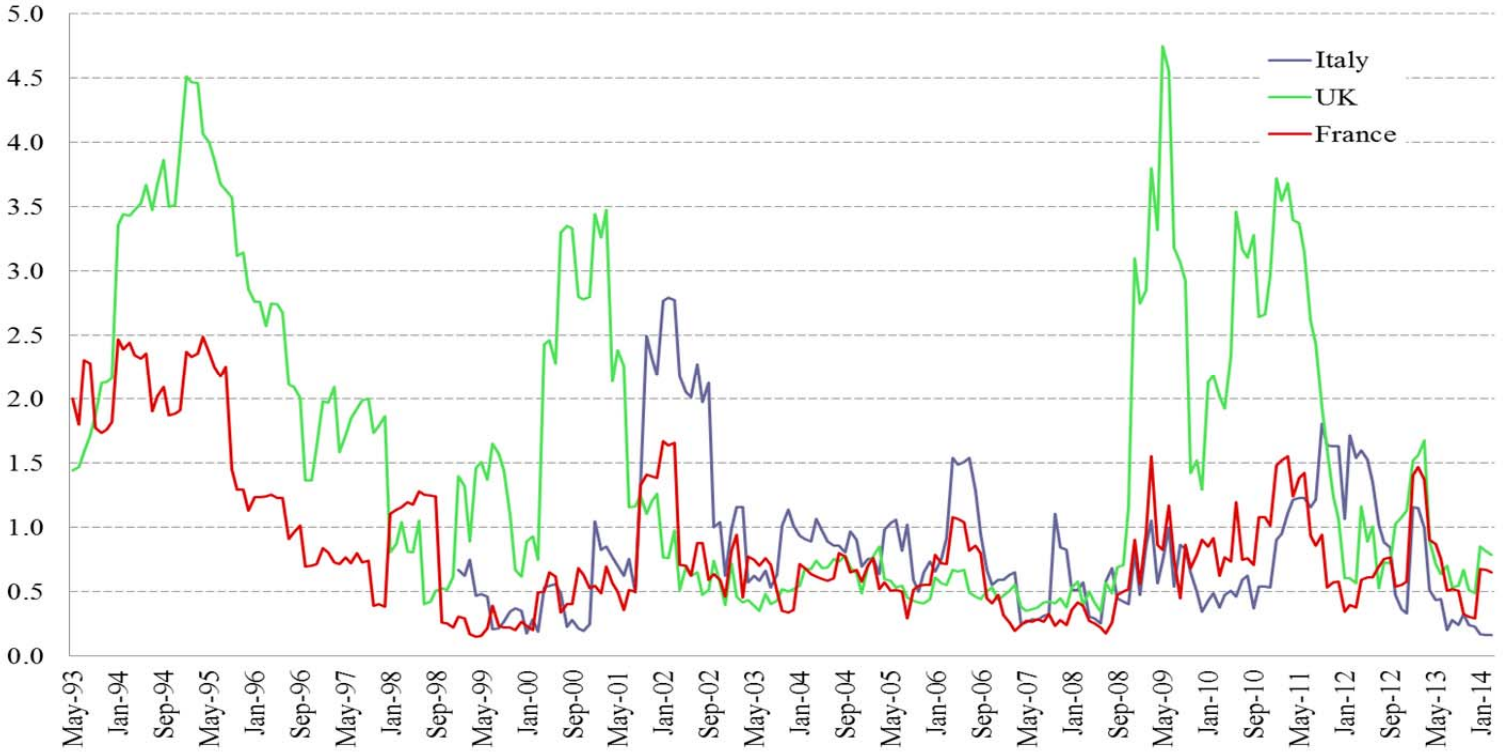
Source: Consensus Forecast and Eurostat

Figure 3c: United Kingdom



Source: Consensus Forecast and Eurostat

Figure 4. RMSE on the Overall Government Balance



Source: Consensus Forecast and Eurostat

APPENDIX

A. Description of variables

Name	Description	source
Overall balance, forecast	Forecast for t and t+1 of nominal overall balance (in local currency)	Consensus Economics
Growth of GDP, forecast	Forecast for t and t+1 of GDP growth (in %)	
Inflation, forecast	Forecast for t and t+1 of GDP growth (in %)	
US long term rate, forecast	Forecast for t and t+1 of 10 year rate (in %)	
US short term rate, forecast	Forecast for t and t+1 of 3 month rate (in %)	
Government bond yield	Forecast for t and t+1 of 10 year rate (in %)	
AAA-BAA US corporate bonds	spread on risky corporate bonds (in %)	Datastream
Bid ask spread	Benchmark bond -10-year government benchmark bond yield, Ask price or primary activity, average of observations through period - Euro	ECB
Financial Stability Index	(in %)	IMF (Cardarelli et al., 2011)
Actual spread	Spread between yield on 10 year government bond in country, relative to yield on 10 year German government bond (in %)	Datastream

B. Forecasters in Italy, France and the UK

Italy			France		
ISCO	Banca di Roma	Bank of America - Merrill	Elf Aquitaine	AXA Investment	Bank of America - Merrill
Fiat SpA	Banca Commerciale	Citigroup	Centre Prev l'Expansion	Banque D'Orsay	Citigroup
IRS	Credito Italiano	Deutsche Bank – Milan	EXANE	Banque Indosuez	Deutsche Bank France
Studi Finanziari	Istituto Bancario Italiano	Econ Intelligence Unit	GAMA	Banque Paribas	Econ Intelligence Unit
Prometeia	Euromobiliare	FAZ Institut	Gaz de France	Banque Populaire	FAZ Institut
ENI	Banca IMI	IHS Global Insight	OFCE	BFCE	IHS Global Insight
Centro Europa Ricerche	Banca Intesa	Goldman Sachs	INSEE	BIPE	Goldman Sachs
ISAE	Cariplo SpA	Chase Manhattan - Milan	IPECODE	BNP	ING Financial Markets
Ref.	RASFIN	ING Financial Markets	Total	BNP-Paribas	UBS
ref.irs	Cofiri SIM	UBS	Total Fina Elf	Caisse des Depots	HSBC France
	Caboto	HSBC		CDC IXIS	Salomon SB Citibank
	Banca Nzle del Lavoro	Salomon SB Citibank		COE – CCIP	Schroder SSB Citibank
	Capitalia	Schroder SSB Citibank		COE-Rexecode	JP Morgan Paris
	Intesa Sanpaolo	JP Morgan – Milan		Natixis Banque Populaire	Morgan Stanley
	IXIS CIB	Morgan Stanley		CPE	S G Warburg Bacot
	UniCredit			Crédit Agricole	Morgan Guaranty Paris
				Crédit Comm de France	
				Crédit Lyonnais	
				Crédit National	
				Rexecode	
				Société Générale	
				Nomura France	
				Oddo Securities	

	UK		
Cambridge Econometrics	ABN Amro Hoare Govett	James Capel	Bank of America
Beacon Econ Forecasting	Barclays Bank	Schroders	Citigroup
British Telecom	Williams de Broe	Kleinwort Benson	Chase Manhattan
Business Strategies	Barclays Capital	Lloyds Bank	Deutsche Bank
Capital Economics	Barclays de Zoete	UBS Phillips & Drew	Credit Suisse First Boston
City Univ Business School	Baring Brothers	UBS	Credit Suisse
Confed of British Industry	BNP Paribas	Lloyds TSB Group	Econ Intelligence Unit
ITEM Club	Citibank	Lloyds TSB Financial Markets	Global Insight
Economic Perspectives	County Nat West	Lombard Street Research	IHS Global Insight
Experian Business Strategies	Credit Lyonnais Secs	Yamaichi	Goldman Sachs
Imperial Chemical Inds	Deutsche Morgan Grenfell	Midland Bank	HSBC
Liverpool Macro Res.	Greenwell Montagu	Morgan Guaranty	ING Financial Markets
London Business School	Greenwich NatWest	UBS Warburg	JP Morgan
NIESR	Halifax Building Soc	National Westminster	Lehman Brothers
Oxford – LBS	Halifax PLC	NatWest Group	Merrill Lynch
Oxford Econ Forecasting	Société Générale	NatWest Markets	Morgan Stanley
Oxford Economics	Hambros Bank	Nomura Research Institute	Schroder SSB Citibank
	HBOS	Norwich Union	Salomon Brothers
	Henley Centre	Shearson Lehman	Salomon Smith Barney
	Hoare Govett	Panmure Gordon	
	West LB Panmure	RBC Dominion	
	Smith New Court	RBS Financial Markets	
	SGST Securities	Robert Fleming Secs	
	Industrial Bank of Japan	Royal Bank of Scotland	
	ING-Barings	S G Warburg	
	SBC Warburg	Salomon Brothers	

B. Calculation of the forecasted overall balance (as a ratio of GDP)

CEF provides forecasts for the total deficit only in nominal values (local currency). Hence, we follow Heppke-Falk and Hüfner (2004) and Poplawski-Ribeiro and Rülke (2011) to construct a forecast measure of deficit ratio to GDP (percentage of GDP). For that, we cannot simply scale the nominal value deficit forecast by the GDP forecast, since the CEF surveys for growth rates only, and not for the GDP in nominal value.

We construct a measure of the expected nominal year-ahead GDP forecast of forecaster *i* at month *m* and year *t* as follows. In the first step, we take a real-time measure of real GDP in levels for a particular year *t*. We use the real-time forecast of the same-year real GDP (in levels) coming from the most recent IMF World Economic Outlook (WEO) vintage available at any particular month *m* of year *t*. The IMF WEOs are published either in April or October, hence from May to October we use the April issue, and the October issue in the other months.

The second step is to compute the year-ahead GDP forecast in nominal value. We multiply the real-time (WEO) measure of same-year real GDP (in levels), $E_{WEO,t}\left[y_t\right]$, by the year-ahead market (Consensus) forecasts for GDP *growth*, $E_{i,t,m}\left[growth_{t+1}\right]$, and inflation, $E_{i,t,m}\left[inflation_{t+1}\right]$, for each forecaster *i* at a particular month *m* of year *t*. The expected year-ahead nominal GDP value for each country is then

$$E_{i,t,m}\left[y_{t+1}\right] = E_{WEO,t}\left[y_t\right] \times \left(1 + E_{i,t,m}\left[growth_{t+1}\right] + E_{i,t,m}\left[inflation_{t+1}\right]\right).$$

The year-ahead expected overall balance for each country is then:

$$E_{i,t,m}\left[surplus_{t+1}\right] = \frac{E_{i,t,m}\left[surplus_{t+1}^{nom}\right]}{E_{i,t,m}\left[growth_{t+1}\right]},$$

where $E_{i,t,m}\left[surplus_{t+1}^{nom}\right]$ is the (CEF) forecast of the nominal overall balance by forecaster *i* in month *m* of year *t* for one year-ahead *t+1*.

REFERENCES

Aizenman, J., M. Hutchison, and Y. Jinjarak, 2013, "What is the risk of European sovereign debt defaults? Fiscal space, CDS spreads and market pricing of risk," *Journal of International Money and Finance*, Vol. 34, pp. 37–59.

Akerlof, G.A., and R.J. Shiller, 2009, "Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism" (Princeton: Princeton University Press).

Akitoby, B., and T. Stratmann, 2008, "Fiscal Policy and Financial Markets," *Economic Journal*, Vol. 118, pp. 1971–1985.

Alesina, A., M. de Broeck, A. Prati, and G. Tabellini, 1992, "Default risk on government debt in OECD countries," *Economic Policy*, Vol. 7, No. 15, pp. 428–463.

Alper, E., and L. Forni, 2011, "Public Debt in Advanced Economies and its Spillover Effects on Long-term Yields" IMF Working Paper No. 11/210, August (Washington: International Monetary Fund).

Arghyrou, M.G., Kontonikas, A., 2011, "The EMU sovereign-debt crisis: fundamentals, expectations and contagion," European Commission Economic Paper, No. 436.

Aristei, D., and D. Martelli, 2014, "Sovereign bond yield spreads and market sentiment and expectations: Empirical evidence from Euro area countries," *Journal of Economics and Business*, Vol. 76, pp. 55–84.

Attinasi, M.G., C. Checherita, and C. Nickel, 2009, "What Explains the Surge in Euro Area Sovereign Spreads During the Financial Crisis 2007-2009?" ECB Working paper No. 1131 (Frankfurt: European Central Bank).

Bao, T., J. Duffy, and C. Hommes, 2013, "Learning, forecasting and optimizing: An experimental study," *European Economic Review*, Vol. 61(C), pp. 186–204.

———, C. Hommes, J. Sonnemans, and J. Tuinstra, 2012, "Individual expectations, limited rationality and aggregate outcomes," *Journal of Economic Dynamics and Control*, Vol. 36(8), pp. 1101–1120.

———, A. Shleifer, and R. Vishny, 1998, "A model of investor sentiment," *Journal of Financial Economics*, Vol. 49, pp. 307–343.

Batchelor, R., 2001, "How Useful Are the Forecasts of Intergovernmental Agencies? The IMF and OECD versus the Consensus." *Applied Economics,* Vol. 33, pp. 225–235.

Beber, A., M. Brandt, and K. Kavajecz, 2009, "Flight-to-Quality or Flight-to-Liquidity? Evidence from the Euro-Area Bond Market," *Review of Financial Studies*, Vol. 22, pp. 925–957.

Berger, H., M. Ehrmann, and M. Fratzscher (2009), "Forecasting ECB Monetary Policy: Accuracy is a Matter of Geography", *European Economic Review*, Vol. 53, pp. 1028-1041.

Bernoth, K., J. von Hagen, and L. Schuknecht, 2004, "Sovereign Risk Premia in the European Government Bond Market." ECB Working Paper Series No. 369 (Frankfurt: European Central Bank).

Bi, H., 2012, "Sovereign Default Risk Premia, Fiscal Limits, and Fiscal Policy, *European Economic Review*, Vol. 56, No. 3, pp. 389–410.

———, E. M. Leeper, and C. Leith, 2013, "Uncertain Fiscal Consolidations," Economic Journal, Royal Economic Society, vol. 0, pages F31-F63, 02.

Blommestein, H., S. Eijffinger, and Q. Zongxin, 2012 "Animal Spirits in the Euro Area Sovereign CDS Market," CEPR Discussion Papers No. 9092 (London: Centre for Economic Policy Research).

Bohn, H., 1998, "The behavior of U.S. Public Debt and Deficits," *Quarterly Journal of Economics*, Vol. 113, pp. 949–963.

De Bondt, W.F., and R. Thaler, 1985, "Does the Stock Market Overreact?" *Journal of Finance*, Vol. 40, No. 3, pp. 793–805.

Caceres, C., V. Guzzo and M. Segoviano, 2010, "Sovereign Spreads: Global Risk Aversion, Contagion or Fundamentals?" IMF Working Paper No. 10/120, May (Washington: International Monetary Fund).

Cardarelli, R., S. Elekdag, and S. Lall, 2011, "Financial stress and economic contractions," *Journal of Financial Stability*, Vol. 7, No. 2, pp. 78–97.

Cheung, Y.W., and M.D. Chinn, 2001, "Currency traders and exchange rate dynamics: a survey of the US market," *Journal of International Money and Finance*, Vol. 20, pp. 439–471.

———, and I.W. Marsh, 2000, "How do UK-Based Foreign Exchange Dealers Think Their Market Operates," NBER Working Paper No. 7524 (Cambridge, MA: National Bureau of Economic Research).

Choi, I., 2001, "Unit root tests for panel data," *Journal of International Money and Finance*, Vol. 20, issue 2, pp. 249–272.

Coibion, O., and Y. Gorodnichenko, 2015, "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts," *American Economic Review*, forthcoming.

Citibank, 2012, "Sovereign CDS ban already having an impact on CEEMEA," *Emerging Markets Strategy*, October 18th.

Claessens, S., and M. Kose, 2013, "Financial Crises Explanations, Types, and Implications," IMF Working Paper No. 13/28 (Washington: International Monetary Fund).

Codogno, L., C. Favero, and A. Missale, 2003, "Yield spreads on EMU government bonds," *Economic Policy*, pp. 505–532.

Cottarelli, C. and L. Jaramillo, 2012, "Walking Hand in Hand: Fiscal Policy and Growth in Advanced Economies." IMF Working Paper No. 12/137, May (Washington: International Monetary Fund).

D'Agostino, A., and M. Ehrmann, 2014, "The Pricing of G7 Sovereign Bond Spreads–The Times, They are a-changing", *Journal of Banking & Finance*, Vol. 47(C), pp. 155–176.

Davig, T., E. Leeper, and T.B. Walker, 2011, "Inflation and the fiscal limit," *European Economic Review*, Vol. 55(1), pp. 31–47.

De Grauwe, P., and J. Ji, 2013, "Self-Fulfilling Crises in the Eurozone: An Emprical Test," *Journal of International Money and Finance*, Vol. 34, pp. 15–36.

De Santis, R., 2014, "The Euro Area Sovereign Debt Crisis: Identifying Flight-to-Liquidity and the Spillover Mechanisms", *Journal of Empirical Finance,* Vol. 26, pp. 150–170.

Dell'Erba, S., and S. Sola, 2011, "Expected Fiscal Policy and Interest Rates in Open Economy, IHEID Working Papers No. 07–2011 (Geneva: Graduate Institute of International and Development Studies).

Dick, C.D., M. Schmeling, and A. Schrimpf, 2013, "Macro-Expectations, Aggregate Uncertainty, and Expected Term Premia," *European Economic Review*, Vol. 58, Issue C, pp. 58–80.

Dovern, J., and J. Weisser, 2011, "Accuracy, Unbiasedness and Efficiency of Professional Macroeconomic Forecasts: An Empirical Comparison for the G7," *International Journal of Forecasting*, Vol. 27, No. 2, pp. 452–465.

———, U. Fritsche, and J. Slacalek, 2012, "Disagreement Among Forecasters in G7 Countries," *The Review of Economics and Statistics*, Vol. 94, No.4, pp. 1081–1096.

Ejsing, J. and W. Lemke, 2009, "The Janus-Headed Salvation: Sovereign and Bank Credit Risk Premia During 2008-09, ECB working paper No. 1127 (Frankfurt: European Central Bank).

Escolano, J., 2010, "A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates," IMF Technical Notes and Manuals, January (Washington: International Monetary Fund).

Favero, C. A., 2013, "Modelling and forecasting government bond spreads in the euro area: A GVAR model," *Journal of Econometrics*, Elsevier, vol. 177(2), pages 343-356.

———, C.A., and A. Missale, 2012, "EU Public Debt Management and Eurobonds." EU Parliament Economic Policy Note (Brussels: European Parliament).

———, M. Pagano, and E. von Thadden, 2010, "How Does Liquidity Affect Government Bond Yields?" *Journal of Financial and Quantitative Analysis*, Vol. 45, No. 1, pp. 107–134.

Franses, P.H., M. McAleer, and R. Legerstee, 2012, "Evaluating Macroeconomic Forecasts: A Concise Review of Some Recent Developments," KIER Working Papers No. 821 (Kyoto: Kyoto University, Institute of Economic Research).

Gerlach, S., S. Alexander, and G.B. Guntram, 2010, "Banking and Sovereign Risk in the Euro area." Deutsche Bundesbank Discussion Paper No. 09/2010 (Frankfurt: Deutsche Bundesbank).

Geyer, A., S. Kossmeier, and S. Pichler, 2004, "Measuring Systematic Risk in EMU Government Yield Spreads," *Review of Finance*, Vol. 8, No. 2, pp. 171–197.

Ghosh, A., J. Ostry, and M.S. Qureshi, 2013, "Fiscal Space and Sovereign Risk Pricing in a Currency Union," *Journal of International Money and Finance*, Vol. 34, pp. 131–163.

Heppke-Falk, K., and F. Hüfner, 2004, "Expected Budget Deficits and Interest Rate Swap Spreads: Evidence for France, Germany and Italy." Deutsche Bundesbank Discussion Paper No. 40/2004 (Frankfurt: Deutsche Bundesbank).

Hirshleifer, D., 2001, "Investor Psychology and Asset Pricing," *Journal of Finance*, Vol. 56, No. 4, pp. 1533–1597

Hommes, C.H., 2014, "Behaviorally Rational Expectations and Almost Self-Fulfilling Equilibria," *Review of Behavioral Economics*, Vol. 1(1-2), pp. 75–97.

———, C., J. Sonnemans, J. Tuinstra, and H. van de Velden, 2005. "A strategy experiment in dynamic asset pricing," *Journal of Economic Dynamics and Control*, Vol. 29(4), pp. 823–843.

Jaramillo, L., and Y. S. Zhang, 2013, "Real Money Investors and Sovereign Bond Yields" IMF Working Paper No. 13/254, November (Washington: International Monetary Fund).

Keane, M.P., and D.E. Runkle, 1990, "Testing the Rationality of Price Forecasts: New Evidence from Panel Data," *American Economic Review*, Vol. 80, pp. 714–735.

Kleibergen, F., and R. Paap, 2006, "Generalized Reduced Rank Tests Using the Singular Value Decomposition," *Journal of Econometrics*, Vol. 133, No. 1, pp. 97–126.

Kumar, M. and T. Okimoto, 2011, "Dynamics of International Integration of Government Securities' Markets," *Journal of Banking and Finance*, Vol. 35, No. 1, pp. 142–154.

Laubach, T., 2009, "New Evidence on the Interest Rate Effects of Budget Deficits and Debt," *Journal of the European Economic Association*, Vol. 7, No. 4, pp. 858–885.

Leeper, E.M., 2009, "Anchoring Fiscal Expectations," NBER Working Paper No. 15269, August (Cambridge, MA: National Bureau of Economic Research).

———, 2010, "Monetary Science, Fiscal Alchemy," Jackson Hole Economic Symposium Paper, October (Kansas City: Federal Reserve Bank of Kansas City).

Manganelli, S., and G. Wolswijk, 2009, "What Drives Spreads in the Euro Area Government Bond Market?" *Economic Policy*, Vol. 24, pp. 191–240.

Mankiw, G., R. Reis, 2002, "Sticky Information versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve," *Quarterly Journal of Economics*, Vol. 117, No. 4, pp. 1295–1328.

Odean, T., 1999, "Do Investors Trade Too Much?" *American Economic Review*, Vol. 89, pp. 1279−1298.

Ottaviani, M., and P. Sørensen, 2009, "Aggregation of Information and Beliefs: Asset Pricing Lessons from Prediction Markets," University of Copenhagen Discussion Papers No. 09-14, (Copenhagen: University of Copenhagen).

Pagano, M., and E.-L. von Thadden, 2004, "The European Bond Markets Under EMU," *Oxford Review of Economic Policy*, Vol. 20, pp. 531–554.

Poghosyan, T., 2012, "Long-Run and Short-Run Determinants of Sovereign Bond Yields in Advanced Economies," IMF Working Paper No. 12/271 (Washington: International Monetary Fund).

Polito, V., and M. Wickens, 2014, "Sovereign credit ratings in the European Union: a model-based fiscal analysis," CEPR Discussion Paper No. 9665 (updated version), December (London: Centre for Economic Policy Research).

Poplawski-Ribeiro, M., and J.C. Ruelke, 2011, "Fiscal Expectations Under the Stability and Growth Pact: Evidence from Survey Data," IMF Working Paper No. 11/48, March (Washington: International Monetary Fund).

Schuknecht, L., J. von Hagen, and G. Wolswijk, 2010, "Government Bond Risk Premiums in the EU: Revisited the Impact of the Financial Crisis," ECB Working Paper No. 1152 (Frankfurt: European Central Bank).

Sims, C.A., 2003, "Implications of rational inattention," *Journal of Monetary Economics*, Vol. 50(3), pp. 665–690.

Shearman & Sterling LLP, 2012, "Selling Themselves Short: EU Enacts Regulation Banning Naked Short Sales and Sovereign Debt CDS," Client Publication, May 1st.

Shleifer, A., 2000, "Inefficient Markets: A Introduction to Behavioral Finance" (Oxford: Oxford University Press).

Stock, J., J. Wright, and M. Yogo, 2002, "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments," *Journal of Business and Economic Statistics*, Vol. 20, No. 4, pp. 518–529.

Trueman, B., 1994, "Analyst Forecasts and Herding Behavior," *Review of Financial Studies*, Vol. 7, pp. 97–124.

Wieland, V., and M. Wolters, 2011, "The Diversity of Forecasts from Macroeconomic Models of the US Economy," *Economic Theory*, Vol. 47, No. 2, pp. 247–292.

Woodford, M., 2001, "Imperfect Common Knowledge and the Effects of Monetary Policy," NBER Working Papers 8673 (Cambridge, MA: National Bureau of Economic Research).