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HOW DO FINANCIAL INSTITUTIONS FORECAST SOVEREIGN SPREADS?

Jacopo Cimadomo, Peter Claeys and Marcos Poplawski-Ribeiro

In 2014 all ECB publications feature a motif taken from the €20 banknote.

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Jacopo Cimadomo
European Central Bank; e-mail: jacopo.cimadomo@ecb.int

Peter Claeys
Vrije Universiteit Brussel; e-mail: Peter.claeys@vub.ac.be

Marcos Poplawski-Ribeiro
International Monetary Fund; e-mail: mpoplawskiribeiro@imf.org

Postal address	60640 Frankfurt am Main, Germany
Telephone	+49 69 1344 0
Internet	http://www.ecb.europa.eu

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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 December 2011, we test whether respondents consider the expected evolution of the fiscal balance—and other economic fundamentals—as 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. Overall, the findings suggest that credible fiscal plans affect expectations of market experts, reducing the pressure on sovereign bond markets.

JEL Classification Numbers: E62, G10, H30.

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

Non-technical summary

Most of the existing literature on the determinants of sovereign bond spreads has investigated whether *realized* (i.e. actual) spreads have been driven by (expected or realized) fundamentals or whether they are instead primarily driven by market sentiment and global risks factors. Often, it is found that fiscal and macro fundamentals (e.g. the government deficit) play little role in explaining realized spreads compared to other variables such as liquidity factors or global risk aversion.

In this paper, we adopt a different approach and analyse how *expectations* about future government bond spreads are formed in the financial market. We focus on the *expected* spread between 10-years government bonds for France, Italy, the UK, and the benchmark 10-years German government bond. In this context, we test if one-year-ahead projections for the government budget balance, inflation and GDP growth played a significant role in explaining one-year-ahead projected government spreads.

One important value added of our analysis is that we exploit a very rich survey-based monthly dataset of individual forecasters – mainly banks and other financial institutions, but also private and public research centres – from January 1993 to December 2011.

Our findings suggest that forecasters significantly consider expected fiscal and other macroeconomic fundamentals in forming their expectations about the next year evolution of sovereign bond spreads. A better expected fiscal outlook—in terms of a more favourable forecast for the government budget balance—reduces expected spreads. While true for all countries, this effect is particularly strong and robust for Italy, for which a 1 percent rise in the expected surplus ratio to GDP reduces forecast spreads by 27 basis points. Higher expected GDP growth tends to be positively and significantly associated with expected spreads for the entire sample in analysis (since 1992). International developments, as reflected in a global risk factor, also spill over onto the forecast spreads. In general, 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. Further evidence on the importance of stable fiscal policies and expected economic growth emerges from the changing relation between forecast fundamentals and expected spreads over time. The outlook of fiscal policy remains important, even during the Financial Crisis. However, during this more recent period market experts associate a context of expected low growth with larger forecast spreads, particularly in Italy.

Overall, our results support the call to increase fiscal transparency and anchor fiscal expectations. Indeed, our paper suggests that a sound and credible macro-fiscal framework implemented by fiscal authorities can lead to stable expectations of the evolution of sovereign bond markets, thus reducing the country's expected risk premium. By the same token, our results can also be read as indicative of some degree of market discipline exerted by financial markets on fiscal policy makers.

I. INTRODUCTION

The fallout of the Financial Crisis 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 to explain this turbulence on sovereign bond markets diverge. One interpretation is that markets paid little attention to fiscal and economic fundamentals before the Crisis in the European Monetary Union (EMU), and so 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, independently of the underlying expected fundamentals. Thus, uncertainty about policy outcomes could make investors sell off sovereign bonds out of fear and lead to mispricing on bond markets (Blommestein et al., 2012).

Which view is correct matters greatly for the quite different policy implications they carry. Under the former view, the prospect of fiscal consolidation and improved economic conditions are necessary steps in bringing down 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 depend on instincts. Pledging to pursue sustainable fiscal policy may be insufficient to shift expectations and reduce spreads.

An extensive empirical literature has documented a declining role of fiscal fundamentals in determining bond spreads. According to some authors, country-specific risk factors are dominated by international financial markets developments in determining bond yield differentials (Favero and Missale, 2012). At the same time, other recent studies argue that increased macroeconomic uncertainty has loosened the relation between macro- and fiscal fundamentals and bond spreads, with differentials being mostly driven by shifts in beliefs (Blommestein et al., 2012; De Grauwe and Ji, 2013). Most of these empirical studies do not treat expectations explicitly, though, as they look into the reaction of *realized* spreads to actual fiscal fundamentals.

Yet, some recent studies include the expected outlook for fiscal policy to explain *realized* spreads, 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 regarding 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 (see, e.g., Attinasi et al., 2009); other papers find a much weaker role for these variables (see, e.g., Arghyrou and Kontonikas,

2011). Nevertheless, this strand of the literature does not investigate how market participant's expectations about the evolution of future bond yields react to a changed perception of future macroeconomic and fiscal developments.

Indeed, it is a priori unknown *which* variables are used by financial institutions in forecasting sovereign spreads, i.e., these institutions may value non-fundamental factors and/or fundamental factors in predicting spreads. Second, the *relative weight* of specific fundamentals in predicting spreads is unknown. In this paper, we address both questions: first, we test the importance of fundamentals as well as non-fundamental factors (specifically, a global risk factor) in the prediction of sovereign spreads. Second, we estimate the contribution of three key fundamentals (inflation, GDP growth and government deficit) in shaping the forecast of spreads.

Understanding how expectations about future sovereign spreads are formed is important for its implications for the need of anchoring market expectations about fiscal policy and sovereign risk premia. According to a recent and still incipient literature, credibly anchoring the market's fiscal expectations can improve significantly the effectiveness of macroeconomic policies (Leeper, 2009 and 2010) by, among others, alleviating the risk premium and ensuring government solvency (Bi, 2012). Importantly, expectations about future fiscal and macroeconomic conditions are not necessarily reflected in the same way in current (actual) spreads and in future (expected) spreads. In fact, the former are also affected by contingent market conditions (e.g. liquidity factors, contagion, etc.) while the latter are in principle unaffected by these factors. Therefore, an analysis of expectations should provide a clearer view of how fundamentals feed into the pricing of government bonds and sovereign risk premia.

In our analysis of how financial markets price-in future developments in fiscal policy and macroeconomic conditions in expected bond spreads, we employ a survey-based monthly dataset of individual forecasters. The latter are mainly financial institutions and (private and public) research centers. We focus on France, Italy, the UK and on the period from January 1993 to December 2011. For each of these market experts, we calculate the one-year-ahead forecast spread between the 10-year government bonds for each of these three countries and the benchmark 10-year German government bond. We then analyze whether market experts' projections for the government budget 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 for these three countries. To the best of our knowledge, this is the first analysis attempting to understand how sovereign bond spreads forecasts by market experts are formed, 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 year-ahead expectations on the sovereign spreads for France, Italy

and the UK. In particular, an improvement in the year-ahead projected fiscal outlook reduces expected spreads. This is especially the case for Italy: a 1 percent rise in the expected surplus ratio to GDP reduces forecast spreads by 27 basis points; whereas the effect is smaller—but still significant—for France and the UK. The projected overall balance and real GDP growth have a significantly larger effect on the expectations about future government spreads, compared to regressions based on realized spreads. For the UK, the sign of the effect of forecast growth on expected spreads even changes compared to the one using realized spreads.

Our results also show that until the recent Crisis, a worse growth outlook was associated with a reduction in forecast spreads. This might reflect a flattening of the yield curve in bad economic times, possibly due to an expected looser stance of monetary policy in this phase of the business cycle. Nevertheless, this relation is reversed for Italy during the global Crisis. During this period, expectations of higher future growth reduce considerably the Italian 10-years expected bond spread, indicating that markets perceived future growth as a crucial variable to ensure the future sustainability of public finance. Finally, the expectation of a higher future inflation tends to increase expected spreads. This is true in particular for the UK over the full sample.

A key implication of our findings is that they confirm the importance of transparency and anchoring fiscal expectations (Leeper, 2009; and Bi, 2012). The findings corroborate the claim that providing credible signals of sound fiscal and macroeconomic policies—consistently oriented to long-term sustainability—helps anchoring market expectations about future developments in the sovereign debt market and risk premia. At the same time, our results are also indicative of some degree of market 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 new dataset used in this study, and the methodology we follow. Section IV discusses the baseline results and some additional findings. Conclusions and policy implications follow in section V.

II. LITERATURE REVIEW

The literature on the determinants of sovereign bond yields and spreads has expanded substantially in recent years, mainly reflecting the heightened concerns for the developments in the European sovereign debt markets during the 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, 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 seems to be relevant only in times of heightened 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 reflecting global investors' risk aversion (Codogno et al., 2003; Geyer et al., 2004; Favero et al., 2010; Manganelli and Wolswijk, 2009). Financial integration has made investors' portfolios co-move more strongly, so that portfolio adjustments shift in one direction (in times of uncertainty, mainly to safe havens). This evolution has made bond yields increasingly dependent on 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 on global financial markets (Favero and Missale, 2012).

More recently, some authors have suggested to relate directly 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—like 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 respond strongly 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).

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

A few papers have recently started to assess the forecasts of fiscal variables from survey data.[1] D'Agostino and Ehrmann (2013), for example, use Consensus Forecast data to investigate the time-varying relation between (realized) sovereign bond spreads of the G7

[1] Poplawski-Ribeiro and Rülke (2011), for instance, use survey data to analyze whether financial market expectations on government budget deficits changed in France, Germany, Italy, and the UK under the Stability and Growth Pact (SGP).

countries, and expectations about macroeconomic fundamentals. Their results show that several risk factors were priced less in the years preceding the Financial Crisis, but an over-pricing of the same factors occurred during the European sovereign debt crisis.[2]

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

III. FINANCIAL MARKET EXPERTS' ECONOMIC FORECASTS

A. A Test on Market Expectations

We use Consensus Economic Forecast data to investigate the relationship between the projections of macroeconomic fundamentals and of sovereign bond spreads. Notably, we estimate whether each forecasters' *expectations* on the evolution of sovereign spreads is determined by their forecast of the fiscal balance, GDP growth, and inflation. Therefore, we test whether forecasters (explicitly or implicitly) assign an important weight to the expected fiscal and other macroeconomic fundamentals in their projection of sovereign bond spreads.

This way, we test the hypothesis whether anchoring fiscal expectations can induce beliefs of forecasters (Leeper, 2009; Bi, 2012). A significant response of the expected spread to higher expected deficits would imply that even if current deficits are high, a credible policy to maintain fiscal policy sustainable can keep spreads at bay.

We analyze the role of the forecast fiscal stance and economic outlook by each individual financial market participant on their *projection* of the sovereign bond yield differential. In addition, we compare such analysis with the one resulting from using the *realized* spread as a dependent variable. This will allow us to test if expectations about future fiscal and macroeconomic developments are more (or less) important *ex-ante*, in explaining projected spreads, than *ex-post*, in explaining realized spreads.

[2] Wieland and Wolkers (2011) compare the predictions of forecasters to the projections based on 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, partly to judgment mistakes.

B. Consensus Economic Forecasts

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 a single country only; a few work for international financial institutions or research institutes that provide forecasts for several countries simultaneously. As most forecasters work at financial institutions, forecast likely reflect market expectations better than forecasts issued by public institutions (D'Agostino and Ehrmann, 2013).

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 forecast 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 not only take a stance on the direction of the expected change of a macroeconomic variable, but also forecast the level of the macroeconomic variable. Evidence shows that CEF forecasts are less biased and more accurate than other surveys.[3] Hence, we can reasonably argue that the CEF survey data broadly reflects 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 the period from January 1993 to December 2011. In fact, these are the only European countries with fiscal forecasts included in the CEF survey with sufficient time coverage, apart from Germany. Including the UK, also allows studying a non-euro area country, besides the advantage that the CEF dataset for the UK is very extensive.

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 by forecasters over time. Some forecasters stopped producing projections for the budget 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 just a few times in the survey. In particular, any forecaster

[3] 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.

participating less than 12 consecutive months in the CEF survey is excluded from our sample. This reduces the panel to 32 forecasters in France, 29 forecasters in Italy, and 61 in the UK.[4] The Appendix provides an overview of the forecasters we use in our sample.

C. 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.[5] The forecasts require some transformation 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. As we analyse bond spreads of a fixed maturity, this would be inappropriate. Hence, we compute an interest rate forecast at a constant maturity 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.

From this fixed maturity forecast, we then construct the spread based on the average of all forecast fixed maturity for Germany. In other words, for each forecast on France, Italy, or the UK, we take the difference between its fixed maturity bond rate forecast and the mean of all German forecasters' fixed maturity 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 in the pre-EMU period. To filter out this effect, we subtract the actual swap spread from the forecast spread. This swap spread is the difference in the 10-year fixed interest rate from 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 surprisingly large range of disagreement in forecasters' views. The range between the upper and the lower quartile in

[4] 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.

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

forecast spreads is generally not below 50 basis points. Given that actual spreads have been in most cases much smaller, this is not a minor difference.

The period 1999-2007 has been characterized by higher consensus among forecasters, and the forecast distribution tends to track quite closely the actual spread. However, at times of turbulence when the median projection spikes, these intervals become much larger. 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 a rise in the dispersion of forecasts. With the Financial Crisis, the actual spread lies also frequently outside the forecast bands, especially for Italy. In these periods, 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 Financial Crisis is also evident from plotting the Root Mean Square Error (RMSE).[6] Figure 2 shows that forecast errors are relatively small in all three countries at least until the Financial Crisis. Since then, forecast errors started to diverge, particularly for Italy. In the period 2010–11, RMSEs have spiked for Italy as respondents largely underestimated the rise in bond spreads. The same inaccuracy in forecasts is less evident for French or British bond spreads, but they have risen to a higher level too.

Fiscal balance ratio

CEF asks respondents for a forecast of the overall balance in nominal terms.[7] In order to transform this forecast into one of the budget 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 the Appendix for more details).

Figure 3 displays the distribution, per quantile, of the year-ahead fiscal balance ratio forecasts. This range between the first and third quartile is rather small for all three countries under examination: half of all forecasters expect the deficit to be contained in an interval of just 0.5 percentage points around the median. The range increases to 1 percent when there are major turning points in the actual fiscal balance. This remarkable consensus among forecasters continues even during the Financial Crisis.

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

[7] For France or Italy, specialists forecast the general budget balance for the calendar (end of the) year. For the UK, the fiscal variable is public sector net cash requirements.

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 forecast 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 till 2002 and starting again in 2009. Between 2002 and 2009, mistakes in budget forecasts were less common. Since the Financial Crisis they have gone up again. Figures 3 and 4 show that during the recent crisis there has been a tendency to overestimate (underestimate) the budget balance (deficit) for all the three countries in our sample.

D. Methodology

In this section, we present the econometric model used in the analysis, and the estimation approach. The aim is to relate financial market experts' predictions of the long-term 10-year bond spread to the forecast fiscal balance ratio to GDP, controlling for other variables. In particular, we test whether expectations of the constant-maturity year-ahead *(t+1)* fiscal balance $E_{i,t,m}\left[b_{t+1}\right]$ for a certain forecaster *i* in some month *m* of year *t* influence the expected year-ahead bond spread $E_{i,t,m}\left[s_{t+1}\right]$.

In addition to the fiscal balance, other economic developments may also matter for the government bond yield expected for the next year. Therefore, we control the relation between the forecast spread and forecast overall balance for the expected one-year-ahead economic growth $E_{i,t,m}\left[\Delta y_{t+1}\right]$, and the inflation rate $E_{i,t,m}\left[\pi_{t+1}\right]$. Data for these variables are also taken form the Consensus Forecasts. 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 loosening 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 adjustment to keep the budget deficit under control (Alesina et al., 1992). If a permanently lower level of growth casts in doubt 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.

As regards 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. Hence, the response of sovereign interest rates and spreads to higher expected inflation should be unambiguously positive.[8]

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; Zoli, 2013). 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 VIX. 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.[9] Descriptive statistics of all variables are shown in Table 1.

Most studies analyzing 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 fiscal balance, GDP growth, and inflation of each forecaster, and the mean forecast of those variables for Germany as explanatory variables.

The baseline specification to test the relation between projections of fiscal balance and the expected sovereign spread for our panel of forecasters can be described as follows:

$$E_{i,t,m}\left[s_{t+1}\right] = \begin{pmatrix} \beta E_{i,t,m}\left[b_{t+1}\right] + \phi E_{i,t,m}\left[\pi_{t+1}\right] + \lambda E_{i,t,m}\left[\Delta y_{t+1}\right] + \\ \mu E_{i,t,m}\left[Z_{t+1}\right] + \sum_{n=2}^{12} \theta^{n} month_{t,m}^{n} + \alpha_i + \varepsilon_{i,t,m} \end{pmatrix}. \quad (1)$$

$E_{i,t,m}\left[x_{t+1}\right]$ is the forecast at month *m* of year *t* by respondent *i* for variable *x*. In model (1), *x* is therefore the government budget balance (s), inflation (π), and the growth rate of GDP (Δy). In addition, *Z* represents the global factor, i.e., the interest rate on the 10-years government bond.[10] Respondents may not continuously update their forecasts and only revise

[8] 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.

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

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

the forecast at regular intervals. This may introduce month effects in 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 $\left(\sum_{n=2}^{12}\theta^{n} month_{t,m}^{n}\right)$ for each month but January represented by the superscript index n (February, $n=2$; March, $n=3;\ldots$; December, $n=12$) to control for this effect. Each of these dummies equals to one whenever $n=m$ and zero otherwise. Finally, as each respondent may use a quite different model to produce her forecast, we include a forecaster specific fixed-effect α_i to account for unobserved heterogeneity across forecasters and estimate (1) with panel fixed effects.[11]

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 may 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 has received over time so that she revises the forecast. We can so get information on each forecaster's information set and use this 'news' as the instrument. News is the 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 each of the three regressors in (1). The reason these six variables are good instruments is that they are based on the forecasters behavior. No information known to the forecasters when updating their projections can have any predictive power for how the forecasts will change between this and the next month (or in any month afterwards). When forecasters construct their macroeconomic projections in any month *m*, developments over the last month are those that determine whether the forecast is being updated or not. Unless there is a lot of persistence in forecasts, this news is likely to be highly correlated with the year-ahead forecasts. At the same time, the news is fully exogenous to the variables (i.e., there is no feedback of the forecast series to the news during that month itself). Further, there should also be no direct impact on the forecast spread from this news that is not already reflected in the regressors for the same reason.[12]

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

[12] There may of course be an independent effect of the instruments on the year-ahead spread as forecasters make a consistent forecast over time, by which the next year forecast probably depends on the macroeconomic forecasts of this year (Kawakami and Romeu, 2011).

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.[13]

IV. RESULTS

A. Baseline Results

Table 2 reports the estimates for the baseline model for the three countries and the full January 1993–December 2011 period sample. The main result is that expectations of a higher government budget surplus significantly reduce forecast spreads for all the three countries. This effect is particularly strong for Italy: a 1 percent rise in the expected surplus ratio to GDP reduces forecast spreads by 27 basis points. The effect is smaller for France or the UK (approximately 3 and 5 basis points, respectively), but the coefficient is still highly statistically significant.

Growth expectations also matter for forecasters. Higher expected economic growth in all three countries leads to increased forecast spreads. As previously discussed, in normal times an expected improvement in the economic outlook is likely to be associated with expectations of a tighter monetary policy in the medium-term and upwards shifts 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 case of better growth prospects.

The effect of expected inflation is positive and significant, but only for the UK. Such effect 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, central banks kept inflation expectations fairly well-anchored in these two countries. As Dick et al. (2013) argue, in such specific environment, it may well be that investors cared relatively less about inflation compared to real growth or uncertainty.

[13] 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.

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 forecast spreads in all three countries in our sample. This market stress effect from global risk is particularly strong for Italy, but more moderate for France and, especially, for the UK. 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 very large number of observations: around 1700 for France, 950 for Italy and 2400 for the UK. We believe that this is an important value-added of the current analysis, which corroborates the robustness of the overall results.

How do these results compare to those arising from the use of *realized* instead of forecast spreads? We substitute the forecast with the realized spread at time *t* as the dependent variable. This implies 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 the expected surplus reduces the *realized* sovereign bond spread in France and Italy. However, the size of the effect is significantly smaller than in the case of forecast spreads, particularly in Italy. Expectations by experts of a one-percent cut in the forecast deficit implies on average a fall of about 12 basis points in the Italian *realized* spread, which is less than half than of what we found using the forecast spread. The effect on the French spread also appears to be broadly halved. For the UK, the effect is positive but very small.

For the growth and inflation forecast, in the case of France and Italy effects are qualitatively similar as for the previous model. Quantitatively, however, effects are again smaller than in the regression based on forecast spreads as far as expected growth is concerned. For the UK, inflation appears to be still significant, but the coefficient is smaller. Interestingly, the sign of the growth coefficient is now reversed: a positive outlook for GDP growth tends to reduce realized spreads. As regards the external global-risk factor, the coefficient in Table 3 is broadly similar compared to what reported in Table 2 for forecast spreads.

The latter comparison suggests a minor - or even of opposite sign - role of expected fundamentals in explaining *realized* than expected sovereign spreads. The expected evolution of fundamentals is quantitatively much more relevant in explaining spread projections indicating that—ex-ante—market participants assign a bigger role to these factors than what observed ex-post. This also suggests that *realized* spreads reflect different factors than only 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's aversion to international risk. So

far, we used the forecast US yield as an indicator of international market movements and found this variable to significantly influence forecast spreads. The reason for adopting that measure is that the other indicators of global risk that have been commonly used are actual series, and not projections. CEF forecasters (or other survey-based forecasters) are not typically 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 actual sovereign spreads, especially in periods of market turbulence. We therefore replace the US 10-years forecast yield with some alternative indicatiors for global risk.

First, we test the AAA-BAA US corporate bond spread, which is frequenctly used in the related literature (Codogno et al., 2003). This spread reflects international liquidity and credit risks. The first block of Table 4 shows that the main findings of Table 1 remain broadly unchanged. In particular, the AAA-BAA corporate spread appears to raise forecast spreads. The impact is quantitatively similar in Italy and the UK. However, while in Italy such strong impact can be due to the weak fiscal position, which makes this country more vulnerable to global shocks, the results for the UK may reflect the strong interlinkages between the US and UK financial markets.

As the Financial Crisis has exposed budgets to bailouts of the banking sector, financial stability is likely an important indicator of risk to fiscal sustainability. 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 problems in the three countries. The second block of Table 4 reveals indeed 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 of investments into 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 Financial Stability Index with the projected fiscal balance. In the third block of Table 4, we observe a negative and, indeed, highly significant effect: higher surpluses do get an additional beneficial effect on spreads if financial instability is high in the US. However, this effect appears to be quantitavitely 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 'fundamentals' in this regression remain broadly consistent with the baseline findings.

Overall, we find that the impacts of global-risk factors tend to be statistically significant but small. Moreover, the overall fit of the regression does not improve significantly 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 spreads projections.[14]

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 a possible issue of reverse causality, given that interest payments depend on interest rates on sovereign securities. Therefore, a change in interest rate conditions could have an effect on the expectations for the overall balance for the next year. We correct the forecasted overall balance ratio by adding the one year lead of 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, although the coefficient now remains significant only for the UK.

Data in levels

So far, we 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 (D'Agostino and Ehrmann, 2013). However, we have also estimated Model (1) using the data in levels directly instead as in differences from the data for Germany. The results are similar to those in the baseline model. Table 6 shows that a higher surplus lowers expected spreads in all countries, albeit the effect is significant in Italy and the UK only.

Differences of growth rates for GDP

We then substitute the growth forecast with the difference between the current-year and year-ahead forecasts of the growth rates. The reason is that the variation in the expected spread may depend on changes in economic variables (Dick et al., 2013). The results for the expected fiscal balance, reported in Table 7, are in line with the baseline estimations with the exception of France, where the response turns significantly positive. The coefficient for expected GDP growth becomes significantly negative for France and Italy. Foreseen accelerations in the expected growth rate of the economy significantly reduce the expected spreads in these two countries, which gives support for the argument that better growth

[14] 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.

perspectives are seen as improving the sustainability of public finances (Cotarelli and Jaramillo, 2012). This effect does not play a significant role in the UK, however.

Dropping one forecaster at a time

As a final 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. The findings from this exercise are reported in Figure 5 for the three countries under examination, and focusing on the three key coefficients on the expected growth, inflation and the surplus. In particular, the charts show how the coefficients change when the *n-th* forecaster – represented on the x-axis - is dropped from the sample. The charts also give an idea of the relative importance of these fundamentals in explaning expected spreads in the three countris. Figure 5 shows that the estimated coefficients tend to be broadly unchanged when regressions are run with *n-1* forecasters, thus confirming the overall rubustness of our results. It also appears evident that – quantitatively – fundamentals are much more important in explaining forecast spreads in Italy and (to a lesser extent) in France, compared to the UK.

C. Sub-Sample Analysis

The recent Financial Crisis has been reflected in increased tension and turbulence in European sovereign bond markets. Bond spreads for the most vulnerable countries jumped at very high levels, and their increased volatility stood in sharp contrast with the stability of sovereign bond markets after 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.

Therefore, this section analyses how market experts changed their spread predictions over time. As in D'Agostino and Ehrmann (2013), we look at three different subsamples for the relation 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—coinciding with Lehman collapse—till December 2011.[15]

Table 8 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 to matter 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 reduces expected spreads in France and Italy.

Over the initial EMU period, the expected deficit is significant only for the UK. The role of the other macroeconomic projections is broadly similar to what emerges from the full-sample estimates. Hence, forecasters seemed to attach still some importance to macroeconomic fundamentals in their assessment of bond prices.

In turn, the period covering the Financial Crisis gives some insights on how expectations about future spreads have been formed during periods of high market turbulence. The fiscal policy indicator seems to play a smaller role during the crisis: the expected fiscal surplus is significant and negative for France, negative but not significant in Italy, and nil in the UK.

In fact, expectations on the expected growth outlook become more important in this period. Particularly, the coefficient for this variable is still positive in France or the UK, but becomes negatively and highly significant for Italy. This suggest that better economic prospects for Italy become very relevant for the evolution of expected spreads. In 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). Instead, results for France and the UK are not substantially different: a expected higher growth still induce an increase in expected spreads, possibly due to expectations of a steepening of the yield curve in good times. The difference result between Italy on the one side, and France 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 France and the UK during the crisis and, therefore, the link between growth and interest rate would be the one characterizing “normal times”.

[15] As in section IV.A, we have performed here 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.

Also in contrast to the positive expected impact of inflation on forecast spreads, is the switch to a negative foreseen impact since September 2008 in France and Italy. The reason is the fall of interest rates and inflation to the zero lower bound in the Eurozone, and the anticipation by market experts that if inflation would pick up with more buoyant growth, spreads would likely start to fall. A similar explanation holds for the unexpected negative sign on the forecast US yield. If the US term structure were to rise, it would likely indicate improved growth prospects in the US, with a positive spillover effect on international bond markets too. The different Quantitative Easing measures by the Federal Reserve have kept the term structure flat, instead. Overall, the results for the third subsample indicate that growth prospects and stability on financial markets would be at least as important as fiscal fundamentals.

V. CONCLUSION

Expectations about macroeconomic and fiscal developments have triggered reactions in the sovereign bond market since the start of the 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 a bad 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 on macro and fiscal fundamentals matter for market experts' perception of future sovereign risk premium, helping ensuring the sustainability of public finance (Bi, 2012). We employ a survey-based monthly dataset of individual forecasters (Consensus Economics Forecast) composed mainly by banks and other financial institutions, but also by private and public research centres. Our sample covers the period from January 1993 to December 2011, therefore, including also a relevant part of the recent Financial Crisis.

We focus on the spread between expected one-year-ahead 10-year government bonds for France, Italy, the UK, and the benchmark 10-year government bond for Germany as forecast 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.

Our findings suggest that forecasters significantly consider expected fiscal and other macroeconomic fundamentals in forming their expectations about the next year evolution of sovereign bond spreads. A better expected fiscal outlook—in terms of a more favourable forecast for the government budget balance—reduces expected spreads. While true for all countries, this effect is particularly strong and robust for Italy, for which a 1 percent rise in the expected surplus ratio to GDP reduces forecast spreads by 27 basis points. Higher

expected GDP growth tends to be positively and significantly associated with expected spreads for the entire sample in analysis (since 1992). International developments also spill over onto the forecast spreads. In general, 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.

Further evidence on the importance of stable fiscal policies and expected economic growth emerges from the changing relation between forecast fundamentals and expected spreads over time. The outlook of fiscal policy remains important, even during the Financial Crisis. However, during this more recent period market experts associate a context of expected low growth with larger forecast spreads, particularly in Italy.

Overall, our results support the call to increase fiscal transparency and anchor fiscal expectations (Leeper, 2010). Besides improving significantly 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) is indeed a key factor to 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, our new database on forecast spreads allows one to explore the heterogeneous spreads forecasts of different market experts. Such heterogeneity could be explored 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 expected spread (Jaramillo and Zhang, 2013). The geographical location of the forecasting expert/institution may be another factor explaining different forecasting patterns on spreads. These topics, which go beyond the scope of this paper, are left for future analysis.

TABLES AND FIGURES

Table 1. Descriptive Statistics, January 1993–December 2011

	France				Italy				UK			
Variable	**sd**	**p_{25}**	**p_{50}**	**p_{75}**	**sd**	**p_{25}**	**p_{50}**	**p_{75}**	**sd**	**p_{25}**	**p_{50}**	**p_{75}**
Forecast constant maturity swap corrected spread (t+1)	0.34	-0.21	0.02	0.19	0.58	-0.05	0.20	0.48	0.48	-0.52	-0.24	0.05
Forecast spread to Germany (t+1)	0.45	-0.20	0.08	0.34	1.89	0.09	0.40	2.50	0.78	0.32	0.75	1.34
Forecast spread to Germany (t)	0.39	-0.04	0.12	0.35	2.04	0.13	0.38	3.10	0.74	0.48	0.88	1.36
Realized spread	0.21	0.02	0.08	0.16	0.65	0.21	0.29	0.81	0.23	-0.24	-0.14	-0.06
Forecast surplus (t+1)	1.60	-3.82	-3.11	-2.52	2.41	-5.00	-3.13	-2.22	2.66	-3.56	-2.75	-1.31
Forecast surplus (t)	1.72	-4.41	-3.31	-2.73	2.59	-5.40	-3.41	-2.41	3.10	-4.13	-3.14	-1.52
Forecast growth (t+1)	0.77	1.70	2.20	2.70	0.80	1.30	1.90	2.50	1.23	1.88	2.40	2.80
Forecast inflation (t+1)	0.58	1.40	1.70	2.00	1.31	1.85	2.09	3.30	1.38	2.40	2.80	3.50
Liquidity proxy (total outstanding securities)	0.33	0.51	0.69	0.97	0.26	1.01	1.16	1.29	0.13	0.18	0.29	0.34
Financial Stability Index	2.23	-3.22	-1.23	0.27	2.44	-2.68	-1.44	0.19	3.37	-2.76	-1.37	1.25
Financial Stability Index (relative to US)	2.65	-1.59	-0.41	0.48	2.68	-1.54	-0.11	1.03	1.73	-0.79	0.18	1.07
Forecast surplus differential to Germany	1.24	-1.41	-0.35	0.00	1.80	-2.27	-0.83	-0.02	2.26	-0.88	0.24	1.04
Forecast growth differential to Germany	0.47	-0.03	0.30	0.60	0.51	-0.44	-0.02	0.31	1.28	-0.28	0.37	1.02
Forecast inflation differential to Germany	0.44	-0.42	-0.12	0.19	0.77	0.26	0.53	1.12	1.17	0.55	0.93	1.37
Forecast yield US	1.07	0.75	1.60	2.68	1.08	0.71	1.44	2.64	1.02	0.80	1.44	2.59
BAA-AAA US spread	0.45	0.69	0.84	1.02	0.43	0.69	0.83	1.02	0.41	0.66	0.81	1.00
Bid ask differential to Germany	10.35	-1.18	1.52	4.57	18.08	-2.25	0.21	3.00	28.37	-25.40	-13.23	0.24

Table 2. Panel Baseline Regressions, Jan. 1993–Dec. 2011[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	-0.034**	-0.270***	-0.054***
	(-2.386)	(-7.576)	(-5.740)
Growth (forecast t+1)	0.245***	0.414***	0.085***
	(8.349)	(4.959)	(5.054)
Inflation (forecast t+1)	0.039	-0.083	0.106***
	(1.121)	(-1.156)	(3.670)
Global factor: yield US (forecast t+1)	0.079***	0.157***	0.024*
	(7.389)	(5.034)	(1.834)
Adjusted R^2	0.04	0.61	0.21
F-test	13.50	8.34	21.10
J-test (p-value)	0.20	0.51	0.52
KP LM test[b]	125.25	19.39	137.52
Number of forecasting institutions	23	22	46
Number of observations	1,676	948	2,403

Notes: [a] All variables are forecasts for the year ahead and (apart from US yields) represent differences from the mean value 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–Dec. 2011[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	-0.020**	-0.122***	0.023***
	(-2.288)	(-4.997)	(4.05)
Growth (forecast t+1)	0.089***	0.176***	-0.107***
	(3.568)	(2.721)	(-6.46)
Inflation (forecast t+1)	-0.031	-0.019	0.011***
	(-1.643)	(-0.362)	(0.67)
Global factor: yield US (forecast t+1)	0.081***	0.206***	0.109**
	(11.838)	(7.644)	(12.26)
Adjusted R^2	0.18	0.09	0.19
F-test	17.28	6.71	25.12
J-test (p-value)	0.04	0.01	0.04
KP LM test[b]	76.09	12.26	66.01
Number of forecasting institutions	12	9	22
Number of observations	1,018	609	1,601

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 4. Panel including alternative Global Risk variables, Jan. 1993-Dec. 2011[a]

	France	Italy	UK	France	Italy	UK	France	Italy	UK	France	Italy	UK
Surplus ratio (forecast t+1)	-0.039***	-0.292***	-0.017	-0.040***	-0.288***	-0.052***	-0.025*	-0.463***	-0.024**	-0.035**	-0.253***	0.005
	(-2.910)	(-8.239)	(-1.454)	(-3.035)	(-8.662)	(-5.493)	(-1.737)	(-6.978)	(-2.162)	(-2.560)	(-7.959)	(0.268)
Growth (forecast t+1)	0.238***	0.361***	0.074***	0.218***	0.339***	0.072***	0.206***	0.151*	0.091***	0.246***	0.447***	0.091***
	(8.126)	(4.361)	(4.379)	(7.911)	(4.357)	(4.388)	(7.728)	(1.672)	(5.139)	(8.404)	(5.454)	(5.402)
Inflation (forecast t+1)	0.032	-0.110	0.112***	0.047	-0.165***	0.135***	0.035	-0.001	0.156***	0.041	-0.015	0.137***
	(0.892)	(-1.620)	(3.966)	(1.355)	(-2.615)	(4.630)	(1.027)	(-0.017)	(5.410)	(1.168)	(-0.208)	(4.619)
Global factor:yield US (forecast t+1)	0.072***	0.139***	0.032**	0.063***	0.151***	0.017	0.078***	0.177***	0.021	0.072***	0.235***	0.011
	(6.901)	(4.232)	(2.302)	(6.122)	(5.226)	(1.301)	(7.338)	(4.830)	(1.554)	(6.992)	(7.856)	(0.828)
AAA-BAA corporate US bond spread	0.048***	0.189***	0.184***									
	(2.501)	(2.848)	(5.832)									
Global factor: corrected fin. stab. index rel. to US				-0.009***	-0.055***	-0.013**						
				(-2.973)	(-4.944)	(-2.296)						
Fundamental and FSI interaction							-0.002***	-0.036***	-0.003***			
							(-2.594)	(-5.380)	(-5.048)			
Fundamental and BAA-AAA US spread interact.										-0.005	0.122***	-0.028***
										(-1.278)	(5.015)	(-4.939)
Adjusted R^2	0.058	-0.602	0.190	0.074	-0.505	0.201	0.070	-1.257	0.193	0.049	-0.499	0.183
F-test	12.965	8.369	20.668	13.570	11.526	19.330	13.262	6.370	20.229	12.674	9.001	22.597
J-test (p-value)	0.304	0.729	0.623	0.665	0.906	0.364	0.565	0.665	0.273	0.210	0.201	0.309
KP LM test[b]	140.915	19.198	58.284	140.149	19.561	139.785	118.921	12.396	48.892	144.195	28.382	25.229
Number of forecasting institutions	23	22	46	23	22	46	23	22	46	23	22	46
Number of observations	1676	948	2403	1657	943	2383	1657	943	2383	1676	948	2403

Notes: 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-Dec. 2011[a]

	France	Italy	UK
Primary surplus ratio (forecast t+1)	-0.041	-0.311	-0.088***
	(-1.410)	(-1.231)	(-5.100)
Growth (forecast t+1)	0.254***	0.977*	0.097***
	(6.393)	(1.880)	(5.452)
Inflation (forecast t+1)	0.060	-0.420	0.112***
	(1.311)	(-1.096)	(3.584)
Global factor: yield US(forecast t+1)	0.053**	0.058	-0.045*
	(2.037)	(0.838)	(-1.859)
Adjusted R^2	0.04	0.02	0.16
F-test	11.56	0.85	19.91
J-test (p-value)	0.07	0.04	0.34
KP LM test[b]	11.12	0.60	16.56
Number of forecasting institutions	23	22	46
Number of observations	1,676	948	2,403

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. Panel Using Data in Levels, Jan. 1993-Dec. 2011[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	-0.015	-0.147***	-0.122***
	(-0.596)	(-2.568)	(-6.484)
Growth (forecast t+1)	0.313***	0.899*	0.140***
	(4.931)	(6.341)	(5.143)
Inflation (forecast t+1)	-0.002	-0.136	0.094**
	(0.027)	(-1.308)	(2.467)
Global factor: yield US(forecast t+1)	0.147***	0.232***	-0.063**
	(7.407)	(3.901)	(-2.411)
Adjusted R^2	0.32	0.17	0.07
F-test	9.21	6.57	18.74
J-test (p-value)	0.00	0.16	0.26
KP LM test[b]	14.31	6.54	22.66
Number of forecasting institutions	23	22	46
Number of observations	1,676	948	2,403

Notes : [a] All variables are forecasts for next year in levels (not 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 7. Panel Using Change in Growth, Jan. 1993–Dec. 2011[a]

	France	Italy	UK
Surplus ratio (forecast t+1)	0.128***	-0.012	-0.022**
	(3.971)	(-0.128)	(-2.012)
Growth (forecast t+1)	-0.345***	-0.721***	0.064***
	(-5.083)	(-2.923)	(4.307)
Inflation (forecast t+1)	0.130**	0.203*	0.123***
	(0.027)	(-1.308)	(2.467)
Global factor: yield US(forecast t+1)	0.195***	0.369***	0.031**
	(7.220)	(4.673)	(2.275)
Adjusted R^2	0.62	0.17	0.07
F-test	8.18	6.57	18.74
J-test (p-value)	0.01	0.16	0.26
KP LM test[b]	6.55	6.54	22.66
Number of forecasting institutio.	23	22	46
Number of observations	1,676	948	2,403

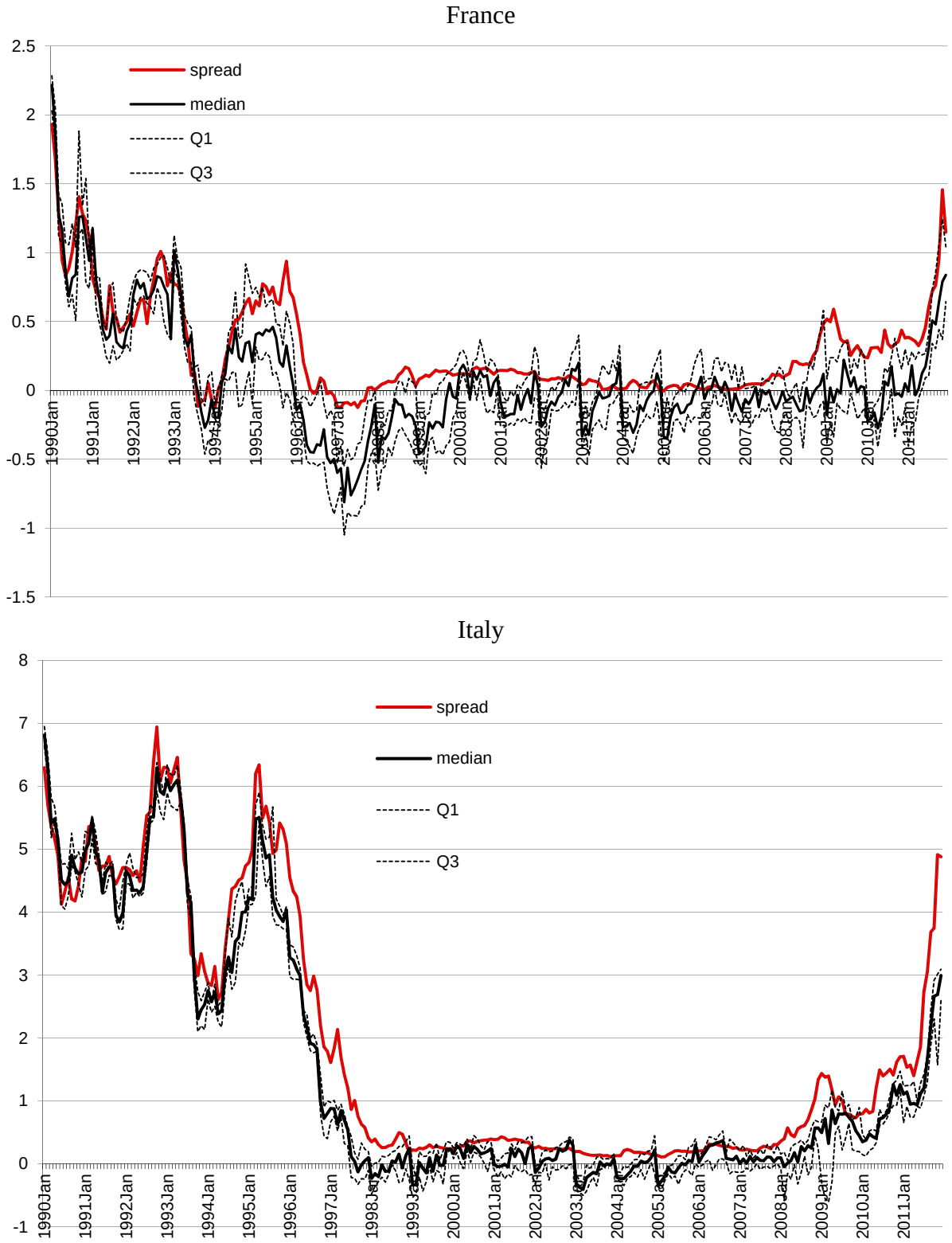
Notes : [a] All variables are forecasts for the year ahead and (apart from US yields) represent differences from the values for Germany ; significance at *** p<0.01, ** p<0.05, * p<0.1 ; monthly dummies not reported. [b] KP LM test is the Kleibergen Paap LM test for weak instruments.

Table 8. Panel with Different Period Subsamples, Jan. 1993-Dec. 2011[a]

	Jan. 1993 – Dec.1999 (pre-EMU)			Jan. 1999 – Sep. 2008 (EMU, pre-crisis)			Sep. 2008 – Dec. 2011 (crisis)		
	France	Italy	UK	France	Italy	UK	France	Italy	UK
Surplus ratio (forecast t+1)	0.352***	-0.344***	-0.054***	0.010	0.020	-0.053***	-0.065***	-0.076	0.002
	(3.840)	(-12.810)	(-5.740)	(0.646)	(0.825)	(-3.289)	(-2.613)	(-0.826)	(0.075)
Growth (forecast t+1)	0.495***	0.265***	0.085***	0.088**	0.085*	-0.032	0.273***	-0.788***	0.268***
	(6.222)	(3.025)	(5.054)	(2.488)	(1.844)	(-0.653)	(4.910)	(-3.621)	(3.575)
Inflation (forecast t+1)	0.058	-0.512***	0.106***	0.138***	0.124***	0.073*	-0.189**	-0.127	0.081
	(0.587)	(-7.234)	(3.670)	(2.865)	(2.201)	(1.792)	(-2.545)	(-0.434)	(1.098)
Global factor : yield US (forecast t+1)	-0.290***	-0.879***	0.024*	0.007	-0.088***	0.029*	-0.089	-0.003	-0.370***
	(-4.449)	(-9.937)	(1.834)	(0.489)	(-3.872)	(1.936)	(-1.174)	(-0.012)	(-4.426)
Adjusted R^2	0.02	0.39	0.20	0.06	0.12	0.07	0.04	0.23	0.15
F-test	5.26	18.60	12.00	3.50	1.45	8.01	3.46	3.03	5.12
J-test (p-value)	0.47	0.63	0.51	0.06	0.93	0.17	0.03	0.14	0.04
KP LM test[b]	30.56	70.37	83.27	45.94	30.50	11.12	57.97	28.30	18.74
Number of forecasting institutions	14	11	35	22	19	29	13	7	13
Number of observations	392	308	992	962	508	1,160	322	129	248

Notes : 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. Actual and Market Forecast Distribution of Bond Spreads



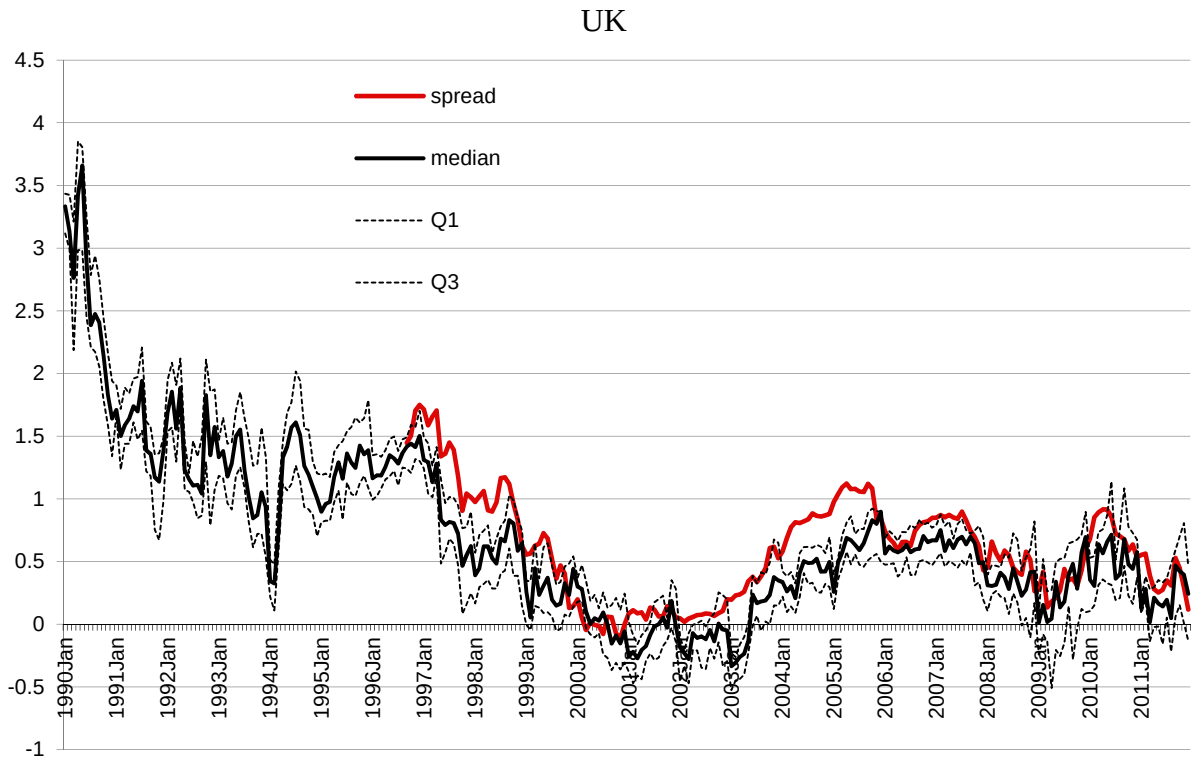


Figure 2. RMSE on Forecasted Bond Spreads

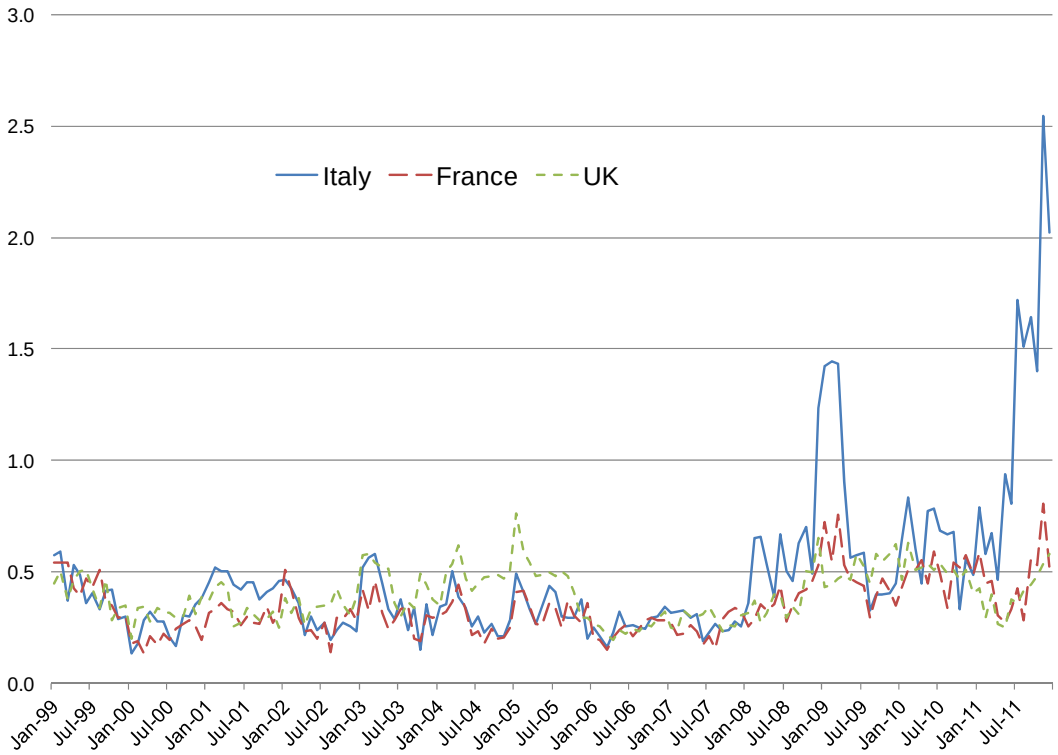
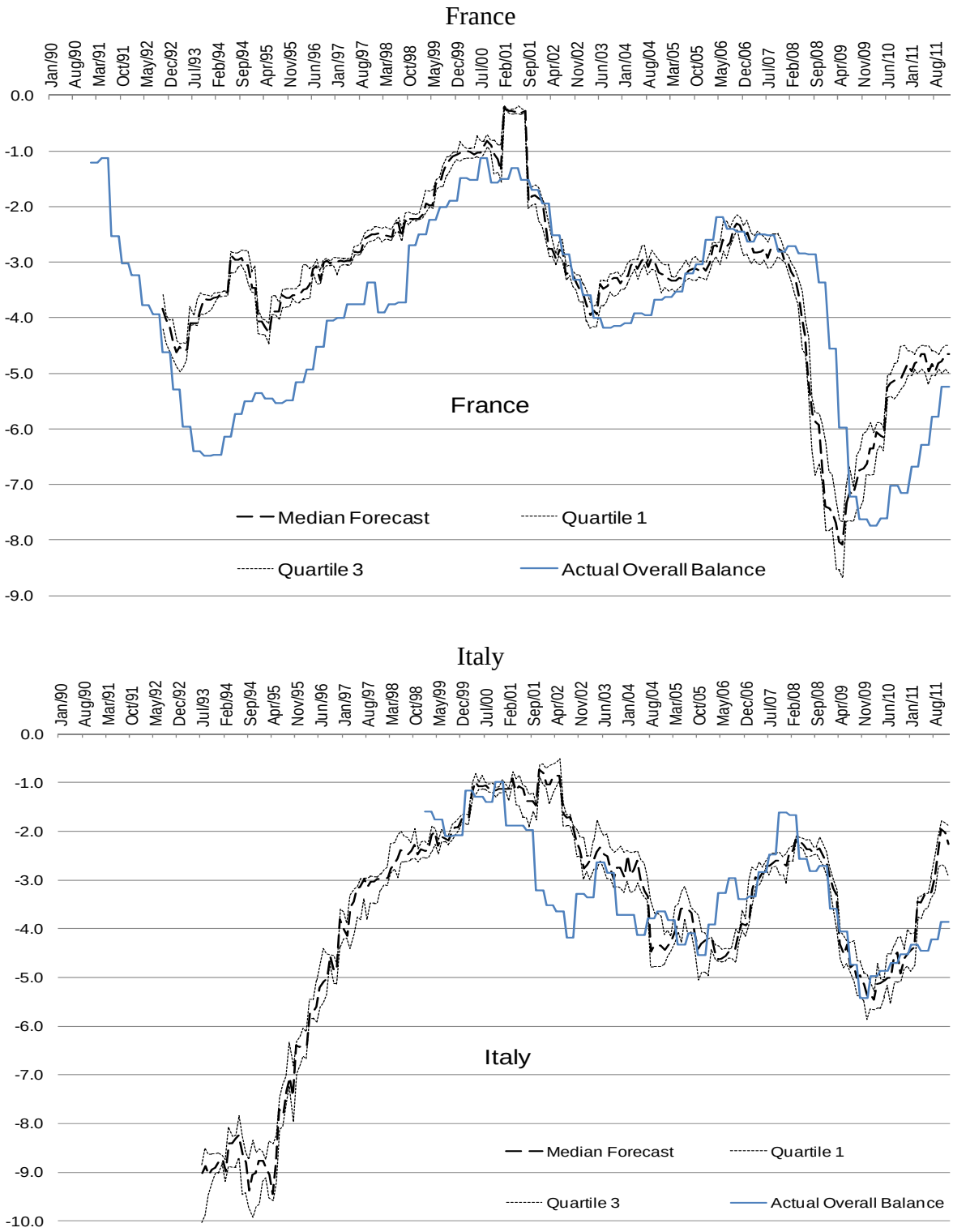


Figure 3. Actual and Market Forecast Distribution of Fiscal Overall Balance



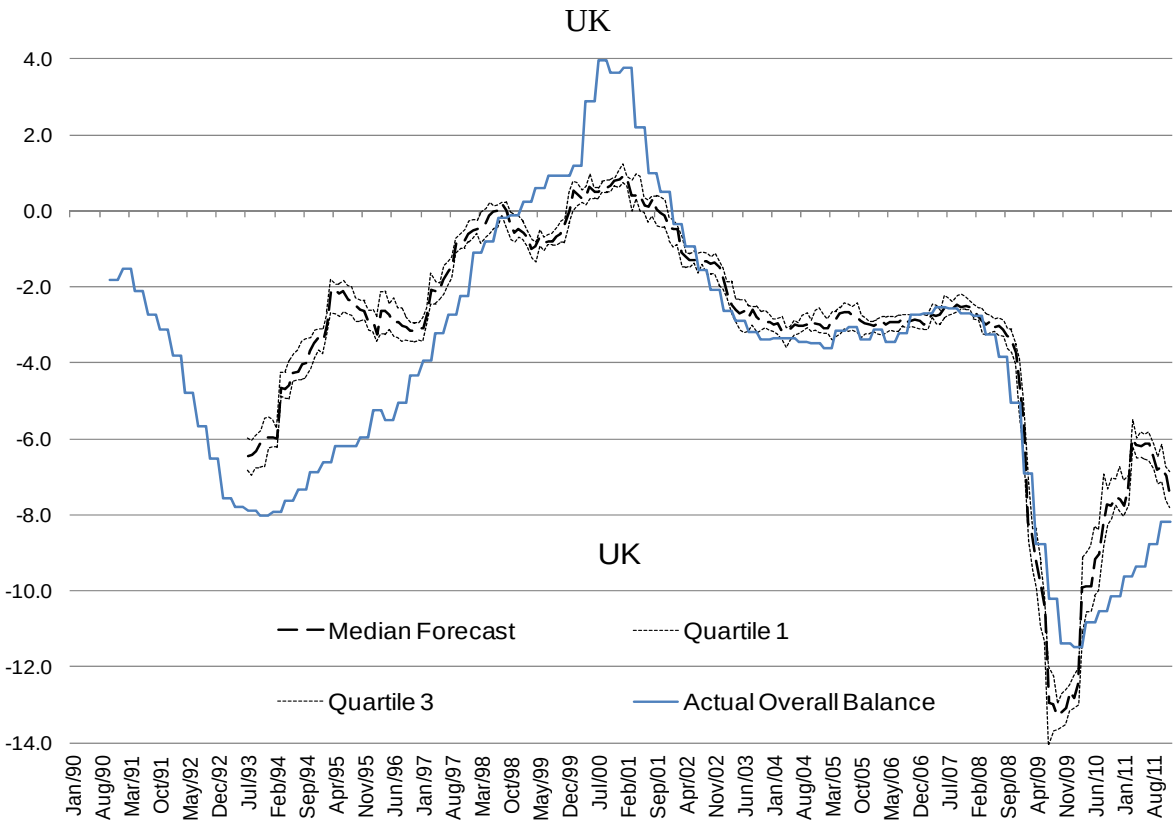


Figure 4. RMSE on Fiscal Overall Balance

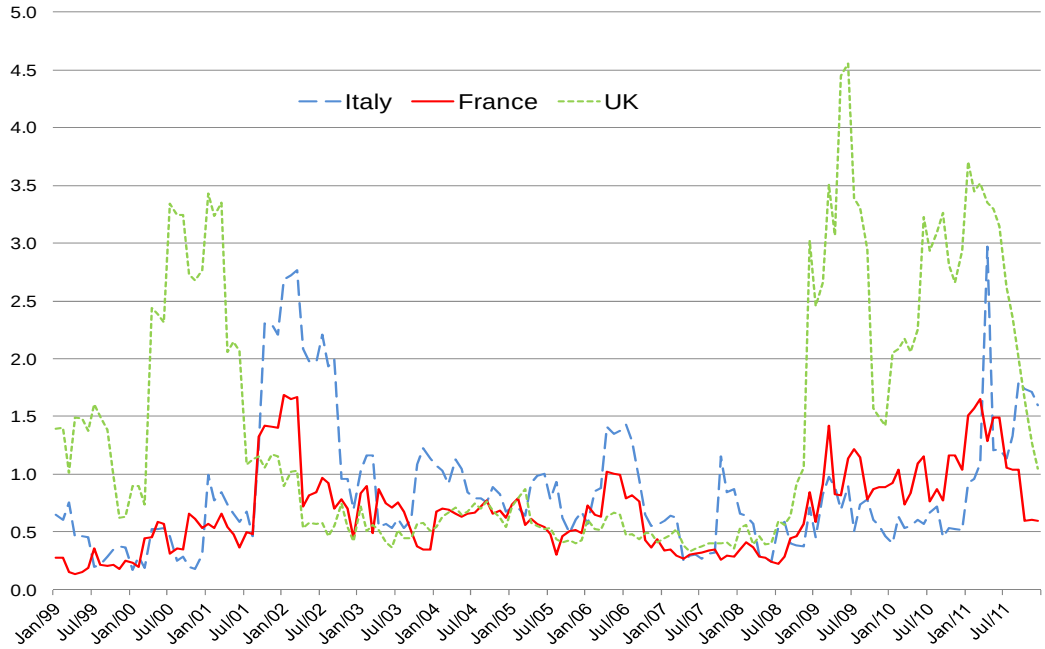
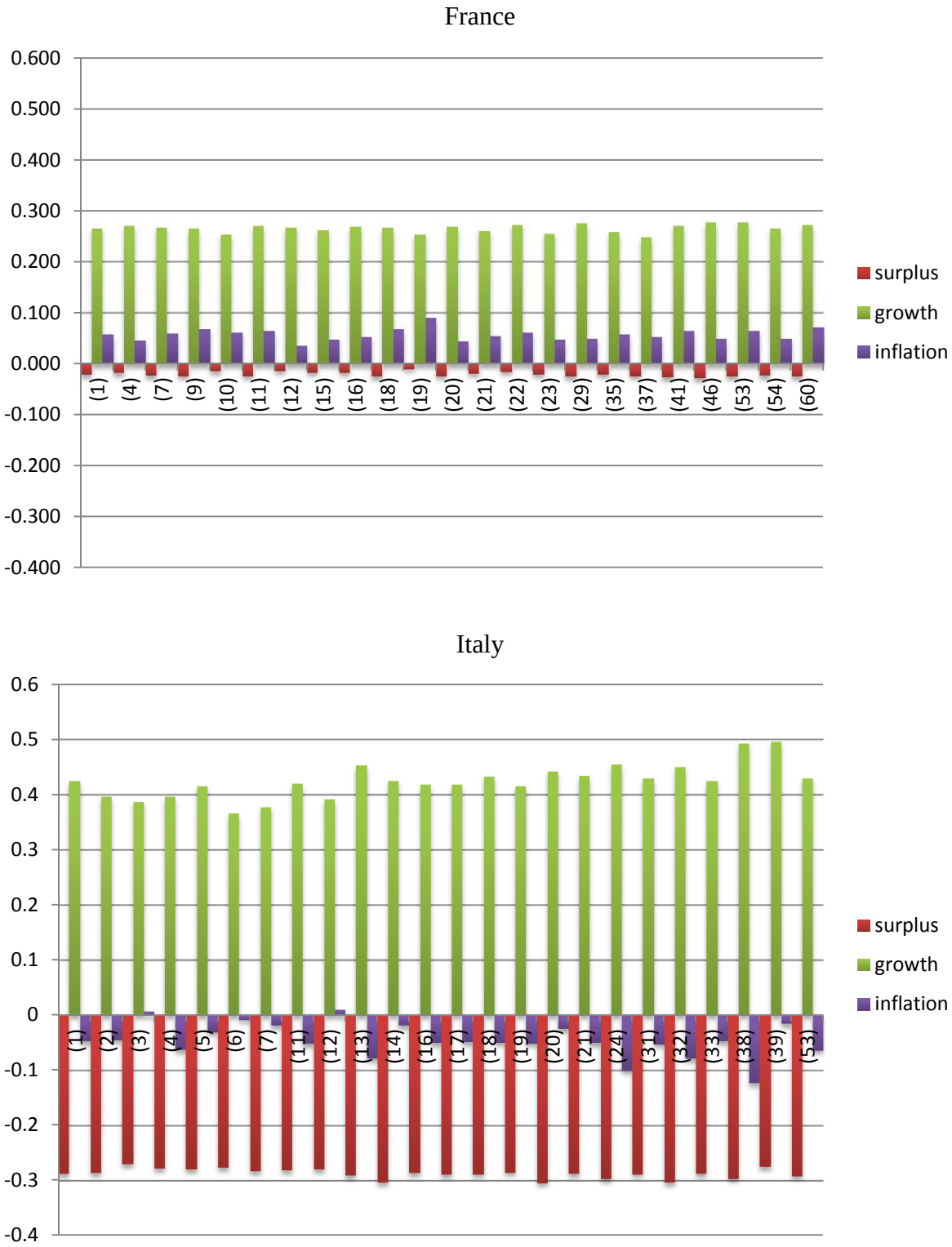
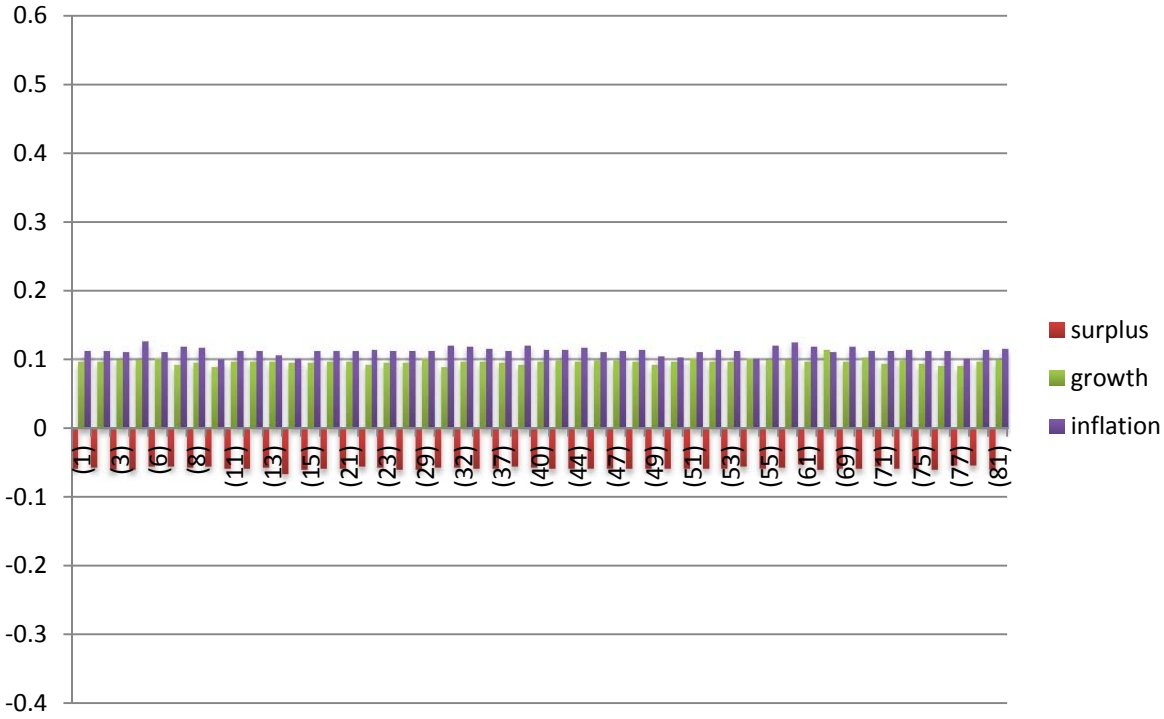


Figure 5. Regression coefficients obtained by dropping one forecaster at a time



UK


0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
(1)
(3)
(6)
(8)
(11)
(13)
(15)
(21)
(23)
(29)
(32)
(37)
(40)
(44)
(47)
(49)
(51)
(53)
(55)
(61)
(69)
(71)
(75)
(77)
(81)
surplus
growth
inflation

APPENDIX

A. Description of variables

Name	description	source
Budget balance, forecast	Forecast for t and t+1 of nominal budget 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
Budget balance	Quarterly data, actual values	
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 budget 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*, $E_{i,t,m}\left[\Delta y_{t+1}\right]$, and inflation, $E_{i,t,m}\left[\pi_{t+1}\right]$, for each forecaster *i* at a particular month *m* of year *t*. The expected year-ahead nominal GDP value for each country is then

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

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

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

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

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