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Fiscal expectations on the Stability and Growth Pact:  
evidence from survey data

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## **FISCAL EXPECTATIONS ON THE STABILITY AND GROWTH PACT: EVIDENCE FROM SURVEY DATA**

### **NON-TECHNICAL SUMMARY**

Economic literature on fiscal rules argues that the signal and credibility gain that they convey to financial markets are two main economic arguments for their implementation. In Europe, however, skepticism about the effects of the Stability and Growth Pact (SGP) on the credibility of Europe's fiscal institutions has been an issue since its inception. Over time, with several EU countries breaching the rules of the Pact, such concerns have spiraled, generating an intense debate about its effectiveness and reliability.

This paper assesses empirically how the introduction and reform of the SGP have changed the expectations of financial market experts on fiscal policies of the four largest European Economies: France, Germany, Italy, and UK. For that we rely on the disaggregated monthly survey provided by Consensus Economics Forecasts on professional economists' deficit forecasts between May 1993 and December 2007 as a proxy for their fiscal expectations. To the best of our knowledge this is the first time that fiscal rules are analyzed by means of markets' expectations.

We test the impact of the SGP in two different dimensions. First, we look at whether the introduction and reform of the Pact have increased accuracy and decreased bias of experts' deficits forecasts. Second, we investigate how the SGP has affected the convergence and bias of their deficit forecasts compared to those of the European Commission and of each country's national fiscal authority (NFA). More convergence of experts' fiscal forecasts to the ones of those institutions could imply an increase in their credibility due to the SGP implementation.

As main results, our paper evinces that only in France accuracy of deficit forecasts by market specialists has significantly increased after the SGP. In turn, credibility of the European Commission's deficit forecasts among market specialists seems to have increased in most of the countries (France, Italy, and the UK), particularly after the Pact's reform in 2005 and up to 2007. Nevertheless, with exception of the UK, our findings suggest a lack of credibility of NFAs fiscal forecasts among market specialists during the SGP.

These results indicate a need for improvements in the enforcement and transparency of Europe's fiscal framework in order to make its fiscal institutions more credible. This is particularly relevant nowadays. The financial crisis and the fiscal stimulus plans implemented have created serious fiscal challenges for the European countries. Restoring stability and sustainability of public finances is a top priority for several EU member states. Certainly, fiscal consolidation could also be better formulated and implemented if policymakers had further insights about what the SGP has achieved in terms of credibility and transparency.

**ABSTRACT**

The paper uses survey data to analyze whether the Stability and Growth Pact (SGP) has changed financial market's expectations on government budget deficits in France, Germany, Italy, and the UK. Our findings indicate that accuracy of financial experts' deficit forecasts has increased in France during the SGP. The Pact seems to have also promoted a gain in credibility of European Commission's deficit forecasts in France, Italy, and in the UK, particularly after its reform in 2005 and up to December 2007. Nevertheless, the National Fiscal Authorities' forecasts of France, Germany, and Italy seem to have not been credible among market experts during the SGP. These results suggest that additional measures could be taken in order to make the fiscal rules of the Pact more credible among market specialists.

*JEL Classification:* E62, H11, H30, H50.

*Keywords:* expectations, credibility, Stability and Growth Pact, survey data.

## ANTICIPATIONS BUDGÉTAIRES ET PACTE DE STABILITÉ ET DE CROISSANCE : UNE ANALYSE À PARTIR DE DONNÉES D'ENQUÊTE

### RÉSUMÉ NON TECHNIQUE

La littérature économique justifie l'emploi de règles budgétaires par le signal et la crédibilité qu'elles envoient aux marchés financiers. En Europe, cependant, le débat a, depuis la mise en place de l'euro, été dominé par un certain scepticisme quant aux effets du Pacte de Stabilité et de Croissance (PSC). Ce scepticisme s'est renforcé avec le temps, plusieurs pays ayant enfreint les règles du PSC.

On évalue empiriquement comment l'introduction et la réforme du PSC a affecté les anticipations des experts des marchés sur les politiques budgétaires de quatre grandes économies européennes : La France, l'Allemagne, l'Italie, et le Royaume-Uni. On utilise pour cela les prévisions de Consensus Economics relatives aux déficits budgétaires entre mai 1993 et décembre 2007. A notre connaissance, c'est la première fois que l'impact du PSC est analysés à travers les anticipations des marchés.

Nous examinons l'impact du PSC dans deux dimensions différentes. D'abord, nous regardons si l'introduction et la réforme du Pacte ont amélioré la qualité des prévisions. En second lieu, nous étudions si le PSC a fait converger les prévisions de déficits sur celles de la Commission européenne et des autorités budgétaires nationales. Davantage de convergence entre les prévisions des experts à celles de ces institutions signifierait une meilleure crédibilité budgétaire grâce au PSC.

Les résultats suggèrent que le PSC n'a amélioré les prévisions de déficit des experts que pour la France. Cependant, la crédibilité des prévisions de la Commission européenne semble avoir augmenté pour trois des quatre pays étudiés (France, Italie, Royaume-Uni), en particulier après la réforme de Pacte de 2005 (et avant la crise de 2008). Sauf pour le Royaume-Uni, la crédibilité des prévisions nationales ne s'est pas améliorée avec la mise en place du PSC.

Ces résultats suggèrent qu'une amélioration du cadre budgétaire européen est nécessaire pour en améliorer la crédibilité. La crise financière et les plans de relance ont considérablement dégradé les finances publiques en Europe. Un ancrage crédible des finances publiques n'en sera que plus nécessaire en sortie de crise, pour gérer le dégonflement progressif des dettes publiques en présence de marchés réactifs.

### RÉSUMÉ COURT

On utilise des données d'enquête sur les prévisions des experts pour évaluer si le Pacte de Stabilité et de Croissance (PSC) a amélioré la qualité des prévisions budgétaires des marchés et la crédibilité de celles des gouvernements (France, Allemagne, Italie, Royaume-Uni) et de la Commission européenne. Les résultats suggèrent que le PSC n'a amélioré les prévisions de déficit des experts que pour la France. Cependant, la crédibilité des prévisions de la Commission européenne semble avoir augmenté pour trois des quatre pays étudiés (France, Italie, Royaume-Uni), en particulier après la réforme de Pacte de 2005

(et avant la crise de 2008). Sauf pour le Royaume-Uni, la crédibilité des prévisions nationales ne s'est pas améliorée avec la mise en place du PSC.

*Classification JEL* : C33, E62, E65, H62.

*Mots clés* : espérances, crédibilité, Pacte de Stabilité et de Croissance, données d'enquête.

## FISCAL EXPECTATIONS ON THE STABILITY AND GROWTH PACT: EVIDENCE FROM SURVEY DATA<sup>1</sup>

Marcos Poplawski-Ribeiro\* and Jan-Christoph Rülke†

### 1. INTRODUCTION

The signal and credibility gain that fiscal rules convey to financial markets are two main economic arguments for their implementation (Kopits (2001), Braun and Tommasi (2004), and Drazen (2004)). Another related argument is that such rules are also supposed to provide guidance to market experts; increasing their awareness of adverse fiscal developments, and contributing to more transparency in the fiscal accounts (Manganelli and Wolswijk (2007) and Leeper (2009)).

In Europe, however, skepticism about the impacts of the Stability and Growth Pact (SGP) on the credibility of Europe's fiscal institutions has been an issue since its inception (Beetsma and Uhlig (1999) and Beetsma (2001)). After the success of the Maastricht Treaty's fiscal framework during the run-up for the Euro, questions about enforcement and countries' commitment to fiscal discipline started to be raised with the implementation of the SGP.<sup>2</sup> Over time, with several EU countries breaching the rules of the Pact, such concerns spiraled, generating an intense debate about its effectiveness and reliability.<sup>3</sup> Eventually, the annulations of the excessive deficit procedures for France and Germany in the end of 2003 led to a reform of the SGP in 2005, whose main objectives were to improve the fiscal rules, and increase "*the legitimacy of the EU fiscal framework*" (European Commission 2005).<sup>4</sup>

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<sup>2</sup>The European fiscal framework is enshrined in the Maastricht Treaty of February of 1992. Further, to make the Treaty provisions more precise and operational, in June of 1997, the European Council accepted a draft resolution of the SGP. In its first draft, the Pact comprised two main branches, one aimed at the surveillance of fiscal policy and one aimed at the dissuasion of fiscal profligacy. The surveillance part entered in force on 1 July 1998, whereas the dissuasive arm effectively came into force on 1 January 1999 (see Cabral (2001)).

<sup>3</sup>For an empirical analysis of the effectiveness of the SGP see Galí and Perotti (2003) and, more recently, Poplawski-Ribeiro (2009).

<sup>4</sup>In an extraordinary meeting in March 2005, the EU finance ministers reached a deal on reforms to the SGP that were made official in the EU summit of heads of state meeting in June of the same year. Such reform changed several items of the previous pact in its both preventive and corrective arm. For a description and analysis of the

Nevertheless, a formal empirical assessment of how the introduction and reform of the SGP changed fiscal expectations of financial market experts has never been carried out. This paper, therefore, performs such assessment for the four largest European Economies: France, Germany, Italy, and UK. This issue is particularly important during the current financial crisis when the revival of discretionary fiscal policy and the implementation of stimulus plans have cast further doubts about reliability of Europe's fiscal rules and institutions.<sup>5</sup>

We use survey data of government budget deficit forecasts provided by financial experts as a proxy for their expectations on fiscal variables. For that we rely on the disaggregated monthly survey provided by Consensus Economics Forecasts on professional economists' deficit forecasts for Germany, France, Italy, and the UK between May 1993 and December 2007.

Then, we test the impact of the SGP on their expectations in two different dimensions. First, we look at whether the introduction and reform of the Pact have increased accuracy and decreased bias of their forecasts. This way, we check whether the higher amount of information on fiscal policy provided by European fiscal institutions after the implementation of the SGP – via, for instance, the Stability and Convergence Programmes (SCP) reports and assessments – have helped financial experts to make more accurate forecasts.

Second, we investigate how the SGP has affected the convergence and bias of experts' deficits forecasts compared to those of the European Commission and of each country's national fiscal authority (NFA). More convergence of experts' fiscal forecasts to the ones of those institutions could suggest an increase in their credibility due to SGP implementation.

To the best of our knowledge this is the first time that fiscal rules are analyzed by means of markets' expectations.<sup>6</sup> Nonetheless, surveyed data and markets' expectations have already been extensively employed in monetary and international economics. In line with our analysis, most papers in monetary policy use agents' expectations to analyze policy credibility (Cukierman and Meltzer 1986, Rogoff 1987, Cukierman 1992); and the impacts of imperfect knowledge, learning and expectation formation on monetary policy.<sup>7</sup>

Heppke-Falk and Hübner (2004) also use survey data as a proxy for fiscal expectations. However, different from us, those authors analyze the relation between interest rate swap spreads and budget deficits in three countries of EMU (France, Germany, and Italy). Their findings

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reformed SGP see, among others, Buti et al. (2005), Chang (2006), Morris et al. (2006), and Beetsma and Debrun (2007).

<sup>5</sup>Artis and Marcellino (2001) and Leal et al. (2007), in addition, argue that fiscal forecasts play a key role in the operation of the SGP. Should those forecasts and expectations turn out to be of poor quality, the operation of the Pact would be severely compromised.

<sup>6</sup>Some papers have already tested the enforcement effects of credit markets on authorities' respect to fiscal rules and discipline (see, for example, Bayoumi et al. (1995) and Manganelli and Wolswijk (2007)). However, instead of using market's expectations directly, those papers check this issue indirectly via changes in bond spreads.

<sup>7</sup>The literature in this field is extensive. See, among others: Clements (1995) and (2008); Mankiw and Reis (2002); Carroll (2003); and Orphanides and Williams (2005), (2006), (2008). In International Economics see, for example, Reitz et al. (2009).



show that after the implementation of the SGP, increases in expected deficits have led to a fall in interest rate swap spreads in Germany and France.<sup>8</sup> Finally, assessments of international organizations' quality of forecasts also employ survey data. Nonetheless, most of those assessments focus on other macroeconomic variables such as growth and inflation rates rather than on fiscal variables.<sup>9</sup>

As main results, our paper indicates that only in France accuracy of deficit forecasts by market specialists has significantly increased after the implementation of the SGP. Moreover, the Pact seems to have promoted a gain in credibility of the European Commission's fiscal forecasts in France, Italy, and in the UK. However, the National Fiscal Authorities' forecasts of France, Germany, and Italy seem to have not been credible among market experts during the SGP. These results suggest, thus, the need of improvements in the enforcement and transparency of Europe's fiscal framework in order to anchor fiscal expectations and to make Europe's fiscal institutions more credible.

The rest of the paper is structured as follows. Section 2 describes the data set and provides preliminary tests on unbiasedness and weak efficiency of financial experts' forecasts. Section 3 focuses on changes in experts' forecasts accuracy and bias due to the introduction and reform of the SGP. Section 4 investigates whether the Pact has changed the convergence and bias of market's fiscal expectations compared to those of the European Commission and NFAs. At last, Section 5 concludes the paper.

## 2. DATASET AND DESCRIPTIVE STATISTICS

We use disaggregated monthly survey data provided by Consensus Economics Forecasts (CEF) on professional economists' forecasts for Germany, France, Italy and the UK during the sample period from May 1993 to December 2007, summing up to 171 months.<sup>10</sup> The survey is performed for two different forecast horizons: forecasts for the end of the same year (same-year), and for the end of the year ahead (year-ahead).<sup>11</sup>

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<sup>8</sup>Allers et al. (1998) use survey data for fiscal variables as well. Nevertheless, those authors conduct a survey in the Netherlands with newspaper readers on their knowledge of government indebtedness and behavior in response to the fiscal policy stance, finding no significant evidence of Ricardian Equivalence on their sample.

<sup>9</sup>See, among others, Batchelor (2001), Blix et al. (2001), Juhn and Loungani (2002), Timmermann (2006), and Melander et al. (2007).

<sup>10</sup>Consensus Economics conducts the survey during the first week of each month and publishes the forecasts at the beginning of the second week of the respective month. Its participants are professional economists working for universities and financial institutions such as international economic research institutes, investment and commercial banks. The number of participants varies from country to country with UK having the highest number of forecasters (66) while Italy the lowest (29). Further information on how the survey is conducted can be found in the website: [www.consensuseconomics.com](http://www.consensuseconomics.com).

<sup>11</sup>The forecasts provided for the same year exhibit on average a six-month forecast horizon (average between the twelve-month forecast horizon of January and one-month horizon of December). Likewise, forecasts for the next year have on average a forecast-horizon of 18 months.

CEF dataset has several advantages over other surveys and is less subject to some of the weaknesses often associated with survey data. First, individuals' forecasts are published together with the names of their companies. As this allows everybody to evaluate the performance of the company, the quality of forecasts can be expected to have an effect on the reputation of the forecasters.<sup>12</sup> The outlined procedure also prevents a participant to reproduce others' forecasts limiting, therefore, the possibility of herding behavior a la Trueman (1994). Moreover, since analysts are bound in their survey answers by their recommendations to clients, an analyst may find hard to justify why she gave a recommendation different to the one in the survey (Keane and Runkle 1990).

Second, unlike some other surveys, professional economists who participate in the CEF poll do 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. Third, the survey data is readily available to the public so that our results can be easily verified.

Table 1 displays the average of the surveyed and actual values of the following variables:<sup>13</sup> the government general budget deficit; the real GDP growth rate; the three-month interest rate; the change in the CPI, (inflation rate); and the interest rate in treasury bonds (T-bill).<sup>14</sup> We present the averages of those variables for the entire sample period (May 1993 to December 2007), and for the period before the implementation of the SGP (May 1993 - December 1998) and subsequent period (January 1999 - December 2007).<sup>15</sup> In turn, Figures 1 to 4 show the development of the expected same-year (solid line), year-ahead (dotted line) and the actual budget balances for France, Germany, Italy, and the UK.<sup>16</sup>

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<sup>12</sup>Batchelor (2001) already shows that Consensus Economics' forecasts of six economic variables (the growth rates in real GDP, consumers expenditure, business investment and industrial production, the rate of consumer price inflation, and the unemployment rate) are less biased and more accurate in terms of mean absolute error and root mean square error compared to OECD's and IMF's forecasts. He also shows that there is little information in the OECD's and IMF's forecasts that could be used to reduce significantly the error in the private sector's forecasts. Further, Dovern and Weisser (2008) provide evidence that the participants in the Consensus poll provide rational and unbiased inflation and growth forecasts for the G7 countries.

<sup>13</sup>The source of surveyed variables is again CEF, while actual values come from IMF (2008*b*), and OECD (2008). See Table 1 for more details.

<sup>14</sup>For France and Germany, specialists forecast the government general budget balance (GTB) for the calendar year. For Italy, the forecast corresponds to the general budget balance for the fiscal year. For the UK, the fiscal variable forecasted is the Public Sector Net Cash Requirements (PSNCR). For France, Germany, and Italy the variables are transformed to budget deficit figures. For further information see the notes on Table 1.

<sup>15</sup>Consensus Economics collects the fiscal forecasts in local currency. Hence, we rewrite the forecasts in terms of GDP by combining real GDP and CPI forecasts. We compute the "forecasted" nominal GDP in the same way as in Heppke-Falk and Hufner (2004). More details on the calculation of the expected budget deficit in terms of GDP can be seen in the Appendix.

<sup>16</sup>Given that our data set is an unbalanced panel, we apply a minimum participation frequency for each forecaster in order to investigate the time series characteristics of the expectation formation process. Therefore, we only include those forecasters who participated at least ten times in the poll. Other minimum participation rates are also used, but the results (available upon request) do not change qualitatively.

The proximity of the forecasted and actual values in Table 1 and Figures 1 to 4 suggest that the expectations on macroeconomic variables are at first sight a good predictor for the actual value. Germany, for instance, has an average forecast for the general budget deficit (inflation rate) between May 1993 and December 2007 of 2.71% of GDP (1.80%), while the actual sample value is 2.66% of GDP (1.73%). Italy has an average forecast for the budget balance (interest rate) of 3.94% of GDP (4.94%), whereas the realized average value is 4.03% of GDP (4.95%).<sup>17</sup>

In order to provide some initial statistics on specialists' forecasts, we start by testing for the absence of bias and informational efficiency in fiscal forecasts during the overall time period. For that, we define same-year forecast errors on government annual total deficit as % of GDP ( $e_{i,t,m}^t$ ) for a particular country as:

$$e_{i,t,m}^t = d_{i,t,m}^t - d_{2008}^t, \quad (1)$$

where the subscripts identify the forecaster ( $i$ ), year ( $t$ ), and month ( $m$ ) that the forecast was done; while the superscripts identify the year ( $t$ ) forecasted. So,  $d_{i,t,m}^t$  is the forecast (expectation) of a financial specialist  $i$  in (the beginning of<sup>18</sup>) a month  $1 \leq m \leq 12$  of a year  $1993 \leq t \leq 2007$  for the total annual budget deficit as % of GDP in the end of the same year  $t$  (same-year). In turn,  $d_{2008}^t$  defines the (realized) total annual deficit (in % of GDP) as measured by the IMF World Economic Outlook (WEO) in 2008 (IMF 2008b) for a year  $t$  (see Table 2 for the list of all variables used in the paper).<sup>19</sup>

Similarly, for each country, year-ahead ( $t + 1$ ) forecast errors of budget deficit (as % of GDP) can be written as:

$$e_{i,t,m}^{t+1} = d_{i,t,m}^{t+1} - d_{2008}^{t+1}, \quad (2)$$

where  $d_{i,t,m}^{t+1}$  is the forecast for the total annual budget deficit (as % of GDP) for the end of the subsequent year  $t + 1$  (year-ahead) made for a specialist  $i$  in (the beginning of) a month  $1 \leq m \leq 12$  of a year  $1993 \leq t \leq 2007$ .

Bias is defined as the tendency toward producing a significant positive or negative errors. Hence,

<sup>17</sup>As expected, the figures also show that same-year forecasts on budget deficit converge toward the actual value in the end of the forecast horizon (December). Consequently, they should be more accurate in December than in previous months.

<sup>18</sup>See footnote 10.

<sup>19</sup>Notice again that budget deficit is expressed in positive terms, i.e. if a country increases (decreases) its debt position this is referred to a positive (negative) budget deficit. Moreover, even though criticized in the literature (see Candelon et al. (2007) and Cimadomo (2007)), we use here the last released revised data as measure for the realized values (see notes on Table 1). Using the different cohorts of ex-post data for the realized values do not change the results significantly and such analysis is available upon request to the authors.

for each country, we test unbiasedness by running the following regression:

$$e_{i,t,m}^{t+h} = \alpha_0 + \varepsilon_{i,t,m}, \quad h = 0, 1, \quad (3)$$

where  $h$  represents the forecast horizon, equaling 0 or 1 depending on whether forecast errors are for the same-year ( $h = 0$ , or  $t$ ) or year-ahead ( $h = 1$ , or  $t + 1$ ) horizons, respectively; and  $\varepsilon_{i,t,m}$  is an error term. Unbiasedness prevails when  $\alpha_0$  equals to zero in (3).

Further, we also test whether forecast bias differs in "good" or "bad" economic times. For European member states, markets experts' forecasts might have been biased due to the difficulties in predicting turning points and economic downturns as in the early 2000s, as well as the current one (see Strauch et al. (2004)). We perform this test by estimating the following equation for each country in the sample:

$$e_{i,t,m}^{t+h} = \alpha_1 + \beta_1 I(\Delta y_{i,t,m}^{t+h}) + \varepsilon_{i,t,m}, \quad (4)$$

where  $\Delta y_{i,t,m}^t$  ( $\Delta y_{i,t,m}^{t+1}$ ) is the forecasted growth rate of real output,  $\Delta y$ , for year  $t$  (year-ahead  $t + 1$ ); and  $I(\cdot)$  is an indicator function that equals 1 whenever  $\Delta y_{i,t,m}^t$  ( $\Delta y_{i,t,m}^{t+1}$ ) is below its sample average or 0 otherwise. In economic terms, coefficient  $\beta_1$  renders it possible to trace out how the correlation between the forecast error of the expected total deficit and the expected growth rate of real output differs in times of economic downturns and booms.

Next, we test for information efficiency. Forecasts are considered efficient if all information available at the time of the forecasts is used. Thus, we follow Mincer and Zarnowitz (1969) and Melander et al. (2007), and estimate the following equation:

$$d_{2008}^{t+h} = \alpha_2 + \beta_2 d_{i,t,m}^{t+h} + \varepsilon_{i,t,m}. \quad (5)$$

Weak efficiency requires that  $\alpha_2 = 0$  and  $\beta_2 = 1$ , but also that the error term is uncorrelated in time (Artis and Marcellino 2001).<sup>20</sup>

Table 3 shows the results of the estimations of equations (3), (4), and (5) for the same-year ( $h = 0$ ) and the year-ahead ( $h = 1$ ) horizons. There, we use the Newey—West Panel estimator (Newey and West 1987) to control for the autocorrelation of the forecasts.

Regarding the Unbiasedness test (3), the highly significant and negative coefficient of  $a_0$  for France (-0.32) conveys that, on average, French financial experts underestimated the total French budget deficit during the period between May 1993 and December 2007. That is because – as shown in Table 1 – they predicted a lower average deficit (2.99) than the realized average (3.31). This is particularly the case before the SGP as Table 1 and Figure 1 display.

<sup>20</sup>This null hypothesis of joint  $\alpha = 0$  and  $\beta = 1$  is also a sufficient (but not necessary) condition for unbiasedness (Holden and Peel 1990).

In Italy and the UK same-year market's forecasts were also negatively biased as their significant and negative values of  $\alpha_0$  convey. In accordance with Figures 3 and 4, this “negative” bias suggests that during the entire sample period, market specialists made consistently optimistic forecasts about the budget deficit that did not materialized in reality. In Germany, in turn, same-year experts' deficit forecasts seem to be marginally pessimistic, which is in accordance with Figure 2. For year-ahead forecasts only in France market deficit forecasts seem to be biased and optimistic over the entire sample period.

The Non-Linear Unbiasedness test of Table 3 shows a negative  $\alpha_1$  for all countries and specifications, but for Germany in the same-year and Italy in the year-ahead. This finding implies that experts were overconfident in times of expected economic boosts. Conversely, they became overly pessimistic whenever an economic downturn was expected (positive coefficient for  $\beta_1$  in all specifications – except for France in the same-year version).

Regarding the weak efficiency test, for both horizons we can reject the null hypotheses that  $\alpha_2 = 0$  and  $\beta_2 = 1$ . This indicates that either the residuals are serially correlated, or information was not efficiently used for specialists when making their forecasts. The coefficient  $\beta_2$  is lower in the year-ahead compared to the same-year (except for Italy), already suggesting that forecast accuracy is lower for a longer forecast horizon (see next section).

Overall, these findings suggest the presence of bias and lack of weak informational efficiency in the four large European countries during the entire sample period. Next sections will analyze these issues more in detail, focusing especially in changes of those findings due to the implementation and reform of the SGP.

### 3. FORECAST ACCURACY AND BIAS DURING THE SGP

This section investigates the effects of the SGP on market experts' forecasts accuracy and bias. The introduction and reform of the SGP led to an increase in information about European fiscal policies over time via two main channels, namely: (i) additional requirements to NFAs in reporting the situation of national fiscal policies via the SCP reports; and (ii) improvements in the assessment of these reports by the European Commission. This increase in information and assessment could have helped market experts to make more accurate and less biased forecasts.

We start testing this hypothesis by computing the root mean squared error (RMSE) of expected budget deficits (in terms of GDP) for each country:

$$RMSE_{t,m} = \sqrt{\frac{\sum_{i=1}^N (e_{i,t,m}^{t+h})^2}{N}}, \quad (6)$$

where  $N$  is the total number of forecasters for a particular country, and  $e_{i,t,m}^{t+h}$  is again the forecast error on budget deficit for either the same-year ( $h = 0$ ), or year-ahead ( $h = 1$ ) horizons.

Figure 5 and 6 show the development of the RMSEs for same-year- and year-ahead forecasts in the four European countries in analysis. As expected, RMSEs for same-year forecasts are much lower than those for year-ahead forecasts, evincing a lower accuracy for longer-horizon forecasts.

In addition, Figure 5 evinces that the RMSE decreases over the course of each year for same-year forecasts. This can also be seen in Table 4, which shows the average RMSE for same-year forecasts for different months throughout the time span of January 1994 to December 2007. RMSEs have often the highest values in January, falling over the year to their lowest values in December due to the smallest forecast horizon in that month. RMSEs of year-ahead forecasts, instead, exhibit a stepwise pattern without a pronounced month effect for that forecast horizon (see Table 5). Hence, year-ahead forecasts seem to be very persistent, with market experts sticking to their prevailing predictions.

More importantly, compared to their initial values, RMSEs for both forecast horizons fell considerably between 1996 and 1999. Such time span coincides with the run-up period for the entry in the Eurozone, indicating that in the years close to the adoption of the Euro forecast accuracy improved among market participants.

With SGP's implementation, RMSEs increased again for same-year- and year-ahead forecasts, even though remaining lower than the period prior to 1996 (particularly in France and Italy).<sup>21</sup> For the same-year forecasts the peak of the RMSE for the UK in 2000 of about 3.2 can be attributed to unexpected revenues based on the government's auction of third-generation mobile telecommunications licenses.<sup>22</sup>

These findings can also be observed by Tables 4 and 5. In those, Theil's-U statistics compare average RMSEs ( $\overline{RMSE}$ ) between the time periods before and after the introduction of the SGP in July 1998 (i.e.  $\text{Theil's-U} = \overline{RMSE}_{1993,5-1998,6} / \overline{RMSE}_{1998,7-2007,12}$ ) for each country of the sample. For same-year forecasts, all Theil's-U values are higher than unity, indicating that RMSEs for that forecast horizon were lower for the time period after the SGP introduction. Theil's-U statistics for year-ahead forecasts are higher than unity for most of the countries, except for Germany.

Beyond the RMSEs' analysis, we test more formally the impact of the SGP on forecast accuracy

<sup>21</sup>Strauch et al. (2004) find the same dynamics for fiscal authorities' forecasts of EU member states.

<sup>22</sup>In the 2000 Budget the Government forecast an overall central government net cash requirement (CGNCR) of -£4.1 billion for the financial year 2000/2001. But the actual cash requirement for that year proved to be far lower, standing at -£35.2 billion (3.7 percent of GDP). Of this extra cash, £19.5 billion arose from proceeds of the third-generation mobile telecommunications licenses, with the rest owing to a generally more favorable fiscal position than expected (Power and Andrews 2001).

and bias in the year-ahead deficits forecasts by means of the following equation:<sup>23</sup>

$$e_{i,t,m}^{t+1} = \alpha_3 + \beta_{30}e_{i,t,m-1}^{t+1} + \beta_{31}x_{i,t,m}^{t+1} + \beta_{32}ele_t + \beta_{33}month_{t,m} + \beta_{34}sgp1_{t,m} + \beta_{35}sgp2_{t,m} + \varepsilon_{i,t,m} , \quad (7)$$

where  $e_{i,t,m-1}^{t+1}$  is the lagged total deficit year-ahead forecast error of forecaster  $i$  in month  $m-1$  of year  $t$ ; and  $x_{i,t,m}^{t+1}$  is a vector of forecast errors of relevant economic variables. These last are: the year-ahead forecast error of real GDP growth rate ( $\Delta y_{i,t,m}^{t+1} - \Delta y_{2008}^{t+1}$ ); the year-ahead forecast error of inflation ( $cpi_{i,t,m}^{t+1} - cpi_{2008}^{t+1}$ ); the year-ahead forecast errors of the short-term (3-month) interest rate ( $i\_short_{i,t,m}^{t+1} - i\_short_{2008}^{t+1}$ ); and the year-ahead forecast errors of the long-term (10-year bond) interest rate ( $i\_long_{i,t,m}^{t+1} - i\_long_{2008}^{t+1}$ ).<sup>24</sup>

Further,  $ele_t$  is a year dummy equaling 1 in years of parliamentary elections and 0 otherwise;<sup>25</sup> and  $month_{t,m}$  is a month trend, assuming value 1 for January up to 12 for December of a year  $t$ . The variables related to the SGP are the month dummies  $sgp1_{t,m}$  and  $sgp2_{t,m}$ .  $sgp1_{t,m}$  corresponds to the first phase of the SGP, equaling 1 from July 1998 to June 2005 and 0 otherwise. In turn,  $sgp2_{t,m}$  covers the period of the reform of the SGP, valuing 1 between July 2005 and December 2007, and zero otherwise. Finally,  $\varepsilon_{i,t,m}$  is an i.i.d. error term.

According to Auerbach (1995) and Leal et al. (2007) three types of forecast errors may exist: policy, economic, and technical (behavioral) errors. Policy errors are due to errors on the course of fiscal policy, owing to the implementation of new, not yet announced by the forecast cut-off date, fiscal policy measures or cancellation of the previously announced measures. Economic errors are those that can be explained by wrong forecasts of macroeconomic variables that are used in the budget projections (e.g. GDP). Finally, technical errors are due to other remaining factors. They might in part derive from behavioral responses, but also from the model misspecification on the fiscal side.<sup>26</sup>

The lagged dependent variable in (7) checks for persistency in the forecast errors (technical error). Growth forecast errors are included since they could be negatively correlated with the forecasts errors on budget deficit measured in percentage of GDP (economic error). Forecast error on inflation is another variable that may affect deficit forecast errors, in particular when the tax indexation system is not perfect (Artis and Marcellino 2001). Forecast errors on interest

<sup>23</sup>We use year-ahead instead of same-year forecasts in (7) given that such horizon reflects better medium-term expectations of market specialists. Moreover, the longer the forecast horizon the higher the uncertainty, and therefore, the more specialists could rely on their credibility on the SGP to form their expectations.

<sup>24</sup>As a robustness check, we also estimate equation (7) excluding the long-term interest rate. Results do not change qualitatively and are available upon request.

<sup>25</sup>The parliamentary election variable is constructed with the data set of the website of the International Institute for Democracy and Electoral Assistance (IDEA – <http://www.idea.int/vt/parl.cfm>) combined with the information from the website (<http://electionresources.org>). For further information see Poplawski-Ribeiro (2009).

<sup>26</sup>In the particular case of Europe, Leal et al. (2007) claim that judgment is an important ingredient in fiscal forecasting since policy measures are still not always well-specified in the relevant governmental documents.

rates may also affect forecasts on budget deficit due to wrong predictions on the debt service. The dummy for election captures the effects of potential political budget cycles on forecasts errors of market participants (policy error).<sup>27</sup> Finally, the dummy  $month_{m,t}$  controls for monthly trend on forecast errors as previously discussed (technical error).

After controlling for those variables, we test for the effects of the two SGP versions on the deficit forecast errors via the dummies  $sgp1_{t,m}$  and  $sgp2_{t,m}$ . We split the SGP in its two versions given that the reform of Pact promoted changes in the preventive arm of the SGP such as the presentation of the country-specific medium-term objectives in its SCP (Morris et al. 2006). This last incremented the amount of information provided by authorities to the European Commission. In addition, the reform of the Pact *per se* already indicates a fatigue and lack of credibility of its first version that could have been boosted after the reform in 2005.

We run two tests with (7). First, we run the regressions for our four sample countries using the absolute values of forecast errors of all variables in (7). In line with the analysis employing RMSEs, such test allows us to check whether accuracy in fiscal forecasts increased throughout the period of the SGP. In the second test, we estimate the regressions using instead the levels of the forecast errors. With such specification, we test for bias in experts' fiscal forecasts and whether the SGP led to overly optimistic or pessimistic deficit forecasts.

Table 6 reports the results using individuals fixed effects and the Newey-West Panel estimator.<sup>28</sup> The first four columns display the results using the absolute values of the forecast errors (convergence test), whereas the other columns show the estimations with their levels (unbiasedness test).

Starting by the convergence test, the positive and significant value of the constant shows a strong divergence (inaccuracy) between year-ahead deficit forecasts and realized values in all four countries during the pre-SGP period. The positive and significant coefficient of the lagged dependent variable ( $e_{i,t,m-1}^t$ ) in all countries, in addition, corroborates the result of strong persistence in year-ahead forecast errors discussed in the analysis of RMSEs.

As expected, inaccuracy on GDP growth forecasts has significantly increased inaccuracy in market's year-ahead deficit forecasts in all countries, but Italy. In this last country the higher the inaccuracy in the real GDP growth forecast, the larger is the accuracy in the fiscal deficits. As we will see next, this could suggest that market experts have been overly pessimistic about year-ahead deficit in that country. They have only forecasted deficits correctly when they have

<sup>27</sup>Strauch et al. (2004) discuss two reasons why incumbent governments may want to issue biased forecasts on budget deficit on electoral years, which could induce errors in market experts' predictions. First, incumbents may try to provide a picture of a healthy economy and fiscal discipline to their electorate (see also Jonung and Larch (2006)). Second, they may seek to boost the economy with a fiscal expansion before elections in order to improve their chances.

<sup>28</sup>We perform the same analysis using same-year forecast errors (results available upon request). The main difference is that for the same-year forecasts, besides France, market experts in Italy and in the UK have also become more accurate during the second version of the SGP.



been more optimistic about GDP growth. As for growth, higher forecasts errors for inflation also have led experts to be less accurate on deficit forecasts.

In turn, variable  $month_{t,m}$  is significant and negative for all countries. Thus, as discussed in the RMSEs analysis, year-ahead deficit forecast inaccuracy fell with the shrinking of the forecast-horizon. Moreover, forecast accuracy on year-ahead deficit significantly increased during electoral years in Germany. The results for Germany is in accordance with Strauch et al. (2004), who find that fiscal plans become more sound during elections years.<sup>29</sup>

Regarding the effects of SGP's introduction in forecast accuracy, during its first phase, the Pact seems to have improved market experts' accuracy only in France (negative coefficient of  $sgp1_{t,m}$  for that country). During the reformed period of the SGP, forecast accuracy remained high in France; while it worsened in Germany and Italy.

Turning to the analysis of forecast unbiasedness, the last four columns of Table 6 show the estimations of (7) using the forecast errors in levels. In those columns, the negative values for the constant show that market experts were significantly optimistic in the UK, and pessimistic in Italy during the period pre-SGP (May 1993 to June 1998).

The significant and positive coefficient of the lagged dependent variable ( $e_{i,t,m-1}^{t+h}$ ) for all countries indicates that deficit forecast errors are significantly persistent over time. As expected, the coefficient of GDP growth forecast error is also significant and negative for all countries. Forecasters have predicted higher deficits whenever growth forecasts were overly pessimistic. For example, a positive difference of 1% between the expected and realized growth rates has led to a negative difference of -0.11% (overly optimistic) same-year forecast error on deficit in France.

High inflation forecasts have significantly increased deficit forecasts for all countries. The same happened with higher short-term interest rate forecasts for France and Italy, while in the UK a higher short-term interest rate forecast have made experts' deficit forecasts to fall. Hence, in this last country when experts have predicted a high short-term they may have also expected a lower inflation rate, and therefore, deficit forecast. In turn, higher long-term interest rates forecasts are significantly associated with higher deficits in France and the UK.

The dummy  $month_{t,m}$  is a significant variable for the UK. Its negative coefficient indicates that British forecasters have started the year overly pessimistic about the deficit in the year-ahead and, as the forecast horizon shrink, they have corrected their prediction to lower levels of deficits. In addition, the dummy for electoral years is significant for all countries in the sample (but France), suggesting significant effects of political budget cycles in market's fiscal expectations.<sup>30</sup> In Italy and the UK the coefficient of that variable is positive. This indicates

<sup>29</sup>Those authors argue that governments may put a premium on 'getting the house in order' during the election year. Alternatively, authorities may want to tie in the fiscal options of their successor if they face only a small probability of re-election (Strauch et al. 2004).

<sup>30</sup>Several authors have already discussed the importance of political budget cycles for the SGP and European fiscal

that market specialists have expected higher year-ahead deficits during electoral years in those countries.

Regarding the SGP effects on forecast bias, during its first version, the Pact seems to have induced a higher pessimism on year-ahead deficit expectations in France and the UK, as suggested by the significant and positive coefficients of  $sgp1_{t,m}$  in those countries. Further, during the more recent period of the reformed SGP, the pessimism has also appeared in Germany and Italy.

Overall, the results of this section suggest a positive impact of the SGP in terms of experts' fiscal forecast accuracy in France. The increase in information over fiscal policy that the SGP provoked via the requirement of SCPs in those countries seems to have not increased significantly accuracy of market experts of the other three big economies of the Eurozone in any of its two versions.

#### **4. CREDIBILITY OF THE EUROPEAN COMMISSION'S AND NFAS' FISCAL FORECASTS**

The fact that forecast accuracy seems to have not improved during the two periods of the SGP is not sufficient to evidence a lack of credibility on the forecasts of the European fiscal institutions. Policy credibility is rather related to economic agents' belief on policymaker's plans (Cukierman 1992).

This section, therefore, analyzes the credibility of European policymakers' fiscal plans among market experts by testing how convergence between forecasts of those two types of agents evolved after the introduction and reform of the SGP. It checks that for the two levels of European fiscal authorities involved in the SGP's implementation: (i) the European Commission, who is the supra-national European body responsible to enforce the rules of the Pact and to prepare the fiscal forecasts for the Union; and (ii) the National Fiscal Authorities (NFAs) or countries' treasuries, who run national fiscal policies and prepare the national forecasts and SCP reports for assessment by the European Commission. More convergence between those fiscal authorities' and experts' forecasts could indicate a higher credibility of those authorities.

##### **4.1. European Commission (EC)**

We start the analysis by investigating the relation between experts' forecasts and those of the European Commission. As in the previous section, here we focus on the year-ahead forecasts. Those give us a better idea about expectations over the medium-term fiscal policy.

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policies (see, among others, Buti and van den Noord (2003), Afonso (2008), Poplawski-Ribeiro and Beetsma (2008), and Poplawski-Ribeiro (2009)).

Figure 7 displays European Commission's and market experts' year-ahead deficit forecasts. Commission's data comes from its Autumn (end of October/beginning of November) forecasts,<sup>31</sup> whereas experts' data corresponds to their forecasts in (beginning of) November of each year. In that figure we already observe some correlation between the EC's and the experts' forecasts.

This correlation is analyzed more formally by performing the following encompassing test for the year-ahead deficit forecasts of each country in our sample:<sup>32</sup>

$$d_{i,t,11}^{t+1} = \alpha_4 + \beta_{40}d_{EC,t,10}^{t+1} + \beta_{41}d_{EC,t,10}^{t+1} * sgp1_{t,10} + \beta_{42}d_{EC,t,10}^{t+1} * sgp2_{t,10} + \varepsilon_{i,t,11}, \quad (8)$$

where  $d_{i,t,11}^{t+1}$  is the year-ahead forecasts of budget deficits among market's specialists in November ( $m = 11$ ) of year  $t$ ;<sup>33</sup> and  $d_{EC,t,10}^{t+1}$  is the EC's year-ahead deficit forecast for a particular country made in the Autumn (end of October, or  $m = 10$ ) of a year  $t$ .

Coefficient  $\beta_{40}$  in (8) tests whether specialists encompassed Commission's deficit forecasts during the period prior to the SGP (1993-1998). In turn, coefficients  $\beta_{41}$  and  $\beta_{42}$  measure the extent to which experts' encompassing of EC's forecasts changed during the old- and reformed SGP period.

Table 7 shows the results of this test. The significant coefficient for  $d_{EC,t,1}^{t+1}$  in all columns evinces that market experts have indeed encompassed EC's forecasts in all sample countries and for their median during the period pre-SGP (1993-1998).<sup>34</sup> The value for Germany, for example, implies that in that country, market experts have increased their year-ahead deficit forecast by 1.07% of GDP when the Commission's forecast has gone up by 1% of GDP. During both periods of the SGP, encompassing of Commission's forecasts has increased significantly in Italy, while has fallen in Germany and for the median of all countries (in this last sample only during the first phase of the SGP).

Next, we test whether market's and Commission's year-ahead forecasts have converged over time. For that we perform the following estimation:

$$d_{EC,t,10}^{t+1} - d_{i,t,11}^{t+1} = \left[ \begin{array}{l} \alpha_5 + \beta_{50} (d_{EC,t-1,10}^t - d_{i,t-1,11}^t) + \beta_{51} (\Delta y_{EC,t,10}^{t+1} - \Delta y_{i,t,11}^{t+1}) \\ + \beta_{52} (cpi_{EC,t,10}^{t+1} - cpi_{i,t,11}^{t+1}) + \beta_{53} sgp1_{t,11} + \beta_{54} sgp2_{t,11} + \varepsilon_{i,t,11} \end{array} \right], \quad (9)$$

<sup>31</sup>Data on the European Commission's forecasts is obtained from Melander et al. (2007) and augmented with European Commission (2006) and (2007). We gratefully thank Annika Melander and co-authors by providing their data set.

<sup>32</sup>We also perform the encompassing test using OECD's forecasts obtained from Cimadomo (2007), who we thankfully acknowledge by sharing the data. Such dataset is analyzed since some authors argue that the OECD is freer from political pressures of member states' fiscal authorities than the EC (Artis and Marcellino 2001), which could impact on the forecast encompassing by the markets. Our main results, however, are robust to the use of OECD's dataset.

<sup>33</sup>See Footnote 31. The number of experts' forecasts is thus reduced by the factor twelve compared to those used in the previous analyses. Moreover, we have 60 observations available for the median of budget deficit forecasts covering each of the four countries in the sample between 1993 and 2007.

<sup>34</sup>This result is robust for same-year forecasts.

where  $d_{EC,t-1,10}^t$  is EC's previous-year deficit forecast for a particular country in the end of October ( $m = 10$ ) for the same-year  $t$ ;  $d_{i,t-1,11}^t$  is market experts' previous-year deficit forecast (in November,  $t = 11$ ) for the same-year  $t$ ;  $\Delta y_{EC,t,10}^{t+1}$  is EC's year-ahead real GDP growth forecast for a particular country in year  $t$ ; and  $cpi_{EC,t,10}^{t+1}$  is EC's year-ahead inflation forecast for a particular country in year  $t$ .

Equation (9) is regressed using two different versions of the differences between Commission's and specialists' forecasts. First, we estimate those differences in absolute values, testing for convergence between the two types of forecasters over time. In line with Cukierman and Meltzer (1986) and Cukierman (1992), one can interpret this set of estimations as a test of credibility of the Commission's fiscal forecasts.<sup>35</sup> Second, we estimate (9) with the differences in levels, checking for the existence of biases between markets' and Commission's forecasts.<sup>36</sup>

Table 8 displays the results of the convergence tests. The first five columns correspond to the estimation of the differences in (9) in absolute values. In those columns, the coefficients of the constant show that for all countries divergence between Commission's and market experts' deficit forecasts were highly significant during the period pre-SGP. Again, according to Cukierman and Meltzer (1986) and Cukierman (1992), this suggests a lack of credibility by market specialists on Commission's fiscal forecasts in that period.

The coefficient of the differences in absolute values of the lagged deficit forecasts between the two types of forecasters is significant for France, the UK and the median of the countries; indicating an inertia in the divergence between EC's and market experts' deficit forecasts in those countries. Further, as expected, an increase in divergence of GDP growth forecasts between specialists and the Commission seems to have augmented divergence in their deficit forecasts for Germany, the UK, and the median of the countries.

The SGP dummies suggest that convergence in year-ahead deficit forecasts between financial market and the Commission during the first SGP period went up in Italy, but remained unaltered in France, Germany, and the UK. Thus, during the first phase of the SGP credibility of Commission's fiscal forecasts seems to have increased only in Italy. During the reformed-SGP period, credibility (convergence) seems to have increased in France, and again in Italy and in the UK. In Germany, convergence seems to have not happened due to the overly optimism of

<sup>35</sup>Cukierman (1992), for example, defines policy credibility as "...a continuous measure that is inversely related to the absolute value of the difference between the central bank's (policymaker's) plan and the public's beliefs about those plans" [pp. 207]. For him, the smaller this difference, the higher the credibility of a planned policy.

<sup>36</sup>Christodoulakis and Mamatzakis (2009) already show that European Commission tends to display optimistic year-ahead fiscal forecasts for government balance, while same-year forecasts tend to be pessimistic. Further, Leal et al. (2007) find that this optimistic bias occurs in periods of deficit increases, whereas the pessimistic bias happens in periods in which the budget balance improves. The cause is the poor record by the Commission in anticipating turning points in economic activity. Other reasons, however, also explain Commission's forecast errors, such as the realism of the assumptions about the international economic environment (Melander et al. 2007). Keereman (2003), for example, shows that the latter reason explains up to about 60% of the forecast error in EU year-ahead forecasts for GDP and inflation.

market experts.

The last five columns of Table 8 show the estimations of the differences in (9) in levels. There, the significantly positive constant for the UK indicates a (optimistic) bias of market experts' forecasts toward lower deficits over GDP than those forecasted by the Commission in the period pre-SGP. Germany is the only country where this bias is significantly negative (pessimistic), suggesting that during that period experts consistently predicted higher year-ahead deficits over GDP than the Commission (see also Figure 7). For France, Italy, and for the median of countries no significant difference between market experts' and Commission's forecasts is observed, indicating no bias among forecasters of that country.

Further, the differences in level of GDP growth forecasts have a significantly negative coefficient for all countries, except for France. As expected, this finding suggests that whenever the Commission has been more optimistic about growth than market experts, it has also forecasted a significantly lower year-ahead deficits than them.

The dummy for the first phase of the SGP conveys that optimism among market experts (relative to the Commission) increased in Germany in that period. In France, Italy, and the UK, instead, previous market's optimism during the pre-SGP period, seems to have turned to pessimism (compared to forecasts of the Commission). Thus, SGP's introduction seems to have improved the mood of market's experts (compared to that of the Commission) in Germany, but not in France and the UK.

With SGP's reform, an (significant) optimistic bias is found only in Germany. In France and Italy, instead, Wald tests (not shown here) indicate that no significant differences (bias) existed between the two types of forecasters. As we discussed above, this might be due to the higher convergence of their forecasts during this period in those two countries.

Therefore, the findings of this section indicate that the SGP had led to an increase of convergence between markets' experts and Commission's forecasts in Italy during both its two periods, and in France and the UK after its reform. Moreover, the Pact seems to have caused an increase in optimism of market experts' forecasts compared to those of the Commission in Germany. These results suggests then, a gain in credibility of Commission's forecasts due to the SGP in France and Italy, while in Germany it provoked an overly optimism among market experts.

#### 4.2. National fiscal authorities

This section contrasts year-ahead forecasts of market experts with those of Treasuries – or National Fiscal Authorities (NFA).<sup>37</sup> We retrieve these authorities' forecasts (publicly available

<sup>37</sup>These NFAs are the following: (i) *Ministère de l'Économie, de l'Industrie et de l'Emploi – Minefe* (France); (ii) *German Bundesministerium der Finanzen* (Germany); (iii) *Ministero dell'Economia e delle Finanze* (Italy); and (iv) *HM Treasury* (UK).

only since 1999) from their Stability and Convergence Programme reports sent yearly to the European Commission.<sup>38,39</sup>

Figure 8 displays a first comparison of those forecasts. There, the specialists' year-ahead deficit predictions seem to be correlated with those of the NFAs. Yet, market specialists' forecasts are visually higher than those of the NFAs for the three countries in the Eurozone, suggesting already overly optimistic forecast biases of those treasuries (compared to market specialists' forecasts).<sup>40</sup>

As in the previous section, we analyze this issue more in detail by initially running an encompassing test, using now NFA's (instead of Commission's) year-ahead deficit forecasts for a reduced time sample between the years 1999 and 2007:

$$d_{i,t,1}^{t+1} = \alpha_6 + \beta_{60}d_{j,t,1}^{t+1} + \beta_{61}d_{j,t,1}^{t+1} * sgp2_{t,1} + \varepsilon_{i,t,1}. \quad (10)$$

In (10)  $j = [France, Germany, Italy, UK, \overline{NFA}]$  identifies each country's NFA and the median of all countries ( $\overline{NFA}$ ); and  $d_{j,t,1}^{t+1}$  corresponds to the year-ahead deficit forecast provided by a NFA  $j$  in January ( $m = 1$ ) of a particular year  $1999 \leq t \leq 2007$ .<sup>41</sup> We also interact  $d_{j,t,1}^{t+1}$  with the dummy for the reformed period of the SGP ( $sgp2_{t,1}$ ) to check whether specialists changed their encompassing of NFAs' deficit forecasts after the reform of the Pact.

The results of this test are displayed in Table 9. For all countries as well as for their median, the significant coefficient of  $d_{j,t,1}^{t+1}$  indicates that market experts encompassed NFAs' deficit forecasts during the first version of the SGP (1999-2005). The encompassing value of NFA's deficit forecasts by market experts seem to have fallen significantly only in Germany during the period

<sup>38</sup>These reports are normally sent to the European Commission in the end of the previous year (December) or in the beginning of January of the year in analysis. Then, European Commission analyzes the programmes and makes its evaluations public around February of the same year. Therefore, our sample period in this section spans from January 1999 to January 2007.

<sup>39</sup>Both reports – the SCPs and Commission's assessments – can be found in the website: [http://ec.europa.eu/economy\\_finance/sg\\_pact\\_fiscal\\_policy/sg\\_programmes9147\\_en.htm](http://ec.europa.eu/economy_finance/sg_pact_fiscal_policy/sg_programmes9147_en.htm).

<sup>40</sup>Accordingly, Strauch et al. (2004) also analyze the performance of budgetary balance and economic growth forecasts made in 126 Stability and Convergence Programmes between 1991 and 2002. They conclude that in different countries the budget surpluses and economic growth forecasts are marked by optimistic biases, which were more apparent during the Maastricht convergence process. Moreover, governments do not seem to use available information efficiently to minimise the forecast error of their budgetary projections. Finally, the need for convergence to reach the budgetary reference value of the Maastricht Treaty was associated with more restrictive fiscal projections in programmes starting before 1998, whereas electoral cycles played a stronger role thereafter. Stein (1994), in turn argues that such over optimistic forecasts by NFAs may in general be used to hide the adverse effects of unrealistic political demands.

<sup>41</sup>For example,  $d_{France,t,1}^{t+1}$  represents then the year-ahead deficit forecast provided by the French *Minefe* in its SCP report for the European Commission in January ( $m = 1$ ) of a year  $1999 \leq t \leq 2007$ . In turn,  $d_{\overline{NFA},t,1}^t$  corresponds to the median of year-ahead deficit forecasts of the fiscal authorities of all four countries in our sample in a particular year  $t$ .

of the reformed SGP, but remained the same in all other countries.<sup>42</sup>

Next, we apply the convergence and bias tests for the NFAs' forecasts as follows:

$$d_{j,t,1}^{t+1} - d_{i,t,1}^{t+1} = \left[ \begin{array}{l} \alpha_8 + \beta_{80} (d_{j,t-1,1}^t - d_{i,t-1,1}^t) + \beta_{81} (\Delta y_{j,t,1}^{t+1} - \Delta y_{i,t,1}^{t+1}) \\ + \beta_{82} (cpi_{j,t,1}^{t+1} - cpi_{i,t,1}^{t+1}) + \beta_{83} sgp2_{t,1} + \varepsilon_{i,t,1} \end{array} \right], \quad (11)$$

where  $t$  covers now the time span between 1999 and 2007;  $d_{j,t-1,1}^t$  is a ( $j$ ) NFA's previous-year deficit forecast for the same-year  $t$ ;  $d_{i,t-1,1}^t$  is market experts' previous-year deficit forecast (in January,  $m = 1$ ) for the same-year  $t$ ;  $\Delta y_{j,t,1}^{t+1}$  is a ( $j$ ) NFA's year-ahead ( $t + 1$ ) real GDP growth forecast in year  $t$ ; and  $cpi_{j,t,1}^{t+1}$  is a ( $j$ ) NFA's year-ahead inflation forecast for a particular country in year  $t$ .

Again, we run two regressions using (11), one with the differences in absolute values (convergence test), and other using their levels (unbiasedness test). The results of both tests can be seen in Table 10.

The coefficient of the constant in the first four columns is highly significant and positive for all countries, indicating a significant divergence between the year-ahead deficit forecasts of those countries' NFAs and market specialists during SGP's first version. This finding suggests a lack of credibility by market specialists in the year-ahead deficit forecasts of these NFAs during that period (except for the median of all countries).

In addition, only in the UK, where the fiscal rules of the SGP are not binding, the credibility of their NFA's fiscal forecasts seems to have increased during the reformed Pact. For the other countries, the results remain statistically unaltered with a significant divergence between deficit forecasts of their respective NFAs and of market experts.

Regarding the estimation with the differences of (11) in levels, the constant is significant and negative for France, Germany, Italy, and the median of all countries, indicating that during the first version of the SGP (1999-2005) market specialists in those countries significantly predicted higher year-ahead deficits than the NFAs (market's pessimistic bias). In the UK no bias is observed between the NFA's and specialists' forecasts.

In turn, an increase in the (positive) difference of GDP growth forecasts between the NFAs of France, Italy, the UK, and the median of all countries, and that of market specialists marginally increased the pessimistic bias of market experts' fiscal forecasts (compared to those of the respective NFAs). The same holds for the median of the countries (marginally significantly, though), suggesting that the higher optimism about growth for the NFAs partially explains the lower year-ahead deficit forecasts of those authorities relative to markets' forecasts.<sup>43</sup>

<sup>42</sup>A Wald test of significance of coefficients (not shown here) indicates that the sum of  $d_{j,t,1}^{t+1} + d_{j,t,1}^{t+1} * sgp2_{t,1}$  is significantly different from zero for all countries.

<sup>43</sup>Accordingly, Jonung and Larch (2006) find that in three of the four largest EU countries the ex-ante assessment

In addition, the positive and significant coefficient of  $sgp2_{t,1}$  for France and Germany conveys that the value of market's forecast bias has been less pessimistic in those countries during the period of the reformed Pact. However, even though the coefficient of the bias statistically changes in France, Italy, and the UK, during that period no significant bias is found for any of the countries in the sample.<sup>44</sup>

Overall, the results of this section suggest a lack of credibility of the NFA's year-ahead deficit forecasts among market experts in most of the countries of our sample.<sup>45</sup> Nevertheless, the reform of the Pact seems to have promoted an increase in the credibility of the *HM Treasury's* forecasts, but the UK is not really bound by rules of the SGP.

## 5. CONCLUSION

Economic literature on fiscal rules argues that two of the main motivations for their implementation is the information and the signal they provide to financial markets on a fiscal authority's commitment to fiscal discipline. This paper investigates this claim by analyzing how the introduction and reform of the Stability and Growth Pact have changed market experts' expectations on fiscal policies of the four largest European Economies: France, Germany, Italy, and UK.

We use survey data from market experts on budget deficit forecasts and test whether the SGP has increased accuracy and has reduced bias of those forecasters compared to the realized values. In addition, we check whether the European Commission and the National Fiscal Authorities have enhanced their credibility with the SGP by testing for convergence and unbiasedness of market experts' fiscal forecasts to those authorities' forecasts.

As main results, we obtain the following for each of the countries:

- **France:** The introduction of the SGP has made market experts' forecasts more accurate and less overly optimistic (less biased). Moreover, the European Commission's fiscal forecasts seem to have become more credible among financial experts during both periods of the SGP. However, our findings suggest that this credibility gain has not occurred to the forecasts of the French national fiscal authority's (*Minefe*).
- **Germany:** During the entire sample period, German financial experts' fiscal forecasts seem to have been inaccurate. Further, our findings suggest that the year-ahead fiscal forecasts of both European Commission and *Bundesministerium* have remained not credible among market specialists during the SGP. Those experts have also been more pessimistic than the German *Bundesministerium der Finanzen*.

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of potential GDP growth has generally been more optimistic than on an ex-post basis (particularly in Germany and Italy). In their estimations, only the UK Treasury appears to have followed a somewhat more prudent approach when assessing the medium-term growth outlook of its economy for the purpose of planning the budget.

<sup>44</sup>This finding is obtained via a Wald test of coefficient restrictions (not shown here) testing if  $constant + sgp2_{t,1}$  is different from zero.

<sup>45</sup>Credibility is, however, obtained for the median of all countries during both periods of the SGP.



- **Italy:** We find inaccuracies of Italian market experts' forecasts for the entire sample period, but in particular after the SGP-II. Those experts have also become more pessimistic during that period. Further, our findings point to a convergence between Commission's and markets' fiscal forecasts after the SGP. Nevertheless, this convergence seems to have not happened between the Italian experts' and the *Ministero dell'Economia e delle Finanze's* forecasts in any of the SGP periods. Market's forecasts are also significantly more pessimistic than that of the Italian NFA.
- **UK:** UK's market specialists seem to have had inaccurate forecasts for the entire sample period. However, our findings suggest a gain in the credibility of the European Commission's deficit forecasts among market experts after the SGP reform in 2005. Further, even though the UK is not bound by the rules of the SGP, the reform of the Pact seems to have promoted a gain in the credibility of the British *HM Treasury's* fiscal forecasts among market participants.

Overall our analysis suggests that only in France accuracy of deficit forecasts by market specialists has significantly increased after the implementation of the SGP. The larger availability of information in fiscal figures due to SGP requirements (e.g. SCP reports and assessments) has apparently not been sufficient to improve markets' forecasts in most of the countries analyzed.

In turn, credibility of the European Commission's deficit forecasts among market specialists seems to have increased in most of the countries (France, Italy, and the UK), particularly after the Pact's reform in 2005. Nevertheless, with exception of the UK, our findings indicate a lack of credibility of NFAs' fiscal forecasts among market specialists during the SGP. Market experts have also been more pessimistic than the NFAs on fiscal figures, mainly due to the overly optimistic predictions of those authorities (Strauch et al. (2004) and Jonung and Larch (2006)).

These findings imply that the European (national and supra-national) fiscal authorities could adopt additional measures in order to make their fiscal plans and forecasts more credible. For example, a more prudent budgetary policy and stronger finance minister would already increase their credibility besides providing other economic gains for their countries (van der Ploeg 2007).

Moreover, fiscal projections and the SCPs should be more sophisticated and frequent (e.g. in a quarterly basis). Transparent projections could present a menu of the more interesting and relevant adjustments and show how other aspects of the macroeconomy are likely to evolve under each contemplated adjustment (Leeper 2009). In addition, independent and nonpartisan government agencies could be established (independent oversight). These agencies could be charged with identifying changes in the cyclical state of the economy, assessing the extent to which fiscal plans are consistent with year-ahead objectives, and providing advice on various policy measures (see Jonung and Larch (2006), IMF (2008a), Debrun et al. (2009) and Leeper (2009)).<sup>46</sup>

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<sup>46</sup>IMF (2010) has recently prepared a comprehensive list of measures that could make those plans more credible,

In the same way as Central Banks currently do, those agencies could also run public monthly surveys among market experts over fiscal forecasts, helping national fiscal plans to become more accountable and increasing public awareness of adverse fiscal developments. Cooperation and exchange of information among those agencies would, in addition, enlarge fiscal coordination in Europe without removing sovereignty of national fiscal policies, which would still be voted by national parliaments.

All these additional measures are particularly relevant nowadays. The financial crisis and the fiscal stimulus plans implemented have created serious fiscal challenges for the European countries. Restoring stability and sustainability to public finances is a top priority for several EU member states. Certainly, fiscal consolidation could be better formulated and implemented if policymakers had further insights about what the SGP has achieved in terms of credibility and transparency.

The current analysis offers, therefore, various other possibilities for further research. For example, the signaling effects of SGP's implementation could be tested in more detail. Credibility of European fiscal institutions could also be further investigated. An additional analysis of the entire distribution of experts' forecasts could provide us more information about such important aspect of the SGP. Finally, it would also be interesting to compare how forecasts of fiscal variables by market's participants have changed in other OECD countries when compared to our sample countries. That would put European experience with the SGP into a broader perspective, and demonstrate whether the improvement in fiscal forecasts has being indeed a SGP effect or just a trend among developed countries.

## **TABLES AND FIGURES**

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transparent and sustainable.

**Table 1 – Averages of the main variables - May 1993 to December 2007**  
(in percent, unless otherwise specified)<sup>e</sup>

Country	France		Germany		Italy		UK			
	93-98	99-07	93-07	93-07	93-98	99-07	93-07	93-98	99-07	93-07
Time period										
<b>Total Budget Deficit Forecast (annual)<sup>b</sup></b>										
Same-year	3.74	2.51	2.99		3.29	2.34	2.71	6.02	2.63	3.94
Year-ahead	3.35	2.39	2.76		3.05	2.08	2.46	5.62	2.50	3.72
Actual Budget Deficit <sup>c</sup>	4.44	2.60	3.31		2.75	2.61	2.66	5.90	2.59	3.77
<b>Real GDP Growth Forecast (annual)</b>										
Same-year	1.82	2.03	1.96		1.28	1.56	1.50	1.44	1.72	1.53
Year-ahead	2.29	2.34	2.38		2.06	1.97	2.01	1.96	2.56	2.08
Actual Growth Rate <sup>c</sup>	1.70	2.14	1.97		1.43	1.50	1.47	1.35	1.47	1.42
<b>Three-month Interest Rate Forecast</b>										
Same-year	3.89	3.18	3.72		4.39	3.21	3.59	3.21	6.37	4.94
Year-ahead	3.57	3.38	3.77		4.39	3.45	3.76	3.47	6.08	4.89
Actual Interest Rate <sup>d</sup>	5.30	3.22	3.89		4.54	3.22	3.65	3.03	8.24	4.95
<b>CPI Growth Rate Forecast (annual)</b>										
Same-year	1.73	1.56	1.62		2.29	1.55	1.80	2.14	3.57	2.67
Year-ahead	1.94	1.51	1.67		2.23	1.55	1.80	1.91	2.89	2.44
Actual CPI Growth <sup>c</sup>	1.38	2.07	1.68		1.45	1.78	1.73	3.43	2.59	2.72
<b>T-Bill Forecast (annual)</b>										
Same-year	6.34	4.49	5.23		6.15	4.43	5.12	8.99	4.59	6.35
Year-ahead	6.34	4.71	5.36		6.39	4.68	5.36	8.67	4.80	6.35
Actual T-Bill <sup>c</sup>	6.23	4.39	5.16		7.05	4.54	5.60	8.77	4.56	6.40

Notes: <sup>a</sup> Actual values corresponds to yearly averages between 1993 and 2007. <sup>b</sup> Values in percent of GDP. For France and Germany, total deficit is accounted in the calendar year. The revenues of the auction of the German government in 2000 (50 billion Euros) were dropped out since they are not recorded in the total deficit. For Italy, budget deficit is accounted in the fiscal year. For UK, budget deficit is defined as Public Sector Net Cash Requirements (PSNCR) in the fiscal year. Moreover, the revenues of the government's auction of third-generation mobile telecommunications licences are included in the PSNCR for the UK (£19.5 billion). Sources of actual values: <sup>c</sup> IMF (2008b), and <sup>d</sup> OECD (2008).

Table 2 – List of Variables (in alphabetical order)

Variables of the Estimations	
$\Delta y_{EC,t,10}^{t+1}$	Year-ahead real GDP growth forecast of the European Commission for a particular country in a year $t$ .
$\Delta y_{i,t,m}^{t+h}$	(Same-year or year-ahead) forecast of growth rate of real output ( $\Delta y$ ) in month $m$ of year $t$ .
$\Delta y_{j,t,1}^{t+1}$	Year-ahead real GDP growth forecast of a National Fiscal Authority for a particular country (or the median of all countries in the sample) in a year $t$ .
$cpi_{EC,t,10}^{t+1}$	Year-ahead CPI inflation forecast of the European Commission for a particular country in a year $t$ .
$cpi_{i,t,m}^{t+h}$	Forecasted inflation rate for year $t + h$ in month $m$ of year $t$ .
$cpi_{j,t,1}^{t+1}$	Year-ahead CPI inflation forecast of a National Fiscal Authority for a particular country (or the median of all countries in the sample) in a year $t$ .
$d_{2008}^{t+h}$	Actual (realized) total annual deficit in a year $t$ ( $h = 0$ ) or $t + 1$ ( $h = 1$ ).
$d_{EC,t,10}^{t+1}$	Year-ahead deficit forecast of the European Commission for a particular country in a year $t$ .
$d_{EC,t-1,10}^t$	Previous-year deficit forecast of the European Commission for a particular country for year $t$ .
$d_{i,t,m}^{t+h}$	Same-year or year-ahead forecast of total deficit (as % of GDP) in month $m$ of year $t$ .
$d_{i,t,m-1}^{t+h}$	Lagged (same-year or year-ahead) forecast of total deficit in previous month ( $m - 1$ ) of year $t$ .
$d_{i,t-1,m}^{t+h}$	Lagged (same-year or year-ahead) forecast of total deficit in previous year ( $t - 1$ ) in a particular month $m$ .
$d_{j,t,1}^{t+1}$	Year-ahead deficit forecast of a National Fiscal Authority for a particular country (or the median of all countries in the sample) in a year $t$ .
$d_{j,t-1,1}^t$	Previous-year deficit forecast of a National Fiscal Authority for a particular country (or the median of all countries in the sample) for a year $t$ .
$e_{i,t,m}^{t+h}$	Same-year ( $h = 0$ ) or year-ahead ( $h = 1$ ) forecast error of annual total deficit in month $m$ of year $t$ .
$e_{i,t,m-1}^{t+h}$	Lagged total deficit (current-year or year-ahead) forecast error of forecaster $i$ in month $m - 1$ of year $t$ .
$ele_t$	Year dummy equaling 1 in years of parliamentary elections and 0 otherwise.
$i\_long_{i,t,m}^{t+h}$	Forecasted long-term (10-year bond) interest rate in month $m$ of year $t$ for the end of year $t + h$ .
$i\_short_{i,t,m}^{t+h}$	Forecasted short-term (3-month) interest rate in month $m$ of year $t$ for the end of year $t + h$ .
$I(\Delta y_{i,t,m}^{t+h})$	Indicator function that equals 1 whenever $f_{i,t,m}^{\Delta y_t}$ ( $f_{i,t,m}^{\Delta y_{t+1}}$ ) is below its sample average; and 0 otherwise.
$month_{t,m}$	Month trend, assuming value 1 for January up to 12 for December of a year $t$ .
$sgp1_{t,m}$	Month dummy corresponding to the old version of the SGP: equals 1 from July 1998 to June 2005; and 0 otherwise.
$sgp2_{t,m}$	Month dummy covering the period of the reformed SGP: equals 1 between July 2005 and December 2007; and 0 otherwise.

**Table 3 – Tests for unbiasedness, non-linear unbiasedness and weak efficiency (May 1993 - Dec. 2007)**

Variables	Same-Year forecasts				Year-Ahead forecasts			
	France	Germany	Italy	UK	France	Germany	Italy	UK
<b>Unbiasedness test</b>								
$\alpha_0$	-0.32*** (7.65)	0.07* (1.96)	-0.09** (2.50)	-0.41*** (8.71)	-0.27*** (3.66)	0.02 (0.35)	0.13 (1.38)	-0.02 (0.17)
<b>Non-linear Unbiasedness test</b>								
$\alpha_1$	-0.20*** (4.02)	-0.04 (1.47)	-0.21*** (4.27)	-0.47*** (8.17)	-0.45*** (4.51)	-0.30*** (3.13)	-0.03 (0.24)	-0.34*** (3.57)
$\beta_1$	-0.27*** (3.82)	0.24*** (3.69)	0.23*** (3.90)	0.25*** (3.79)	0.40*** (4.21)	0.60*** (5.81)	0.39*** (2.97)	1.03*** (7.95)
$\alpha_1 + \beta_1 < 0^a$	0.99	0.00	0.67	0.99	0.19	0.00	0.00	0.00
<b>Weak Efficiency test</b>								
$\alpha_2$	1.01*** (14.01)	0.74*** (21.68)	0.37*** (6.48)	0.40*** (10.83)	1.44*** (13.74)	2.19*** (31.39)	0.36** (2.38)	1.10*** (18.16)
$\beta_2$	0.60*** (31.20)	0.75*** (36.06)	0.89*** (79.49)	0.71*** (57.82)	0.45*** (17.09)	0.17*** (6.05)	0.94*** (35.33)	0.48*** (27.37)
$\beta_2 = 1^b$	0.00	0.00	0.00	0.00	0.00	0.00	.02	0.00
Obs.	2,811	3,979	1,997	4,364	2,387	3,545	1,799	4,091
Groups	31	41	29	56	31	41	29	56

Notes: Equations (3), (4), and (5) are estimated using Newey-West Panel estimator with cross-fixed effects. Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively.

<sup>a</sup> t-Test under the null hypothesis that  $\alpha_1 + \beta_1 < 0$ . <sup>b</sup> t-Test under the null hypothesis that  $\beta_2 = 1$ .

**Table 4 – RMSE of the same-year forecast for budget deficit (over the years 1994 to 2007)**

	France	Germany	Italy	UK
January	0.69	0.73	0.80	1.18
February	0.67	0.73	0.73	1.15
March	0.65	0.71	0.68	1.10
April	0.63	0.68	0.63	1.02
May	0.63	0.66	0.66	0.98
June	0.62	0.63	0.67	0.93
July	0.56	0.60	0.63	0.88
August	0.54	0.58	0.60	0.78
September	0.45	0.55	0.64	0.78
October	0.39	0.50	0.62	0.77
November	0.38	0.46	0.61	0.73
December	0.37	0.42	0.57	0.69
Theil-U	2.30	1.55	1.01	1.65

Notes: RMSE here is defined by (6) for  $h = 0$ .

Theil-U =  $\frac{RSM\bar{E}_{may1993-jun1998}}{RSM\bar{E}_{i,jul1998-dec2007}}$  for a particular country. A value higher than 1 indicates that the RMSE is lower for the time period after the SGP introduction.

**Table 5 – RMSE of the year-ahead forecast for budget deficit (over the years 1994 to 2007)**

	France	Germany	Italy	UK
January	2.66	2.46	2.82	1.63
February	2.66	2.45	2.82	1.58
March	2.66	2.45	2.83	1.57
April	2.66	2.45	2.82	1.51
May	2.66	2.45	2.81	1.48
June	2.65	2.45	2.80	1.47
July	2.65	2.45	2.81	1.41
August	2.65	2.45	2.80	1.40
September	2.64	2.45	2.81	1.41
October	2.63	2.45	2.82	1.31
November	2.63	2.45	2.84	1.26
December	2.63	2.44	2.83	1.20
Theil-U	1.41	0.93	1.82	1.04

Notes: RMSE here is defined by (6) for  $h = 1$ .

Theil-U =  $\frac{RSM\bar{E}_{may1993-jun1998}}{RSM\bar{E}_{i,jul1998-dec2007}}$  for a particular country. A value higher than 1 indicates that the RMSE is lower for the time period after the SGP introduction.

Table 6 – Impact of SGP on the errors of the year-ahead forecasts (May 1993 – Dec. 2007)

Country	Absolute Forecast Error				Forecast Error			
	France	Germany	Italy	UK	France	Germany	Italy	UK
constant	0.20*** (5.80)	0.17*** (5.88)	0.32*** (5.29)	0.10*** (2.30)	-0.01 (0.62)	-0.02 (0.56)	0.13*** (2.17)	-0.23*** (4.52)
Lagged Dep. Variable ( $e_{i,t,m}^t$ )	0.87*** (67.57)	0.77*** (50.02)	0.69*** (23.26)	0.88*** (95.83)	0.87*** (73.94)	0.79*** (54.54)	0.77*** (34.43)	0.86*** (68.08)
Output Forecast Error	0.08*** (4.59)	0.17*** (10.89)	-0.09*** (4.43)	0.11*** (4.95)	-0.11*** (8.45)	-0.17*** (11.59)	-0.19*** (5.88)	-0.15*** (6.68)
Inflation Forecast Error	0.10*** (4.94)	0.04*** (2.11)	0.20*** (7.99)	0.05*** (2.65)	0.09*** (5.31)	0.13*** (6.54)	0.17*** (5.01)	0.16*** (6.38)
Interest Rate Forecast Error	0.01** (2.01)	-0.01 (0.55)	0.05*** (2.84)	0.00 (0.06)	0.02*** (2.63)	0.02 (1.30)	0.07*** (3.20)	-0.17*** (8.51)
Bond Forecast Error	0.00 (0.32)	-0.02 (1.28)	-0.05*** (3.15)	0.00 (0.05)	0.03*** (3.68)	0.01 (0.97)	-0.02 (1.07)	0.08*** (4.73)
Month trend	-0.01*** (4.12)	-0.02*** (8.41)	-0.04*** (8.52)	-0.02*** (3.85)	0.00 (0.89)	0.00 (0.36)	-0.01* (1.89)	-0.02*** (3.98)
Election dummy	0.01 (0.49)	-0.10*** (5.40)	0.17* (3.82)	0.03 (1.61)	-0.03 (1.51)	-0.08*** (3.62)	0.20*** (5.05)	0.10*** (4.30)
SGP Phase I dummy ( $sgp1_{t,m}$ )	-0.06*** (4.27)	0.00 (0.02)	0.22 (6.37)	0.03 (1.23)	0.12*** (4.85)	0.02 (1.01)	-0.01 (0.12)	0.20*** (6.03)
Reformed SGP dummy ( $sgp2_{t,m}$ )	-0.05*** (2.20)	0.13*** (5.16)	0.25*** (4.99)	-0.04 (1.23)	0.20*** (7.64)	0.09*** (3.56)	0.14*** (3.19)	0.11*** (3.12)
Observations (No. of groups)	1,954 (31)	2,939 (41)	1,359 (28)	3,021 (56)	1,954 (31)	2,939 (41)	1,359 (28)	3,021 (56)
Test statistic: Fixed effects (F-value) <sup>a</sup>	2.68***	1.49**	1.40*	1.32**	3.54***	1.71**	2.24***	1.87***
Goodness of Fit: within	0.9368	0.9619	0.8464	0.9496	0.9664	0.9748	0.9342	0.9788
between	0.8361	0.9965	0.9341	0.9548	0.9503	0.9900	0.9805	0.9915
overall	0.9387	0.9657	0.8535	0.9525	0.9673	0.9756	0.9407	0.9806

Notes: Equation (7) is estimated using Newey-West Panel estimator with cross-fixed effects. Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively. <sup>a</sup> The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.



**Table 7 – Encompassing test for the European Commission: year-ahead expected deficit (1993 - 2007)**

	France	Germany	Italy	UK	Median <sup>a</sup>
constant	0.93*** (15.00)	0.09*** (2.06)	0.06 (0.42)	0.52*** (11.36)	0.66*** (7.81)
$d_{EC,t,10}^{t+1}$	0.65*** (32.03)	1.07*** (56.90)	0.98*** (43.47)	0.69*** (50.80)	0.84*** (9.27)
$d_{EC,t,10}^{t+1} * sgp1_{t,11}$	0.01 (0.69)	-0.17*** (11.63)	0.08 (1.27)	0.18*** (7.49)	-0.23*** (2.71)
$d_{EC,t,10}^{t+1} * sgp2_{t,11}$	0.04 (1.64)	-0.21*** (11.40)	0.08* (1.79)	0.06*** (2.64)	-0.10 (1.12)
Observations (No. of Groups)	254 (33)	338 (43)	173 (33)	363 (61)	60 (4)
Test: Fixed effects (F-value) <sup>b</sup>	2.63**	2.00***	0.87	2.50***	2.84**
Goodness of Fit: within	0.9316	0.9405	0.9604	0.9474	0.8327
between	0.8275	0.9236	0.9773	0.9231	0.9331
overall	0.9162	0.9300	0.9641	0.9344	0.8316

Notes: Equation (8) is estimated using Newey-West Panel estimator with cross-fixed effects.

Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively. <sup>a</sup> Estimation using the median value of all countries.

**Table 8 – Convergence test: difference (absolute value and in level) of specialists' and European Commission's year-ahead forecasts for budget deficit (1993 - 2007)**

	Difference in absolute value					Difference in level				
	France	Germany	Italy	UK	Median <sup>a</sup>	France	Germany	Italy	UK	Median <sup>a</sup>
constant	0.38*** (4.68)	0.21*** (4.95)	0.78*** (6.08)	0.48*** (6.77)	0.52*** (2.89)	0.10 (1.61)	-0.16*** (3.45)	0.08 (0.45)	0.27*** (3.45)	-0.07 (0.48)
$d_{EC,t-1,10}^t - d_{i,t-1,11}^t$	0.24*** (3.78)	0.01 (0.08)	-0.01 (0.05)	0.31*** (4.45)	0.24*** (2.80)	0.21*** (4.53)	0.01 (0.10)	-0.02 (0.26)	0.36*** (6.44)	0.37*** (4.72)
$\Delta y_{EC,t,10}^{t+1} - \Delta y_{i,t,11}^{t+1}$	-0.05 (0.36)	0.26*** (2.55)	-0.08 (0.28)	0.13*** (1.36)	0.37*** (2.21)	-0.13 (1.27)	-0.23*** (2.79)	-0.46*** (2.29)	-0.24*** (3.72)	-0.55*** (3.33)
$cp_{EC,t,10}^{t+1} - cp_{i,t,11}^{t+1}$	-0.10 (0.69)	0.03 (0.42)	-0.35* (1.79)	-0.10 (1.32)	-0.16 (0.91)	0.03 (0.22)	0.11 (1.24)	0.46*** (2.34)	-0.09 (1.43)	0.12 (0.77)
$sgp1_{t,11}$	-0.07 (1.07)	0.01 (0.32)	-0.25*** (2.79)	-0.02 (0.24)	-0.22 (1.24)	-0.19*** (2.78)	0.35*** (6.36)	-0.32*** (2.10)	-0.67*** (5.77)	-0.07 (0.38)
$sgp2_{t,11}$	-0.14** (2.19)	0.07* (1.68)	-0.25*** (2.67)	-0.28*** (3.94)	-0.14 (0.84)	-0.09 (0.97)	0.34*** (4.83)	-0.30*** (2.03)	0.01 (0.12)	0.09 (0.38)
Observations (No. of Groups)	205 (30)	260 (40)	125 (28)	256 (52)	56 (4)	205 (30)	260 (40)	125 (28)	256 (52)	56 (4)
Test: Fixed effects (F-value) <sup>b</sup>	1.20	1.22	0.97	1.13	0.13	2.14**	1.79***	1.12	1.24	0.71
Goodness of Fit: within	0.759	0.456	0.397	0.468	0.188	0.836	0.656	0.636	0.759	0.294
between	0.648	0.016	0.352	0.525	0.129	0.627	0.195	0.504	0.833	0.391
overall	0.735	0.395	0.371	0.467	0.181	0.790	0.596	0.535	0.750	0.298

Notes: Equation (9) is estimated using Newey-West estimator with cross-fixed effects. Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively. <sup>a</sup> Estimation using the median value of all countries. <sup>b</sup> The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

**Table 9 – Encompassing test for National Fiscal Authorities: year-ahead expected deficit (1999 - 2007)**

	France	Germany	Italy	UK	Median <sup>a</sup>
constant	0.30*** (3.26)	0.09 (0.63)	1.22*** (7.90)	0.01 (0.09)	1.23 (1.55)
$d_{j,t,1}^{t+1}$	1.06*** (23.51)	1.14*** (18.54)	0.62*** (6.64)	1.15*** (21.30)	0.55 (0.89)
$d_{j,t,1}^{t+1} * sgp2_{t,1}$	0.03 (1.09)	-0.19*** (5.53)	0.26*** (3.68)	0.07 (1.14)	0.03 (0.08)
Observations (No. Of Groups)	98 (22)	174 (35)	92 (26)	153 (44)	32 (4)
Test: Fixed effects (F-value) <sup>b</sup>	1.08	1.43*	0.84	2.65***	0.78
Goodness of Fit: within	0.8911	0.8785	0.6926	0.8972	0.2264
between	0.8415	0.8381	0.7572	0.8385	0.0058
overall	0.8753	0.8611	0.7228	0.8669	0.2033

Notes: Equation (10) is estimated using Newey-West Panel estimator with cross-fixed effects.

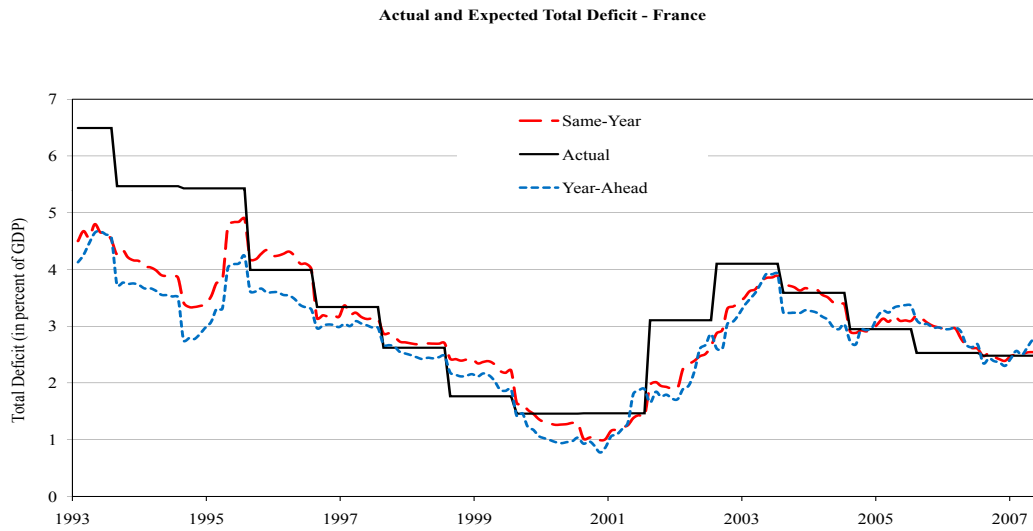
Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively. <sup>a</sup> Estimation using the median value of all countries. <sup>b</sup> The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

**Table 10 – Convergence test: difference (in absolute value and level) of specialists' and National Fiscal Authorities' year-ahead forecasts for budget deficit (1999 - 2007)**

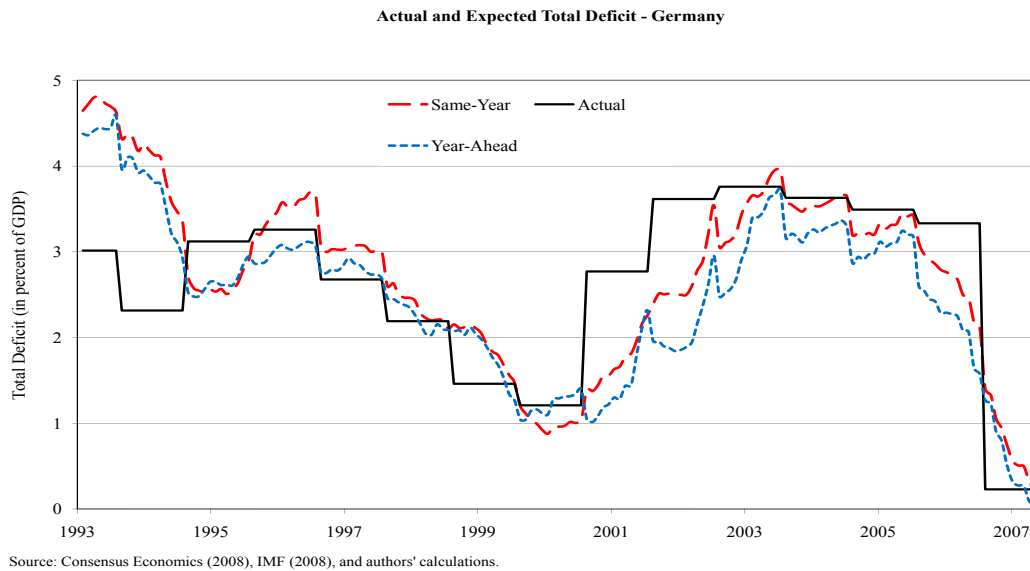
	Difference in absolute value					Difference in level				
	France	Germany	Italy	UK	Median <sup>a</sup>	France	Germany	Italy	UK	Median <sup>a</sup>
constant	0.30*** (3.31)	0.27*** (7.12)	0.46*** (2.76)	0.39*** (4.69)	0.34 (1.53)	-0.18** (3.58)	-0.17*** (4.62)	-0.34*** (2.78)	0.08 (1.01)	-0.36*** (3.27)
$d_{j,t-1,1}^t - d_{i,t-1,1}^t$	-0.05 (0.32)	0.01 (0.15)	-0.06 (0.43)	0.14 (1.33)	0.07 (.62)	-0.08 (0.92)	0.07 (0.76)	-0.04 (0.34)	-0.17 (1.65)	0.19*** (2.95)
$\Delta y_{j,t,1}^{t+1} - \Delta y_{i,t,1}^{t+1}$	0.07 (0.46)	0.07 (1.48)	0.25 (1.43)	0.01 (0.15)	0.37 (0.85)	-0.29*** (2.71)	-0.08 (1.63)	-0.32*** (2.62)	-0.25*** (4.36)	-0.69*** (2.38)
$cp_{j,t,1}^{t+1} - cp_{i,t,1}^{t+1}$	-0.34* (1.90)	0.02 (0.29)	0.37 (1.20)	0.07 (0.52)	0.59 (0.37)	-0.23 (1.42)	-0.11* (1.82)	0.54* (1.92)	0.34* (1.73)	0.22 (0.57)
<i>sgp2</i> <sub>t,1</sub>	-0.08 (1.39)	-0.07 (1.58)	-0.11 (0.96)	-0.15*** (2.48)	-0.06 (0.72)	0.20** (2.37)	0.25*** (3.60)	0.15 (0.91)	-0.09 (0.69)	0.11 (0.72)
Observations (No. of Groups)	76 (20)	136 (30)	65 (20)	101 (31)	32 (4)	76 (20)	136 (30)	65 (20)	101 (31)	32 (4)
Test: Fixed effects (F-value) <sup>b</sup>	5.75***	0.61	0.68	1.61	2.60*	2.87*	1.31	1.23	1.14	1.65
Goodness of Fit: within	0.483	0.112	0.617	0.558	0.190	0.903	0.491	0.748	0.711	0.388
between	0.309	0.000	0.482	0.093	0.427	0.894	0.368	0.330	0.413	0.284
overall	0.307	0.075	0.527	0.334	0.024	0.891	0.421	0.577	0.578	0.363

Notes: Equation (11) is estimated using Newey-West Panel estimator with cross-fixed effects. Values in parentheses report t-statistics. \*\*\*, \*\*, and \* indicate significance at one, five and ten percent level respectively. <sup>a</sup> Estimation using the median value of all countries. <sup>b</sup> The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

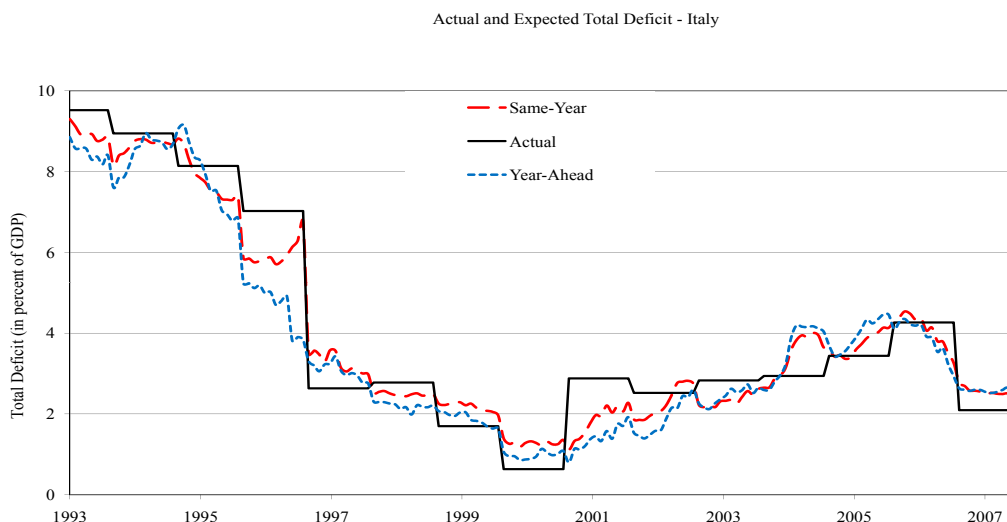
**Figure 1 – Actual and forecasted budget deficit – France (May 1993 - Dec. 2007)**



**Figure 2 – Actual and forecasted budget deficit – Germany (May 1993 - Dec. 2007)**

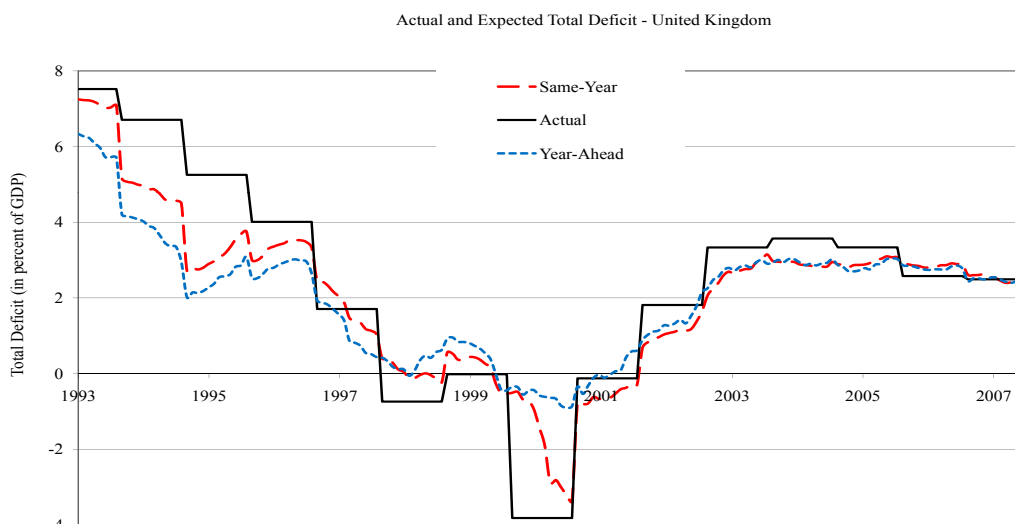


**Figure 3 – Actual and forecasted budget deficit – Italy (May 1993 - Dec. 2007)**



Source: Consensus Economics (2008), IMF (2008), and authors' calculations.

**Figure 4 – Actual and forecasted budget deficit – UK (May 1993 - Dec. 2007)**



Source: Consensus Economics (2008), IMF (2008), and authors' calculations.

Figure 5 – RMSE for the same-year forecasts of budget deficit

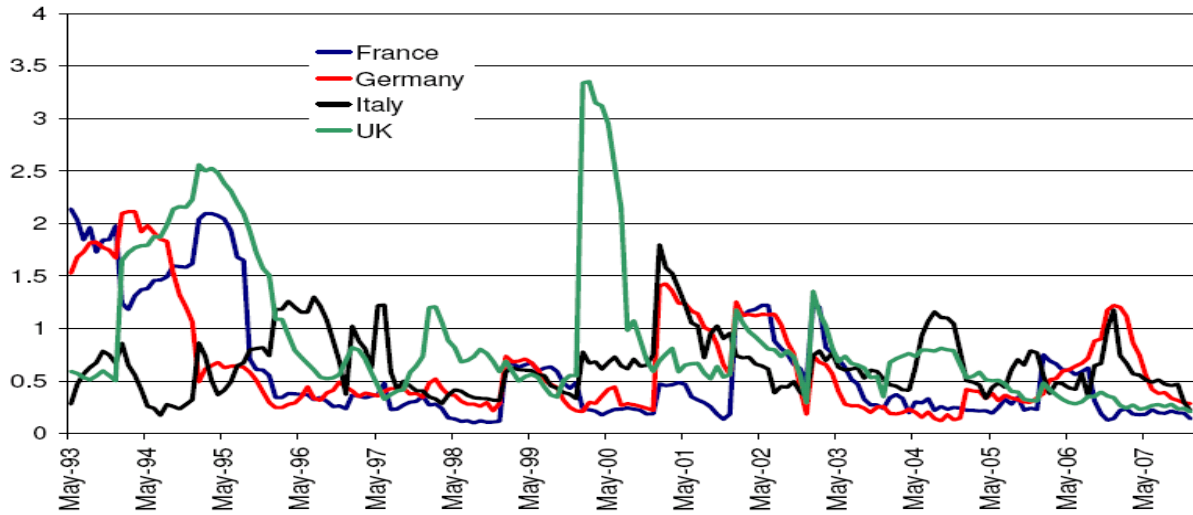
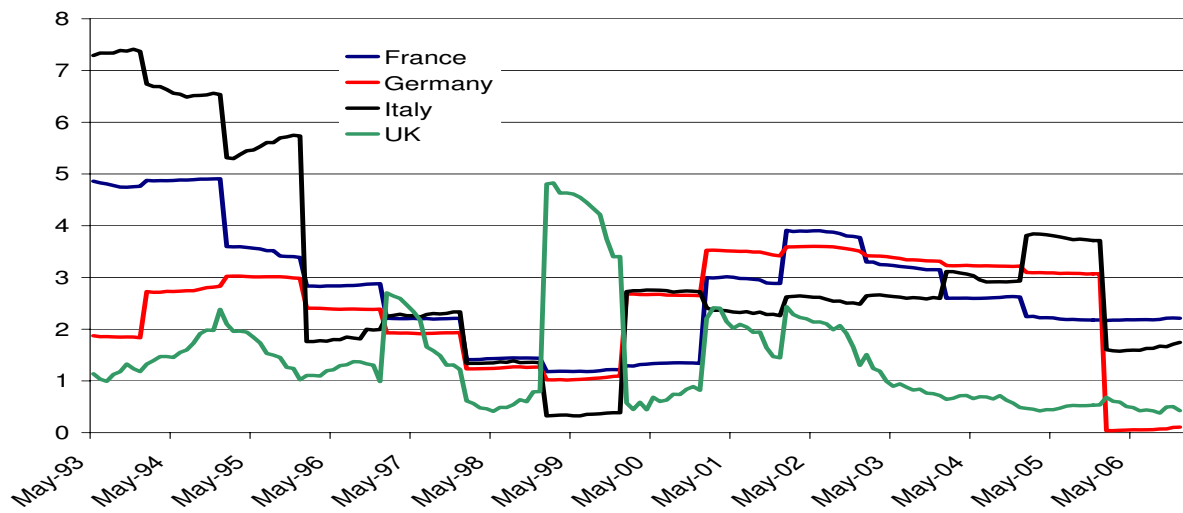
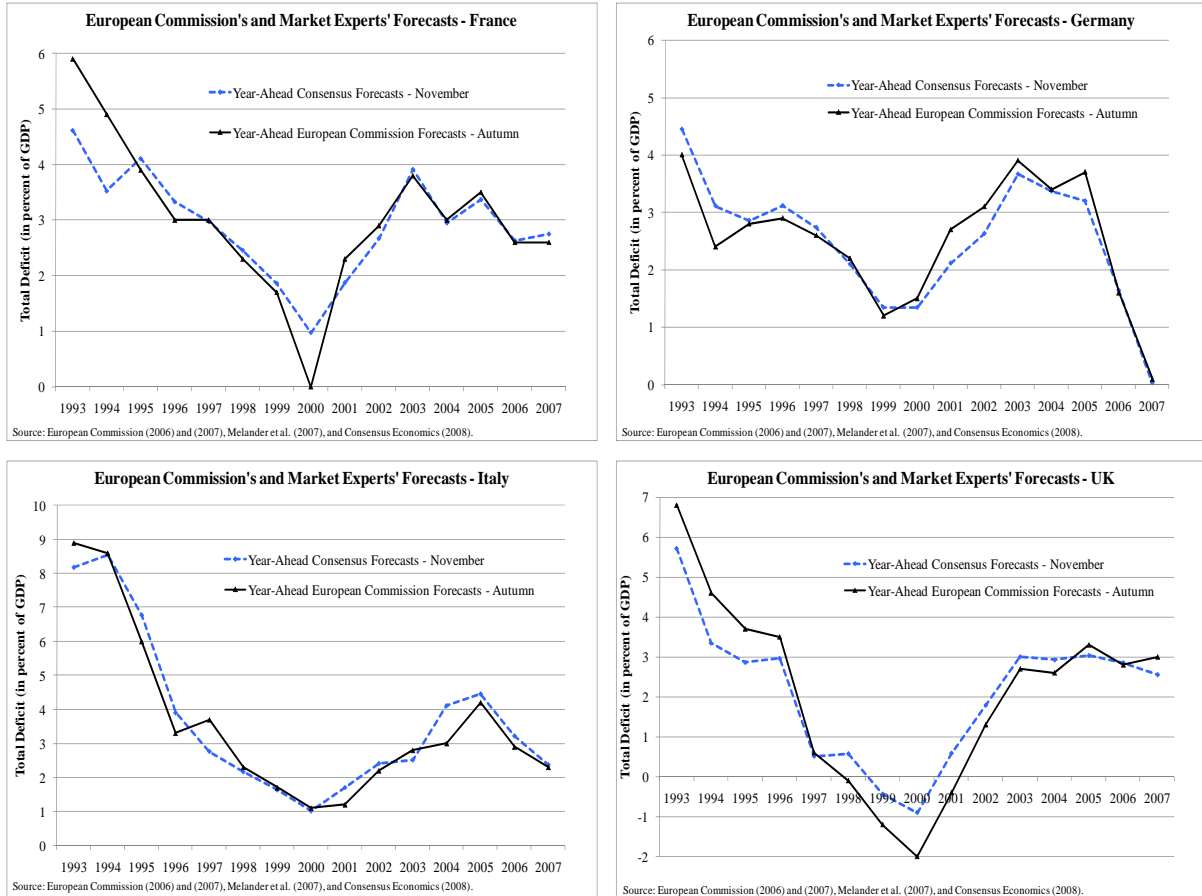


Figure 6 – RMSE for the year-ahead forecasts of budget deficit



**Figure 7 – European Commission’s and market experts’ year-ahead forecasts of budget deficit**





**Figure 8 – National Fiscal Authorities’ and market experts’ year-ahead forecasts of budget deficit**



## Appendix

### CALCULATION OF THE FORECASTED TOTAL DEFICIT AS PERCENTAGE OF GDP

First, we calculate the expected nominal GDP forecast of forecaster  $i$  at month  $m$  and year  $t$  given his/her GDP and CPI forecasts. For the same-year forecast we calculate the expected nominal GDP at the end of the respective year as:<sup>47</sup>

$$y_{i,t,m}^t = y_t^{nom} * [1 + \Delta y_{i,t,m}^t + cp_{i,t,m}^t].$$

The forecast horizon decreases over the course of the year as  $m$  increases ( $m = 1, 2, \dots, 12$ ).

The realized nominal GDP ( $y_t^{nom}$ ) is obtained from the IMF (2008b). As a robustness check we have also used the nominal GDP known at year  $t - 1$  to account for different time horizons and used the real-time data base of the OECD to account for different vintages of the GDP. The results, however do not change and are available upon request. In the next step we construct the same-year expected total deficit in terms of GDP,  $d_{i,t,m}^t$ , as:<sup>48</sup>

$$d_{i,t,m}^t = \frac{def_{i,t,m}^t}{y_{i,t,m}^t},$$

where  $def_{i,t,m}^t$  is the nominal total deficit in terms of local currency for a particular year  $t$ .

For the year-ahead forecast, analogously, we take the GDP and CPI forecast for the current and the next year to calculate the expected nominal GDP at the end of the next year.

<sup>47</sup>The same procedure has been applied by Heppke-Falk and Hübner (2004)

<sup>48</sup>By doing this calculation, we assume that  $def_t$  is not correlated with  $y_{t+k}^{nom}$  for  $k > 0$ .

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