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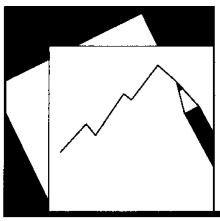

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Fiscal Expectations Under the Stability and Growth Pact: Evidence from Survey Data

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Fiscal Expectations Under the Stability and Growth Pact: Evidence from Survey Data[1]

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Abstract

The paper uses survey data to analyze whether financial market expectations on government budget deficits changed in France, Germany, Italy, and the United Kingdom during the period of the Stability and Growth Pact (SGP). Our findings indicate that accuracy of financial expert deficit forecasts increased in France. Convergence between the European Commission's and market experts' deficit forecasts also increased in France, Italy, and the United Kingdom, particularly during the period after SGP's reform in 2005. Yet, convergence between markets' forecasts and those of the French, German, and Italian national fiscal authorities seems not to have increased significantly during the SGP.

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

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

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I. 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; Drazen, 2004). A related proposition is that such rules 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; 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; Beetsma, 2001). After the success of the Maastricht Treaty's fiscal framework in the run-up to adoption of the euro, questions about enforcement and countries' commitment to continued fiscal discipline were raised during the implementation of the SGP.[1] Over time, with several European Union (EU) countries breaching the rules of the Pact, such concerns spiraled, generating an intense debate about its effectiveness and reliability.[2] Eventually, the annulations of the excessive deficit procedures for France and Germany at the end of 2003 led to a reform of the SGP in 2005. The main objectives of the reform were to improve the fiscal rules and increase "the legitimacy of the EU fiscal framework" (European Commission, 2005).[3]

This paper assesses how the introduction and reform of the SGP changed fiscal expectations of financial market experts for the four largest European economies: France, Germany, Italy, and the United Kingdom (UK) between May 1993 and December 2007. Although the UK did not adopt the euro and, therefore, is not subject to the sanctions under the Pact, it is included in the sample as a benchmark to the other three countries, which are members of the euro area.

First, we check whether the introduction and reform of the Pact reduced inaccuracy and bias of market expert forecasts, using the *Consensus Economics Forecasts* monthly survey of professional economists' deficit forecasts as a proxy for fiscal expectations. Second, we investigate whether convergence between those expert fiscal forecasts and the ones from the

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[1] 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 1997 the European Council accepted a draft resolution of the SGP. In its first draft, the Pact comprised two main branches, one aimed at surveillance of fiscal policy and one aimed at dissuasion of fiscal profligacy. Enforcement of the surveillance part began on July 1, 1998, whereas enforcement of the dissuasive arm began on January 1, 1999 (see Cabral, 2001).

[2] For an empirical analysis of the effectiveness of the SGP see Galí and Perotti (2003) and, more recently, Poplawski-Ribeiro (2009).

[3] 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 in June of that year. The reform changed several items of the previous pact's preventive and corrective arms. For a description and analysis of the reformed SGP, see, among others, Buti, Eijffinger and Franco (2005); Chang (2006); Morris, Ongena, and Schuknecht (2006); and Beetsma and Debrun (2007).

European Commission or from each country's national fiscal authority (NFA) increased after the SGP.

To the best of our knowledge this is the first time fiscal rules have been analyzed using market expectations.[4] Such an exercise is not straightforward. National budgets and fiscal policy are not always direct subjects of market speculation. They are usually planned once a year, with little real-time updating or monitoring of actual behavior during the budget period. Thus, the possibility exists that the forecasting of annual budgets until the crisis was not an exercise of great importance to market experts. When answering the fiscal part of their *Consensus* survey before the crisis, they could have ignored the SGP.

This could lead to divergences in the forecasts of market experts and national authorities. Different from more independent institutions, fiscal authorities may also be influenced by factors (e.g. political) other than technical issues when making their forecasts (Auerbach, 2007; and Leal and others, 2007). This may affect the accuracy and convergence between the forecasts of those two agents. Another more technical issue is related to the different definitions of fiscal deficits (e.g. net lending, cash basis, cyclically adjusted etc.). Market experts may have a different definition in mind when answering the survey than that used by the national authorities.[5]

Nonetheless, survey data as proxy for expectations has already been used in fiscal policy (see, for example, Heppke-Falk and Hüfner, 2004; and Allers, de Haan, and de Kam, 1998).[6] Moreover, survey data and market expectations have been extensively employed in other economic fields, particularly in monetary and international economics. In monetary economics most papers use agents' expectations to study policy credibility (Cukierman and Meltzer, 1986; Rogoff, 1987; Cukierman, 1992) and the impacts of imperfect knowledge, learning, and expectation formation on monetary policy.[7] Another common application of

[4] Some papers already tested the enforcement effects of credit markets on fiscal rules and discipline (see, for example, Bayoumi, Goldstein, and Woglom, 1995; and Manganelli and Wolswijk, 2007). Those papers, however, check this issue indirectly via changes in bond spreads instead of using straight market expectations.

[5] Political influences can lead to biases in the fiscal authorities' forecasts in both directions, pessimistic and optimistic. On one hand, the authorities may optimistically forecast GDP growth and fiscal figures (Jonung and Larch, 2006). On the other hand, the minister of finance may deliberately underestimate tax revenues to alleviate spending pressures (van der Ploeg, 2007; Beetsma and others, 2010). On the different deficit definitions used by market experts to answer the fiscal survey see further footnote 13 of this paper.

[6] Heppke-Falk and Hüfner (2004) use survey data to investigate the relationship between interest rate swap spreads and budget deficits in three countries of the European Monetary Union (EMU)—France, Germany, and Italy—showing that, with the implementation of the SGP, hikes in expected deficits led to a fall in interest rate swap spreads in Germany and France. In turn, Allers, de Haan, and de Kam (1998) conducted 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.

[7] The literature in this field is extensive. See among others: Clements (1995) and (2008); Mankiw and Reis (2002); Carroll (2003); Orphanides and Williams (2005), (2006), (2008); and Berger, Ehrmann, and Fratzscher (2009). In international economics, see, for example, Reitz, Stadtmann, and Taylor (2009).

this data is to assess the quality of international organization forecasts. But, most of these analyses focus on other macroeconomic variables (such as growth and inflation rates) rather than on fiscal variables.[8]

The main findings of this paper show that accuracy of deficit forecasts by market specialists increased in France after the SGP implementation. Moreover, convergence between market experts and the European Commission fiscal forecasts seems to have increased for France, Italy, and the United Kingdom. Nevertheless, such convergence seems not to have happened to the French, German, and Italian national fiscal authorities' forecasts. These results suggest scope for further improvements in the forecasting accuracy of national and EU institutions to better anchor fiscal expectations.

The rest of the paper is structured as follows. Section II presents the dataset and preliminary tests on unbiasedness and efficiency of financial experts' forecasts. Section III focuses on changes in expert forecast accuracy and bias owing to the introduction and reform of the SGP. Section IV tests whether the Pact affected the convergence and bias of market's fiscal expectations compared to those of the European Commission or NFAs. Section V concludes.

II. Dataset and Descriptive Statistics

A. The Data Sample

Consensus Economics Forecasts (CEF) disaggregated monthly survey data on professional economic forecasts is used as a proxy for fiscal deficit expectations during the sample period of May 1993 to December 2007, summing up to 171 months.[9] In the EMU, the fiscal survey is done for Germany, France, and Italy, covering two different forecast horizons: one for the end of the same year (same-year) and one for the end of the year ahead (year-ahead).

The CEF dataset has several advantages over other surveys and is less subject to some of the weaknesses often associated with survey data. First, individual forecasts are published together with the names of their companies. This makes those forecasts more accountable. It prevents a participant from reproducing others' forecasts, limiting the possibility of herding behavior (Trueman, 1994). Moreover, because analysts are bound in their survey answers by their recommendations to clients, an analyst may find it difficult to justify why he or she gave a recommendation different from the one in the survey (Keane and Runkle, 1990).

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[8] See, among others, Batchelor (2001); Blix and others (2001); Juhn and Loungani (2002); Timmermann (2006); and Melander, Sismanidis, and Grenouilleau (2007).

[9] CEF 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 and investment and commercial banks. The number of participants varies from country to country with the United Kingdom having the highest number of forecasters (66) and Italy the lowest (29). Further information on how the survey is conducted is available via the Internet: www.consensuseconomics.com.

Second, unlike some other surveys, professional economists who participate in the CEF poll not only take a stance on the direction of the expected change of a macroeconomic variable but also forecast the level of the macroeconomic variable. Third, the survey data is readily available to the public.[10]

Table 1 displays the average of the surveyed and actual values for: (i) the government general budget deficit; (ii) the real GDP growth rate; (iii) the three-month interest rate; (iv) the inflation rate (change in CPI); and (v) the interest rate on treasury bonds (T-bills).[11] Averages of those variables are presented for the entire sample period (May 1993 to December 2007), and for the period before the implementation of the SGP (May 1993 to December 1998) and the subsequent period (January 1999 to December 2007). In turn, Figures 1 to 4 show the development of the expected same-year, year-ahead, and the actual budget balances for France, Germany, Italy, and the United Kingdom.[12]

The proximity of the forecasted and actual values in Table 1 and Figures 1 through 4 suggests at first glance that the expectations on macroeconomic variables are a good predictor for the actual value. Germany, for instance, has an average forecast between May 1993 and December 2007 for the budget deficit (inflation rate) of 2.71percent of GDP (1.80 percent), while the actual value is 2.66 percent of GDP (1.73 percent). Italy has an average forecast for the budget balance (interest rate) of 3.94 percent of GDP (4.94 percent), whereas the realized average value is 3.77 percent of GDP (4.95 percent).

B. Forecast Accuracy and Bias for the Whole Sample

As addition descriptive statistics, we test for the absence of bias and informational efficiency in the expert fiscal forecasts during the overall time period. For that, the same-year forecast error on government annual total deficit as a percent of GDP ($e^{t}_{i,t,m}$) for a particular country is defined as:

[10] Batchelor (2001) shows that Consensus Economics' forecasts of six economic variables (the growth rates in real GDP, consumer expenditure, business investment, 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 than the OECD and IMF forecasts. Dovern and Weisser (2008) also find that the participants in the CEF poll provide rational and unbiased inflation and growth forecasts for the G7 countries.

[11] 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 United Kingdom, 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. See notes on Table 1 for further information. Moreover, these forecasts are collected by Consensus Economics 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 Hüfner (2004). See the Appendix for more details on this calculation.

[12] Given that this dataset forms an unbalanced panel, a minimum participation frequency for each forecaster is applied. Only those forecasters who participated at least ten times in the poll are included in the sample. Other minimum participation rates are also used, but the results (available upon request) do not change qualitatively.

$$e^{t}_{i,t,m} = d^{t}_{i,t,m} - d^{t}_{2008}, \tag{1}$$

where the subscripts identify the forecaster i, year t, and month m of the forecast; while the superscripts identify the year t forecasted. Thus, $d^{t}_{i,t,m}$ is the forecast (or expectation) of a financial specialist i at the beginning of a given month[13] $1 \le m \le 12$ of a year $1993 \le t \le 2007$ for the total annual budget deficit as a percent of GDP in the end of the same year t. In turn, d^{t}_{2008} defines the realized annual deficit (in percent of GDP) as measured by the *World Economic Outlook, March 2008* (IMF, 2008b) for a year t (see Table 2 for the list of all variables used in the paper).[14]

Similarly, for each country, year-ahead ($t+1$) forecast errors of the budget deficit (as a percent of GDP) are written as:

$$e^{t+1}_{i,t,m} = d^{t+1}_{i,t,m} - d^{t+1}_{2008}, \tag{2}$$

where $d^{t+1}_{i,t,m}$ is the forecast for the annual budget deficit (as a percent of GDP) for the end of the subsequent year $t+1$ (year-ahead) made by a specialist i at the beginning of a given month $1 \le m \le 12$ of a year $1993 \le t \le 2007$.

Bias is defined as the tendency to produce significant positive or negative errors. Hence, for each country, the Unbiasedness test is run by the following regression:

$$e^{t+h}_{i,t,m} = a_0 + \varepsilon_{i,t,m}, \;\; h = 0,1, \tag{3}$$

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 $t+1$), respectively; and $\varepsilon_{i,t,m}$ is an error term. Unbiasedness prevails when α_0 equals zero in (3).

Further, the difference between the forecast biases in "good" or "bad" economic times is also tested. Market expert forecasts might have been biased owing to difficulties in predicting turning points and economic downturns, as in the early 2000s in Europe (see Strauch, Hallerberg, and von Hagen, 2004). This test is then performed by estimating the following equation for each country in the sample:

$$e^{t+h}_{i,t,m} = a_1 + \beta_1 I\left(\Delta y^{t+h}_{i,t,m}\right) + \varepsilon_{i,t,m}, \tag{4}$$

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[13] See footnote 9.

[14] Notice again that budget deficits are shown as positive values, that is, if a country increases (decreases) its debt position this is registered as a positive (negative) budget deficit. We use recently released data as a measure for the realized values (see notes on Table 1); using different cohorts of ex post data for the realized values does not alter the results significantly. These results are available upon request to the authors.

where $\Delta y^{t}_{i,t,m}$ ($\Delta y^{t+1}_{i,t,m}$) is the forecasted real GDP growth rate, Δy, for year t (year-ahead $t+1$); and $I(\cdot)$ is an indicator function that equals 1 whenever $\Delta y^{t}_{i,t,m}$ ($\Delta y^{t+1}_{i,t,m}$) is below its sample average or 0 otherwise. In economic terms, the coefficient β_1 allows us to trace out how the correlation between the forecast error of the expected budget deficit and the real GDP growth rate differs in times of economic downturns and booms.

A third test checks for informational 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, Sismanidis, and Grenouilleau (2007) and estimate the following equation:

$$d^{t+h}_{2008} = \alpha_2 + \beta_2 d^{t+h}_{i,t,m} + \varepsilon_{i,t,m}. \tag{5}$$

Weak efficiency requires that $\alpha_2 = 0$ and $\beta_2 = 1$ and that the error term is uncorrelated in time (Artis and Marcellino, 2001).[15]

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. 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 α_0 for France conveys that, on average, French financial experts underestimated the total French budget deficit between May 1993 and December 2007. This is particularly the case before the SGP (Table 1 and Figure 1), reflecting in part the substantial unexpected effect that a recession in Europe had on the actual French fiscal revenues in the early 1990s.[16]

In Italy and the United Kingdom, same-year market forecasts were also negatively biased as their significant and negative values of α_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 Germany, in turn, same-year expert deficit forecasts seem to be marginally pessimistic, which is in accordance with Figure 2. For one year-ahead forecasts only, market deficit forecasts for France appear to be biased and optimistic over the entire sample period.

[15] This null hypothesis of joint $\alpha = 0$ and $\beta = 1$ is also a sufficient (but not necessary) condition for unbiasedness (Holden and Peel 1990).

[16] Since this effect can also be due to a lower growth rate than expected in the period, we have double-checked this effect by estimating the unbiasedness test (3) also with the nominal value of deficit besides its ratio over GDP. We found again that the fiscal forecasts were too optimistic for that particular period.

The Non-Linear Unbiasedness test in Table 3 shows a negative α_1 for all countries and specifications, except Germany in the same-year and Italy in the year-ahead. This finding implies that experts were overconfident in times of expected economic boosts for most of our sample countries. Conversely, they became overly pessimistic whenever an economic downturn was expected (positive coefficient for β_1 in all specifications, except in France in the same-year version).

Regarding the weak efficiency test, for both horizons the null hypotheses that $\alpha_2 = 0$ and $\beta_2 = 1$ can be rejected. This suggests either that the information was not efficiently used by specialists when making their forecasts during the whole sample period; or could point to econometrics issues related to the estimation of equation (5).[17] The coefficient β_2 is lower in the year ahead compared to the same year (except for Italy), indicating that forecast accuracy is lower for longer forecast horizons (see section III).

In sum, these findings suggest the presence of a forecast bias and the lack of weak informational efficiency in forecasts for the four large European countries during the entire sample period. In the following sections we will analyze these issues in more detail, focusing especially on the periods of the implementation and reform of the SGP.

III. Forecast Accuracy and Bias during the SGP

This section investigates the effects of the SGP on market expert forecast accuracy and bias. The introduction of the SGP in July 1998 led to more monitoring of the European national fiscal policies via two main channels: (i) the Stability and Convergence Programme (SCP) reports and medium-term objectives (MTOs); and (ii) the assessment of those reports by the European Commission.

The reform of the Pact aimed at introducing more flexibility and at strengthening the economic underpinnings and the national ownership of the EU's fiscal framework. Thus, the two SGP versions could have helped market experts to make more accurate and less biased forecasts. This hypothesis is first tested by computing the root mean squared error (RMSE) of expected budget deficits (in terms of GDP) for each country:

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

[17] The residuals may be serially correlated, or the coefficient β_2 may be downward biased since the regression pools across different forecasters for the same underlying forecast. For a given forecast country and period, the dependent variable d_{2008}^{t+h} is fixed, so that the right hand side variable $d_{i,t,m}^{t+h}$ and the error term $\varepsilon_{i,t,m}$ are negatively correlated by construction. See Crowe (2010) for a discussion on econometric issues of estimations using survey data.

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.

Figures 5 and 6 show the development of the RMSEs for same-year- and year-ahead forecasts in the four European countries under analysis. As expected, RMSEs for same-year forecasts are much lower than those for year-ahead forecasts, showing a lower accuracy for longer-horizon forecasts. For both forecast horizons, the RMSEs also fell considerably between 1996 and 1999 compared to their initial values. This time span coincides with the run-up for entry in the euro area, indicating that in the years close to the adoption of the euro forecast accuracy improved among market participants.[18] For the same-year forecasts the peak of the RMSE for the United Kingdom in 2000 can be attributed to unexpected revenues based on the government's auction of third-generation mobile telecommunications licenses.[19]

In addition, Tables 4 and 5 show the average RMSE for same-year and year-ahead forecasts for different months throughout the time span of January 1994 to December 2007. Table 4 shows that the RMSE decreases over the course of each year for same-year forecasts (see also Figure 5). RMSEs often have the highest values in January, falling during the year to their lowest values in December owing to the smallest forecast horizon in that month. RMSEs of year-ahead forecasts, instead, exhibit a stepwise pattern without a pronounced month effect (see Table 5).

The Theil's-U statistics in Tables 4 and 5, in turn, indicate that RMSEs were lower for both forecast horizons during the SGP period (except for Germany for the year-ahead forecasts). This statistic compares average RMSEs ($\overline{RMSE}$) between the time periods before and after the introduction of the SGP in July 1998 (i.e., $Theil's-U = \overline{RMSE}_{1993,5-1998,6} / \overline{RMSE}_{1998,7-2007,12}$) for each country in the sample.

A more formal econometric test of the SGP impact on forecast accuracy and bias in year-ahead deficit forecasts is performed along the same lines as Berger, Ehrmann, and Fratzscher (2009). It includes other explanatory variables to control for unobserved heterogeneities that

[18] Strauch, Hallerberg, and von Hagen (2004) find the same dynamics for fiscal authorities' forecasts of EU member states.

[19] In the 2000 budget the government forecasted 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 was far lower, 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).

are not accounted for the previous RMSE analysis. The test estimates the following equation:[20]

$$e_{i,t,m}^{t+1} = a_3 + \beta_{30} e_{i,t,m-1}^{t+1} + \beta_{31} x_{i,t,m}^{t+1} + \beta_{32} ele_t + \beta_{33} month_t + \beta_{34} sgp1_{t,m} + \beta_{35} sgp2_{t,m} + \varepsilon_{i,t,m}, \quad (7)$$

where $e_{i,t,m-1}^{t+1}$ is the lagged year-ahead forecast error on budget deficit of forecaster i in month $m-1$ of year t; and $x_{i,t,m}^{t+1}$ is a vector of forecast errors on relevant economic variables. These are: (i) the year-ahead forecast error on real GDP growth rate ($\Delta y_{i,t,m}^{t+1} - \Delta y_{2008}^{t+1}$); the year-ahead forecast error on inflation ($cpi_{i,t,m}^{t+1} - cpi_{2008}^{t+1}$); the year-ahead forecast error on the short-term (3-month) interest rate ($i\_short_{i,t,m}^{t+1} - i\_short_{2008}^{t+1}$); and the year-ahead forecast error on the long-term (10-year bond) interest rate ($i\_long_{i,t,m}^{t+1} - i\_long_{2008}^{t+1}$).[21]

Further, ele_t is a dummy set equal to 1 in years of parliamentary elections and 0 otherwise.[22] In turn, $month_{t,m}$ 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 dummies $sgp1_{t,m}$ and $sgp2_{t,m}$. $sgp1_{t,m}$ corresponds to the first phase of the SGP, set equal to 1 from July 1998 to June 2005 and 0 otherwise. In turn, $sgp2_{t,m}$ covers the reform of the SGP, equaling 1 between July 2005 and December 2007, and 0 otherwise. Finally, $\varepsilon_{i,t,m}$ is an i.i.d. error term.

According to Auerbach (1995) and Leal and others (2007) three types of forecast errors may exist: policy, economic, and technical (behavioral) errors. Policy errors are due to errors regarding 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 previously announced measures. Economic errors are those that can be explained by incorrect forecasts of macroeconomic variables used in the budget projections (for example, GDP). Finally, technical errors are due to other remaining factors, which may derive from behavioral responses as well as from model mis-specification on the fiscal side.[23]

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[20] We use year-ahead instead of same-year forecasts in (7) given that this horizon reflects better medium-term expectations of market specialists. Moreover, the longer the forecast horizon the higher the uncertainty and, therefore, the more their expectations could depend on the credibility of the SGP.

[21] 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.

[22] The parliamentary election variable is constructed with the dataset of the website of the International Institute for Democracy and Electoral Assistance (IDEA) available at http://www.idea.int/vt/parl.cfm combined with information available at http://electionresources.org. See also Poplawski-Ribeiro (2009).

[23] In the particular case of Europe, Leal and others (2007) claim that judgment is an important ingredient in fiscal forecasting because policy measures are not always well specified in the relevant government documents.

The lagged dependent variable in equation (7) checks for persistency in the forecast errors (technical error). Growth forecast error is included because it could be negatively correlated with the forecast error on the budget deficit measured in percentage of GDP (economic error). Inflation forecast error is another variable that may affect the deficit forecast error, in particular when the tax indexation system is not perfect (Artis and Marcellino, 2001). Forecast error on interest rates may also affect forecasts on budget deficits owing to incorrect predictions on the debt service. The dummy for elections captures the effects of potential political budget cycles on forecast errors of market participants (policy error).[24] Finally, the dummy $month_{t,m}$ controls for the monthly trend of forecast error as previously discussed (technical error).

After controlling for those variables, we test for the effects of the two SGP versions on the deficit forecast error via the dummies $sgp1_{t,m}$ and $sgp2_{t,m}$, given the changes in the preventive arm that the reform of the Pact in 2005 promoted (see Morris, Ongena, and Schuknecht, 2006).

We perform two tests with equation (7). First, the regressions for our four sample countries are run 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 a specification, we can test the direction of the bias in the expert fiscal forecasts and whether the SGP led to overly optimistic or pessimistic forecasts.

Table 6 reports the results using individual fixed effects for each market specialist and the Newey-West Panel estimator.[25] The first four columns display the results using the absolute values of the forecast errors (accuracy test), whereas the other columns show the estimations using forecast levels (Unbiasedness test).

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

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[24] Strauch, Hallerberg, and von Hagen (2004) discuss two reasons incumbent governments may want to issue biased forecasts on budget deficits in election 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 of reelection.

[25] We perform the same analysis using same-year forecast errors (results are available upon request). The main difference is that for same-year forecasts, besides France, market experts in Italy and in the United Kingdom also became more accurate during the second version of the SGP.

As expected, inaccuracy of real GDP growth forecasts significantly increased inaccuracy in markets' year-ahead deficit forecasts in all countries except Italy. In Italy, the opposite sign of the coefficient could suggest that market experts have been overly pessimistic about year-ahead deficits. Italian specialists only forecasted deficits correctly when they were more optimistic about GDP growth. As for growth, higher forecasts errors for inflation also led experts to be significantly less accurate on deficit forecasts in all countries.

As discussed in the RMSEs analysis, the significant and negative coefficient for $month_{t,m}$ shows that year-ahead deficit forecast inaccuracy fell with the shrinking of the forecast-horizon for all countries. Moreover, forecast accuracy on year-ahead deficit was significantly boosted in election years in Germany. Accordingly, Strauch, Hallerber, and von Hagen (2004) find that fiscal plans became sounder during election years in Germany.[26] The SGP introduction, in turn, seems to have improved market experts' accuracy only in France (negative coefficient of $sgp1_{t,m}$ for that country). During the SGP reformed period, forecast accuracy remained high in France and worsened in Germany and Italy.

Turning to the analysis of forecast unbiasedness, the negative values for the constant in the last four columns of Table 6 suggest that market experts were optimistic in the United Kingdom and pessimistic in Italy pre-SGP (May 1993 to June 1998). The significant and positive coefficient of the lagged dependent variable ($e^{t+1}_{i,t,m-1}$) for all countries reflects the persistence of deficit forecast errors over time.

Further, the coefficient on the GDP growth forecast error is also significant and negative for all countries. As expected, forecasters tended to predict higher deficits whenever growth forecasts were overly pessimistic. For example, a positive difference of 1 percent between the expected and realized growth rates led to a negative difference of −0.11 percent (overly optimistic) year-ahead forecast error on deficit in France. High inflation forecasts significantly boosted deficit forecasts in all countries. The same happened with higher short-term interest rate forecasts in France and Italy, while in the United Kingdom a higher short-term interest rate forecast made expert deficit forecasts fall. Hence, in the United Kingdom when experts predicted a high short-term interest rate they may have also expected a lower inflation rate, and, therefore, a deficit forecast. In turn, higher long-term interest rate forecasts were associated with higher deficits in France and the United Kingdom.

The dummy for election years is significant for all countries in the sample (except France), suggesting relevant effects of political budget cycles in markets' fiscal expectations.[27] In Italy

[26] These authors argue that German 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 reelection (Strauch, Hallerber, and von Hagen, 2004).

[27] Several authors have discussed the importance of political budget cycles for the SGP and European fiscal policies (see, among others, Buti and van den Noord, 2003; Afonso, 2008; Poplawski-Ribeiro and Beetsma, 2008; Poplawski-Ribeiro, 2009).

and in the United Kingdom the coefficient of that variable is positive, suggesting the expectation of higher year-ahead deficits in those countries during election years.

During its first version, the Pact seems to have induced higher year-ahead deficit expectations in France and the United Kingdom, as suggested by their significant and positive coefficients of $sgp1_{t,m}$. During the reformed SGP, this pessimism seems to have also appeared in Germany and Italy.

In summary, the findings in this section suggest a positive impact of the SGP in terms of expert fiscal forecast accuracy in France. However, the increase in fiscal policy monitoring on account of the SGP appears not to have increased accuracy of market experts in the other three big economies of the EU in any of its two versions.

IV. The Convergence of European Commission and NFAs Fiscal Forecasts with Market Forecasts

This section tests whether the European fiscal institutions forecasts and those of market experts converged after the introduction and reform of the SGP. The Convergence tests are applied for the two levels of European fiscal authorities involved in the SGP's implementation: (i) the European Commission (EC), which is the supranational body responsible for enforcing the rules of the Pact and preparing the fiscal forecasts for the region; and (ii) the national fiscal authorities (NFAs) or countries' treasuries, who run the national fiscal policies and prepare the national forecasts, MTOs, and SCP reports for assessment by the commission.

A. European Commission

We first examine the relationship between expert and commission fiscal forecasts. As in the previous section, here the focus is on the year-ahead forecasts, which provide a better idea of expectations over the medium term.

Figure 7 displays the EC and market expert year-ahead deficit forecasts. Commission data comes from its autumn (end of October/beginning of November) forecasts,[28] whereas expert data corresponds to their forecasts at the beginning of November of each year. In the figure some correlation between EC and expert forecasts can be observed.

[28] Data on the European Commission forecasts are obtained from Melander, Sismanidis, and Grenouilleau (2007) and augmented with European Commission (2006) and (2007). We thank Annika Melander and coauthors for sharing their dataset.

Such correlation is more formally analyzed by the following test (encompassing test) for each country in our sample:[29]

$$d_{i,t,11}^{t+1} = a_4 + \beta_{40} d_{EC,t,10}^{t+1} + \beta_{41} d_{EC,t,10}^{t+1} \times sgp1_{t,10} + \beta_{42} d_{EC,t,10}^{t+1} \times sgp2_{t,10} + \varepsilon_{i,t,11}, \quad (8)$$

where $d_{i,t,11}^{t+1}$ is the year-ahead deficit forecast among market specialists in November $(m=11)$ of year t; and $d_{EC,t,10}^{t+1}$ is the EC year-ahead deficit forecast for a particular country made in the autumn (end of October, or $m=10$) of a year t.[30]

Coefficient β_{40} in (8) tests whether specialists encompassed commission deficit forecasts before the SGP (1993–1998).[31] In turn, coefficients β_{41} and β_{42} measure the extent to which expert encompassing of EC forecasts changed during the old and reformed SGP period.

Table 7 displays the results of this test. The coefficient for $d_{EC,t,10}^{t+1}$, significant in all columns and robust for same-year forecasts, shows that market experts indeed encompassed EC forecasts in all sample countries and for their median pre-SGP (1993–1998). The value for Germany, for example, implies that German market experts enlarged their year-ahead deficit forecasts by 1.07 percent of GDP when the commission forecast went up by 1 percent of GDP. During both periods of the SGP, encompassing of commission forecasts increased significantly in Italy, but fell in Germany and for the median of all countries (in the latter, only during the first SGP).

The next test (convergence test) checks whether market and commission year-ahead forecasts converged over time. For that, the following regression is estimated:

$$d_{EC,t,10}^{t+1} - d_{i,t,11}^{t+1} = \begin{bmatrix} a_5 + \beta_{50}\left(d_{EC,t-1,10}^{t} - d_{i,t-1,11}^{t}\right) + \beta_{51}\left(\Delta y_{EC,t,10}^{t+1} - \Delta y_{i,t,11}^{t+1}\right) + \\ \beta_{52}\left(cpi_{EC,t,10}^{t+1} - cpi_{i,t,11}^{t+1}\right) + \beta_{53} sgp1_{t,11} + \beta_{54} sgp2_{t,11} + \varepsilon_{i,t,11} \end{bmatrix}, \quad (9)$$

[29] The encompassing test is also performed using OECD forecasts from Cimadomo (2007), who we thank for sharing the data. Some authors argue that the OECD is freer from political pressures from member states' fiscal authorities than the EC (Artis and Marcellino, 2001), which could affect forecast encompassing by the markets. Our main results, however, are robust to the use of OECD data.

[30] Given that annual (and not monthly) data frequency is used in (8), the number of observations is reduced by the factor twelve compared to those in the previous analyses. Moreover, sixty observations are available for the median of budget deficit forecasts covering each of the four countries in the sample between 1993 and 2007.

[31] Yet, in the case of strong persistence of market forecasts, the coefficient may simply suggest that they are highly correlated with the ECB forecasts given that both forecasters are estimating the same underlying variable.

where $d^{t}_{EC,t-1,10}$ is the EC previous-year deficit forecast for a particular country at the end of October ($m=10$) for a year t; $d^{t}_{i,t-1,11}$ is the market expert previous-year deficit forecast (in November, $m=11$) for a year t; $\Delta y^{t+1}_{EC,t,10}$ is the EC year-ahead real GDP growth forecast for a particular country in year t; and $cpi^{t+1}_{EC,t,10}$ is the EC year-ahead inflation forecast for a particular country in year t.

Equation (9) is estimated using two different versions of the differences between the commission and specialist forecasts. First, those differences are estimated in absolute values, testing for convergence between the two types of forecasters over time.[32] Second, equation (9) is estimated with the differences in levels, checking for the direction of the bias between market and Commission forecasts.[33]

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 the Commission and market expert deficit forecasts were highly significant pre-SGP.

The coefficient of the differences in absolute values of the lagged deficit forecasts between the two forecasters is significant for France, the United Kingdom, and the countries' median, indicating inertia in the divergence between the EC and market expert deficit forecasts in those countries. As expected, an increase in the divergence of real GDP growth forecasts between specialists and the commission augmented the divergence in the deficit forecasts for Germany, the United Kingdom, and the median of the countries.

The SGP dummies suggest that convergence in year-ahead deficit forecasts between markets and the commission during the first SGP went up in Italy but remained unaltered in the other countries. Thus, the commission and Italian market experts' fiscal forecasts seem to have increased convergence during the first phase of the SGP. During the reformed-SGP,

[32] In monetary economics Cukierman and Meltzer (1986) and Cukierman (1992) interpret more convergence between the forecasts of the central bank and those of private agents as a gain in credibility. 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.

[33] Christodoulakis and Mamatzakis (2009) 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 and others (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. Another factor that may explain commission forecast errors is the realism of the assumptions about the international economic environment (Melander, Sismanidis, and Grenouilleau, 2007). Keereman (2003) shows that the last reason may explain up to about 60 percent of the forecast error in EU year-ahead forecasts for GDP and inflation.

convergence increased in France, Italy, and the United Kingdom. In Germany, the over optimism of market experts in those periods seems to have deterred convergence.[34]

The last five columns of Table 8 show the estimates of the differences of (9) in levels. The significantly positive constant for the United Kingdom indicates a bias (optimistic) of expert forecasts toward lower deficits in percent of GDP than those forecasted by the commission 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 than the commission (see also Figure 7). For France, Italy, and for the median of countries no significant difference between market expert and commission forecasts is observed, indicating no bias among forecasters.

The differences in level of real GDP growth forecasts are significantly negative for all countries, except France. As expected, this finding indicates that when the commission was more optimistic about growth than experts, it also forecasted significantly lower year-ahead deficits.

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 contrast, in France, Italy, and the United Kingdom, previous market optimism pre-SGP seems to have turned to pessimism (compared to the forecasts of the commission). With the SGP reform, a (significant) optimistic bias is found again only in Germany, while in France and Italy, Wald tests (not shown here) indicate no significant differences (bias) between the two forecasters. As discussed above, this might be due to the higher convergence of their forecasts during this period in those two countries.

In sum, the results presented in this section suggests that the SGP led to an increase in the convergence between the commission fiscal forecasts and market experts in Italy during both periods and in France and the United Kingdom after its reform. Moreover, the Pact seems to have caused an increase in optimism of market expert forecasts compared to those of the commission in Germany.

B. National Fiscal Authorities

This section contrasts year-ahead forecasts of market experts with those of the national fiscal authorities or treasuries of our sample countries.[35] We retrieve the country authorities'

[34] This result may also suggest that the Commission has improved its forecasting methodologies owing to closer monitoring of countries after the reform of the SGP, or simply to learning by doing.

[35] These national fiscal authorities (NFAs) are the following: (i) *Ministère de l'Economie, 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* (United Kingdom).

forecasts (publicly available since 1999) from their Stability and Convergence Programme reports sent yearly to the European Commission.[36]

Figure 8 displays a first comparison of those forecasts. The expert year-ahead deficit predictions appear to be correlated with those of the NFAs. Yet, expert forecasts are visually higher than those of the NFAs for the three countries in the euro area, indicating already overly optimistic forecast biases of those treasuries (compared to market expert forecasts).[37]

As in the previous section, this issue is analyzed in more detail by first running an encompassing test, now using NFA (instead of Commission) year-ahead deficit forecasts for the reduced time sample between 1999 and 2007:

$$d_{i,t,1}^{t+1} = a_6 + \beta_{60} d_{j,t,1}^{t+1} + \beta_{61} d_{j,t,1}^{t+1} \times sgp2_{t,1} + \varepsilon_{i,t,1}. \qquad (10)$$

In (10) $j = \left[France, Germany, Italy, United\ Kingdom, \overline{NFA} \right]$ identifies each country's NFA and the median of all countries ($\overline{NFA}$); $d_{j,t,1}^{t+1}$ corresponds to the year-ahead deficit forecast provided by an NFA j in January ($\mathrm{m} = 1$) of a particular year $1999 \le t \le 2007$.[38] 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 experts changed their encompassing of NFA deficit forecasts after the reform of the Pact.

The results of this test are shown in Table 9. For all countries as well as for their median, the significant coefficient of $d_{j,t,1}^{t+1}$ suggests that market experts have encompassed NFA deficit forecasts during the first version of the SGP (1999–2005). The encompassing value of NFA

[36] These reports are usually sent to the European Commission at the end of the previous year (December) or the beginning of January of the year in analysis. Then, the European Commission analyzes the programs and makes its evaluations public around February of the same year. The sample period in this section, thus, spans from January 1999 to January 2007. Both reports—the SCP and commission assessments—are available at http://ec.europa.eu/economy finance/sg pact fiscal policy/sg programmes9147 en.htm.

[37] Accordingly, Strauch, Hallerberg, and von Hagen (2004) analyze the performance of budgetary balance and economic growth forecasts made in 126 SCPs 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, the need for convergence to reach the budgetary reference value of the Maastricht Treaty was associated with more restrictive fiscal projections in program starting before 1998, whereas election cycles played a stronger role thereafter.

[38] 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 ($\mathrm{m} = 1$) of a year $1999 \le t \le 2007$. In turn, $d_{\overline{NFA},t,1}^{t+1}$ 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.

deficit forecasts by market experts seems to have fallen significantly only in Germany during the reformed SGP, but remained the same in all other countries.[39]

Next, the Convergence and Unbiasedness tests are applied for the NFA' forecasts as follows:

$$d_{j,t,1}^{t+1} - d_{i,t,1}^{t+1} = \begin{bmatrix} a_7 + \beta_{70}\left(d_{j,t-1,1}^{t} - d_{i,t-1,1}^{t}\right) + \beta_{71}\left(\Delta y_{j,t,1}^{t+1} - \Delta y_{i,t,1}^{t+1}\right) + \\ \beta_{72}\left(cpi_{j,t,1}^{t+1} - cpi_{i,t,1}^{t+1}\right) + \beta_{73} sgp1_{t,1} + \beta_{74} sgp2_{t,1} + \varepsilon_{i,t,1} \end{bmatrix}, \quad (11)$$

where t covers again the time span between 1999 and 2007; $d_{j,t-1,1}^{t}$ is the j NFA previous-year deficit forecast for a year t; $d_{i,t-1,1}^{t}$ is the market expert previous-year deficit forecast (in January, $\mathrm{m} = 1$) for a year t; $\Delta y_{j,t,1}^{t+1}$ is the j NFA year-ahead $(t+1)$ real GDP growth forecast in year t; and $cpi_{j,t,1}^{t+1}$ is the j NFA year-ahead inflation forecast for a particular country in year t.

Again, we estimate (11) in two ways: one with the differences in absolute values (Convergence test); and the other using their levels (Unbiasedness test). The results of both tests are found 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 experts during SGP's first version.

In addition, only in the United Kingdom, where the sanctions of the SGP are not applicable, the convergence of their NFA fiscal forecasts with the market forecasts seems to have significantly 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. This suggests that during the first version of the SGP (1999–2005) market specialists in those countries significantly predicted higher year-ahead deficits than the NFAs (markets' pessimistic bias). In the United Kingdom no bias is observed between the NFA and expert forecasts.

In turn, an increase in the (positive) difference of real GDP growth forecasts between the NFAs of France, Italy, the United Kingdom, and the countries' median and that of market experts marginally pushed the pessimistic bias of market expert fiscal forecasts up (compared to those of the respective NFAs). This again indicates that the higher optimism about growth

[39] A Wald test of significance of coefficients (not shown here) indicates that the sum of $d_{j,t,1}^{t+1} + d_{j,t,1}^{t+1} \times sgp2_{t,1}$ is significantly different from zero for all countries.

for the NFAs partially explains the lower year-ahead deficit forecasts of those authorities relative to the market forecasts.[40]

In addition, the positive and significant coefficient of $sgp2_{t,1}$ for France and Germany conveys that the magnitude of market forecast bias was significantly smaller in those countries during the reformed Pact. However, even though the bias coefficients statistically change in France and Germany during that period, no significant bias is found for any of the countries in the sample.[41]

Overall, the analysis in this section suggests a divergence between the NFA year-ahead deficit forecasts and the market experts forecasts in most of the countries in our sample. A significant convergence is, however, obtained for the median of all countries during both periods of the SGP. Moreover, during the reformed SGP, the convergence between Her Majesty's (HM) Treasury fiscal forecasts and those of the British market experts increased, even though the United Kingdom is not subject to the sanctions under the Pact.

V. CONCLUSION

Economic literature on fiscal rules argues that one of the main motivations for their implementation is the information and signal they provide to financial markets on a fiscal authority's commitment to fiscal discipline. This paper investigates the issue 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 the United Kingdom between 1993 and 2007 (pre-crisis period).

More specifically, Consensus Economic Forecast survey data on budget deficit forecasts is used to test whether the SGP increased accuracy and reduced bias among market forecasters compared to the realized values. In addition, convergence among market expert fiscal forecasts and those of the European Commission and the national fiscal authorities are tested during the two periods of the SGP.

Overall, the analysis suggests that in France accuracy of deficit forecasts by market experts significantly increased after the implementation of the SGP. Yet, the heightened monitoring of fiscal figures on account of SGP requirements seems not to have been sufficient to make market forecasts more accurate in the other countries analyzed.

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[40] Accordingly, Jonung and Larch (2006) find that in three of the four largest EU countries the ex ante assessment of potential GDP growth has generally been more optimistic than on an ex post basis (particularly in Germany and Italy). In Jonung and Larch's estimations, only the United Kingdom Treasury appears to have followed a somewhat more prudent approach when assessing the medium-term growth outlook of its economy.

[41] This finding comes from a Wald test of coefficient restrictions (not shown here) testing whether $\alpha_7 + \beta_{74} sgp2_{t,1} \neq 0$.

In turn, convergence between the European Commission and the market experts deficit forecasts have increased in most of the countries (France, Italy, and the United Kingdom) during the SGP, particularly after the SGP reform in 2005. Nevertheless, with the exception of the United Kingdom, our findings indicate that convergence between the national fiscal authorities (NFA) fiscal forecasts and market experts did not increase during the Pact. Market experts were also more pessimistic than the NFAs on fiscal figures, mainly owing to the overly optimistic predictions of those authorities (Strauch, Hallerberg, and von Hagen, 2004, and Jonung and Larch, 2006).

These findings call for adoption of additional measures by the European (national and supranational) fiscal authorities to strengthen their fiscal planning and make forecasts more accurate. In this sense, accurate projections on growth and inflation are important. In addition, projections could also present a menu of the more interesting and relevant adjustments and show how other aspects of the macroeconomy are likely to evolve under each adjustment (Leeper, 2009). Particularly for the forecasts at the national level, independent and nonpartisan government agencies also could be established or enhanced (see Jonung and Larch, 2006; IMF, 2008a; IMF 2010; Debrun, Hauner, and Kumar, 2009).

This analysis offers various other possibilities for further research. For example, the signaling effects of SGP implementation could be tested in more detail. It would also be interesting to compare how forecasts of fiscal variables by market participants have changed in other OECD countries when compared to our sample countries. That would give a broader perspective to the European experience with the SGP, and show whether the improvement in fiscal forecasts was indeed an SGP effect or just a trend among advanced economies in the period investigated.

TABLES AND FIGURES

Table 1. Average of the Key Variables, May 1993—Dec 2007
(in percent, unless otherwise specified)[a]

Country	France			Germany			Italy			United Kingdom		
Time period	93_98	99–07	93–07	93–98	99–07	93–07	93–98	99–07	93–07	93–98	99–07	93–07
Total budget deficit forecast (annual)[b]												
Same-year	3.74	2.51	2.99	3.29	2.34	2.71	6.02	2.63	3.94	3.15	1.42	2.09
Year-ahead	3.35	2.39	2.76	3.05	2.08	2.46	5.62	2.50	3.72	2.53	1.65	2.02
Actual budget deficit[c]	4.44	2.60	3.31	2.75	2.61	2.66	5.90	2.59	3.77	3.87	1.46	2.15
Real GDP growth forecast (annual)												
Same-year	1.82	2.03	1.96	1.28	1.56	1.50	1.44	1.72	1.53	2.29	2.58	2.44
Year-ahead	2.29	2.34	2.38	2.06	1.97	2.01	1.96	2.56	2.08	2.47	2.55	2.50
Actual growth rate[c]	1.70	2.14	1.97	1.43	1.50	1.47	1.35	1.47	1.42	3.13	2.79	2.93
Three-month interest rate forecast												
Same-year	3.89	3.18	3.72	4.39	3.21	3.59	3.21	6.37	4.94	6.36	4.94	5.51
Year-ahead	3.57	3.38	3.77	4.39	3.45	3.76	3.47	6.08	4.89	6.60	5.08	5.67
Actual interest rate[d]	5.30	3.22	3.89	4.54	3.22	3.65	3.03	8.24	4.95	6.39	4.92	5.50
CPI growth rate forecast (annual)												
Same-year	1.73	1.56	1.62	2.29	1.55	1.80	2.14	3.57	2.67	2.30	2.65	2.44
Year-ahead	1.94	1.51	1.67	2.23	1.55	1.80	1.91	2.89	2.44	3.28	2.35	2.68
Actual CPI growth[c]	1.38	2.07	1.68	1.45	1.78	1.73	3.43	2.59	2.72	2.07	1.68	1.97
T-Bill forecast (annual)												
Same-year	6.34	4.49	5.23	6.15	4.43	5.12	8.99	4.59	6.35	7.38	4.88	5.88
Year-ahead	6.34	4.71	5.36	6.39	4.68	5.36	8.67	4.80	6.35	7.50	4.99	5.99
Actual T-Bill[c]	6.23	4.39	5.16	7.05	4.54	5.60	8.77	4.56	6.40	7.33	4.80	5.84

Sources: Consensus Economics (2008); [c] IMF (2008b), and [d] OECD (2008).

Notes: [a] Actual values corresponds to yearly averages between 1993 and 2007. [b] Values in percent of GDP. For France and Germany, total deficit is accounted in the calendar year. The revenues 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 for in the fiscal year. For the United Kingdom, budget 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).

Table 2. List of Variables for the Estimations (in alphabetical order)

$\Delta y_{EC,t,10}^{t+1}$	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 (Δy) 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 countries median) 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 countries median) 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 a percentage 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 countries median) in a year *t*.
$d_{j,t-1,1}^{t}$	Previous-year deficit forecast of a national fiscal authority for a particular country (or countries median) 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 (same-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*.
$I\left(\Delta y_{i,t,m}^{t+h}\right)$	Indicator function that equals *1* whenever $f_{i,t,m}^{\Delta y_t}$ $\left(f_{i,t,m}^{\Delta y_{t+1}}\right)$ 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: *1* between July 2005 and December 2007; and *0* otherwise.

Table 3. Tests for Unbiasedness, Nonlinear Unbiasedness, and Weak Efficiency, May 1993–Dec 2007

	Same-Year Forecasts				Year-Ahead Forecasts			
Variables	France	Germany	Italy	U.K.	France	Germany	Italy	U.K.
Unbiasedness test								
α_0	-0.32***	0.07*	-0.09**	-0.41***	-0.27***	0.02	0.13	-0.02
	(7.65)	(1.96)	(2.50)	(8.71)	(3.66)	(0.35)	(1.38)	(0.17)
Nonlinear unbiasedness test								
α_1	-0.20***	-0.04	-0.21***	-0.47***	-0.45***	-0.30***	-0.03	-0.34***
	(4.02)	(1.47)	(4.27)	(8.17)	(4.51)	(3.13)	(0.24)	(3.57)
β_1	-0.27***	0.24***	0.23***	0.25***	0.40***	0.60***	0.39***	1.03***
	(3.82)	(3.69)	(3.90)	(3.79)	(4.21)	(5.81)	(2.97)	(7.95)
$\alpha_1 + \beta_1 < 0$ [a]	0.99	0.00	0.67	0.99	0.19	0.00	0.00	0.00
Weak efficiency test								
α_2	1.01***	0.74***	0.37***	0.40***	1.44***	2.19***	0.36**	1.10***
	(14.01)	(21.68)	(6.48)	(10.83)	(13.74)	(31.39)	(2.38)	(18.16)
β_2	0.60***	0.75***	0.89***	0.71***	0.45***	0.17***	0.94***	0.48***
	(31.20)	(36.06)	(79.49)	(57.82)	(17.09)	(6.05)	(35.33)	(27.37)
$\beta_2 = 1$ [b]	0.00	0.00	0.00	0.00	0.00	0.00	.02	0.00
Observations	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 1, 5 and 10 percent respectively. [a] t-Test under the null hypothesis that $\alpha_1 + \beta_1 < 0$. [b] t-Test under the null hypothesis that $\beta_2 = 1$.

Table 4. *RMSE* of the Same-Year Forecast for Budget Deficit, 1994–2007

	France	Germany	Italy	U.K.
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 Equation (6) for h = 0. $Theil-U=\frac{\overline{RMSE}_{may1993-jun1998}}{\overline{RMSE}_{jul1998-dec2007}}$ 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, 1994–2007

	France	Germany	Italy	U.K.
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 Equation (6) for h = 1. $Theil-U=\frac{\overline{RMSE}_{may1993-jun1998}}{\overline{RMSE}_{jul1998-dec2007}}$ 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–December 2007

	Absolute Forecast Error				Forecast Error			
Country	France	Germany	Italy	U.K.	France	Germany	Italy	U.K.
Constant	0.20***	0.17***	0.32***	0.10***	-0.01	-0.02	0.13***	-0.23***
	(5.80)	(5.88)	(5.29)	(2.30)	(0.62)	(0.56)	(2.17)	(4.52)
Lagged dependent variable $\left(e^{t}_{i,t,m-1}\right)$	0.87***	0.77***	0.69***	0.88***	0.87***	0.79***	0.77***	0.86***
	(67.57)	(50.02)	(23.26)	(95.83)	(73.94)	(54.54)	(34.43)	(68.08)
Output forecast error	0.08***	0.17***	-0.09***	0.11***	-0.11***	-0.17***	-0.19***	-0.15***
	(4.59)	(10.89)	(4.43)	(4.95)	(8.45)	(11.59)	(5.88)	(6.68)
Inflation forecast error	0.10***	0.04***	0.20***	0.05***	0.09***	0.13***	0.17***	0.16***
	(4.94)	(2.11)	(7.99)	(2.65)	(5.31)	(6.54)	(5.01)	(6.38)
Interest rate forecast error	0.01**	-0.01	0.05***	0.00	0.02***	0.02	0.07***	-0.17***
	(2.01)	(0.55)	(2.84)	(0.06)	(2.63)	(1.30)	(3.20)	(8.51)
Bond forecast error	0.00	-0.02	-0.05**	0.00	0.03***	0.01	-0.02	0.08***
	(0.32)	(1.28)	(3.15)	(0.05)	(3.68)	(0.97)	(1.07)	(4.73)
Month trend	-0.01***	-0.02***	-0.04***	-0.02***	0.00	0.00	-0.01*	-0.02***
	(4.12)	(8.41)	(8.52)	(3.85)	(0.89)	(0.36)	(1.89)	(3.98)
Election dummy	0.01	-0.10***	0.17*	0.03	-0.03	-0.08***	0.20***	0.10***
	(0.49)	(5.40)	(3.82)	(1.61)	(1.51)	(3.62)	(5.05)	(4.30)
SGP phase I dummy $\left(sgp1_{i,t,m}\right)$	-0.06***	0.00	0.22	0.03	0.12***	0.02	-0.01	0.20***
	(4.27)	(0.02)	(6.37)	(1.23)	(4.85)	(1.01)	(0.12)	(6.03)
Reformed SGP dummy $\left(sgp2_{i,t,m}\right)$	-0.05**	0.13***	0.25***	-0.04	0.20***	0.09***	0.14***	0.11***
	(2.20)	(5.16)	(4.99)	(1.23)	(7.64)	(3.56)	(3.19)	(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)[a]	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 1, 5 and 10 percent respectively. [a] 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	U.K.	Median[a]
Constant	0.93***	0.09***	0.06	0.52***	0.66***
	(15.00)	(2.06)	(0.42)	(11.36)	(7.81)
$d^{t+1}_{EC,t,10}$	0.65***	1.07***	0.98***	0.69***	0.84***
	(32.03)	(56.90)	(43.47)	(50.80)	(9.27)
$d^{t+1}_{EC,t,10} \times sgp1_{t,11}$	0.01	-0.17***	0.08	0.18***	-0.23***
	(0.69)	(11.63)	(1.27)	(7.49)	(2.71)
$d^{t+1}_{EC,t,10} \times sgp2_{t,11}$	0.04	-0.21***	0.08*	0.06***	-0.10
	(1.64)	(11.40)	(1.79)	(2.64)	(1.12)
Observations (no. of Groups)	254 (33)	338 (43)	173 (33)	363 (61)	60 (4)
Test: Fixed effects (F-value)[b]	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 1, 5 and 10 percent respectively. [a] Estimation using the median value of all countries. [b] The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

Table 8. Convergence Test: Difference of Specialists' and European Commission's Year-Ahead Forecasts for Budget Deficit, 1993–2007

	Difference in Absolute Values					Difference in Levels				
	France	Germany	Italy	U.K.	Median[a]	France	Germany	Italy	U.K.	Median[a]
Constant	0.38***	0.21***	0.78***	0.48***	0.52***	0.10	-0.16***	0.08	0.27***	-0.07
	(4.68)	(4.95)	(6.08)	(6.77)	(2.89)	(1.61)	(3.45)	(0.45)	(3.45)	(0.48)
$d^{t}_{EC,t-1,10} - d^{t}_{i,t-1,11}$	0.24***	0.01	-0.01	0.31***	0.24***	0.21***	0.01	-0.02	0.36***	0.37***
	(3.78)	(0.08)	(0.05)	(4.45)	(2.80)	(4.53)	(0.10)	(0.26)	(6.44)	(4.72)
$\Delta y^{t+1}_{EC,t,10} - \Delta y^{t+1}_{i,t,11}$	-0.05	0.26***	-0.08	0.13***	0.37**	-0.13	-0.23***	-0.46**	-0.24***	-0.55***
	(0.36)	(2.55)	(0.28)	(1.36)	(2.21)	(1.27)	(2.79)	(2.29)	(3.72)	(3.33)
$cpi^{t+1}_{EC,t,10} - cpi^{t+1}_{i,t,11}$	-0.10	0.03	-0.35*	-0.10	-0.16	0.03	0.11	0.46**	-0.09	0.12
	(0.69)	(0.42)	(1.79)	(1.32)	(0.91)	(0.22)	(1.24)	(2.34)	(1.43)	(0.77)
$sgp1_{t,11}$	-0.07	0.01	-0.25***	-0.02	-0.22	-0.19***	0.35***	-0.32**	-0.67***	-0.07
	(1.07)	(0.32)	(2.79)	(0.24)	(1.24)	(2.78)	(6.36)	(2.10)	(5.77)	(0.38)
$sgp2_{t,11}$	-0.14**	0.07*	-0.25***	-0.28***	-0.14	-0.09	0.34***	-0.30**	0.01	0.09
	(2.19)	(1.68)	(2.67)	(3.94)	(0.84)	(0.97)	(4.83)	(2.03)	(0.12)	(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)[b]	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 1, 5 and 10 percent respectively.

[a] Estimation using the median value of all countries. [b] 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 the National Fiscal Authorities: Year-Ahead Expected Deficit, 1999–2007

	France	Germany	Italy	U.K.	Median[a]
Constant	0.30***	0.09	1.22***	0.01	1.23
	(3.26)	(0.63)	(7.90)	(0.09)	(1.55)
$d_{j,t,1}^{t+1}$	1.06***	1.14***	0.62***	1.15***	0.55
	(23.51)	(18.54)	(6.64)	(21.30)	(0.89)
$d_{j,t,1}^{t+1} \times sgp2_{t,1}$	0.03	-0.19***	0.26***	0.07	0.03
	(1.09)	(5.53)	(3.68)	(1.14)	(0.08)
Observations (no. of groups)	98 (22)	174 (35)	92 (26)	153 (44)	32 (4)
Test: Fixed effects (F-value)[b]	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 New ey-West Panel estimator w ith cross-fixed effects. Values in parentheses report t-statistics. ***, **, and * indicate significance at 1, 5 and 10 percent respectively. [a] Estimation using the median value of all countries. [b] The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

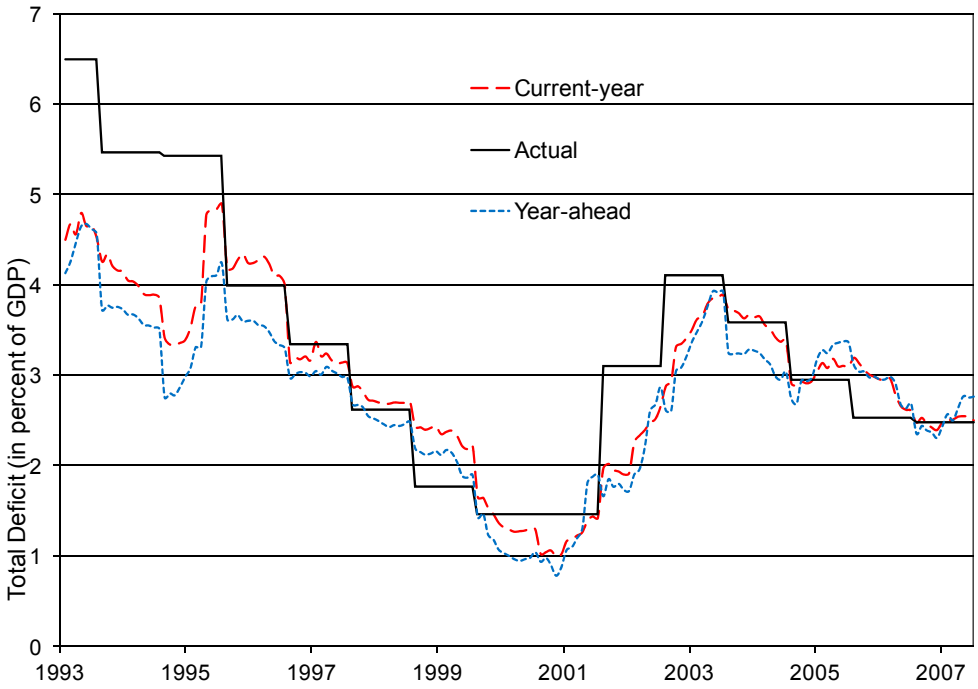
Table 10. Convergence Test: Difference of Specialists' and National Fiscal Authorities' Year-Ahead Forecasts for Budget Deficit, 1999–2007

	Difference in Absolute Values					Difference in Levels				
	France	Germany	Italy	U.K.	Median[a]	France	Germany	Italy	U.K.	Median[a]
Constant	0.30***	0.27***	0.46**	0.39***	0.34	-0.18**	-0.17***	-0.34**	0.08	-0.36***
	(3.31)	(7.12)	(2.76)	(4.69)	(1.53)	(3.58)	(4.62)	(2.78)	(1.01)	(3.27)
$d^{t}_{j,t-1,1} - d^{t}_{i,t-1,1}$	-0.05	0.01	-0.06	0.14	0.07	-0.08	0.07	-0.04	-0.17	0.19***
	(0.32)	(0.15)	(0.43)	(1.33)	(.62)	(0.92)	(0.76)	(0.34)	(1.65)	(2.95)
$\Delta y^{t+1}_{j,t,1} - \Delta y^{t+1}_{i,t,1}$	0.07	0.07	0.25	0.01	0.37	-0.29***	-0.08	-0.32***	-0.25***	-0.69***
	(0.46)	(1.48)	(1.43)	(0.15)	(0.85)	(2.71)	(1.63)	(2.62)	(4.36)	(2.38)
$cpi^{t+1}_{j,t,1} - cpi^{t+1}_{i,t,1}$	-0.34*	0.02	0.37	0.07	0.59	-0.23	-0.11*	0.54*	0.34*	-0.22
	(1.90)	(0.29)	(1.20)	(0.52)	(0.37)	(1.42)	(1.82)	(1.92)	(1.73)	(0.57)
$sgp2_{t,1}$	-0.08	-0.07	-0.11	-0.15**	-0.06	0.20**	0.25***	0.15	-0.09	0.11
	(1.39)	(1.58)	(0.96)	(2.48)	(0.72)	(2.37)	(3.60)	(0.91)	(0.69)	(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)[b]	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 New ey-West estimator w ith cross-fixed effects. Values in parentheses report t-statistics. ***, **, and * indicate significance at 1, 5 and 10 percent respectively.

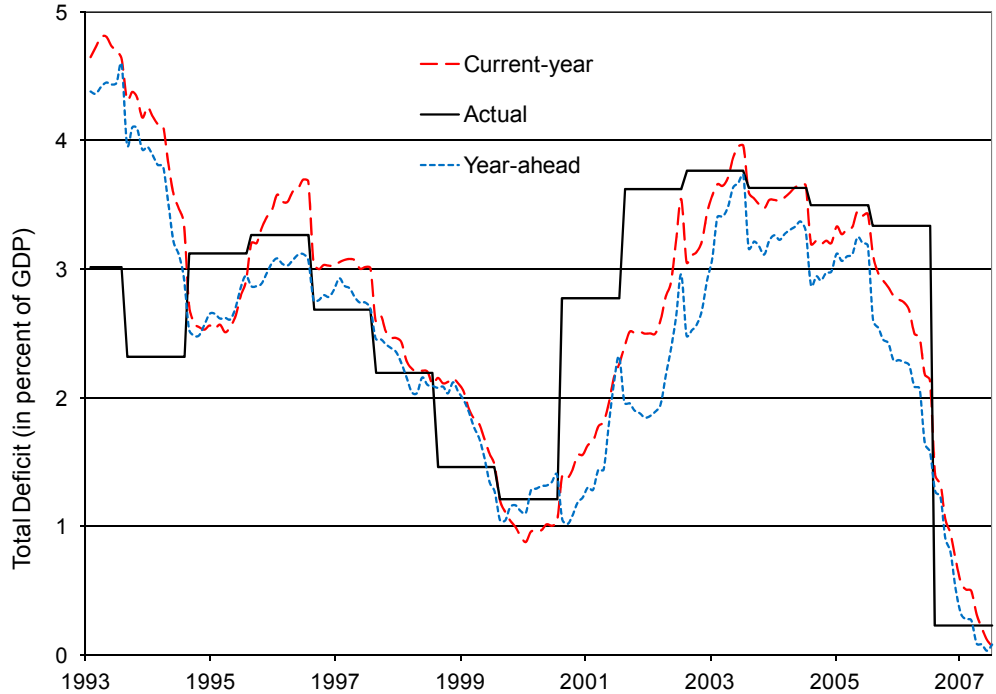
[a] Estimation using the median value of all countries. [b] The null hypothesis of a common constant for all forecasters of the Fixed-effects test can be rejected in all specifications.

Figure 1. France: Actual and Forecasted Budget Deficit,
May 1993–December 2007



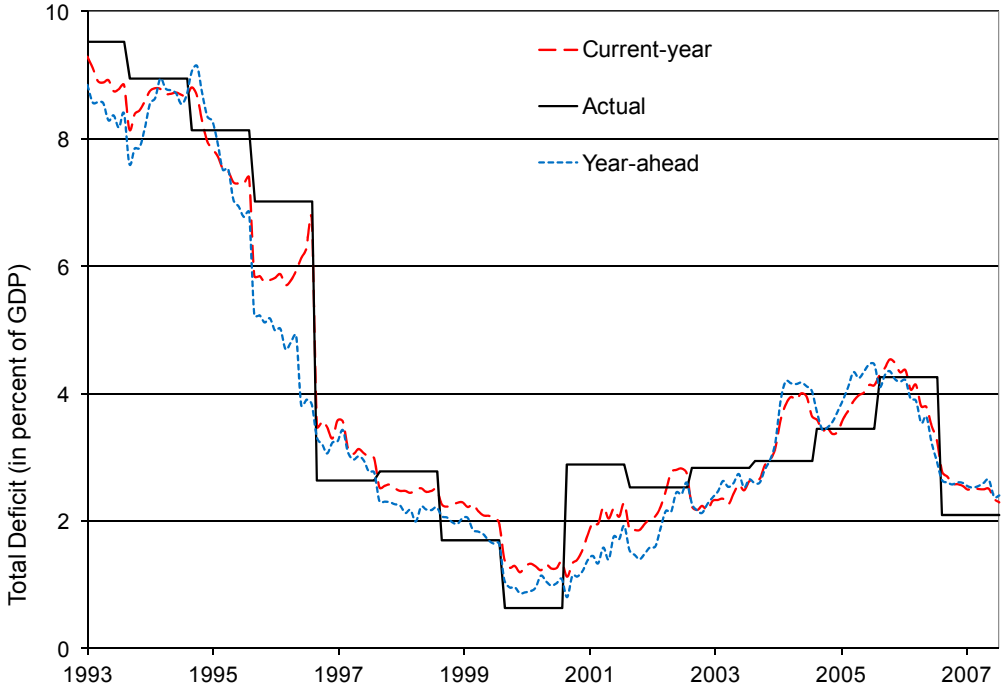
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 2. Germany: Actual and Forecasted Budget Deficit,
May 1993–December 2007



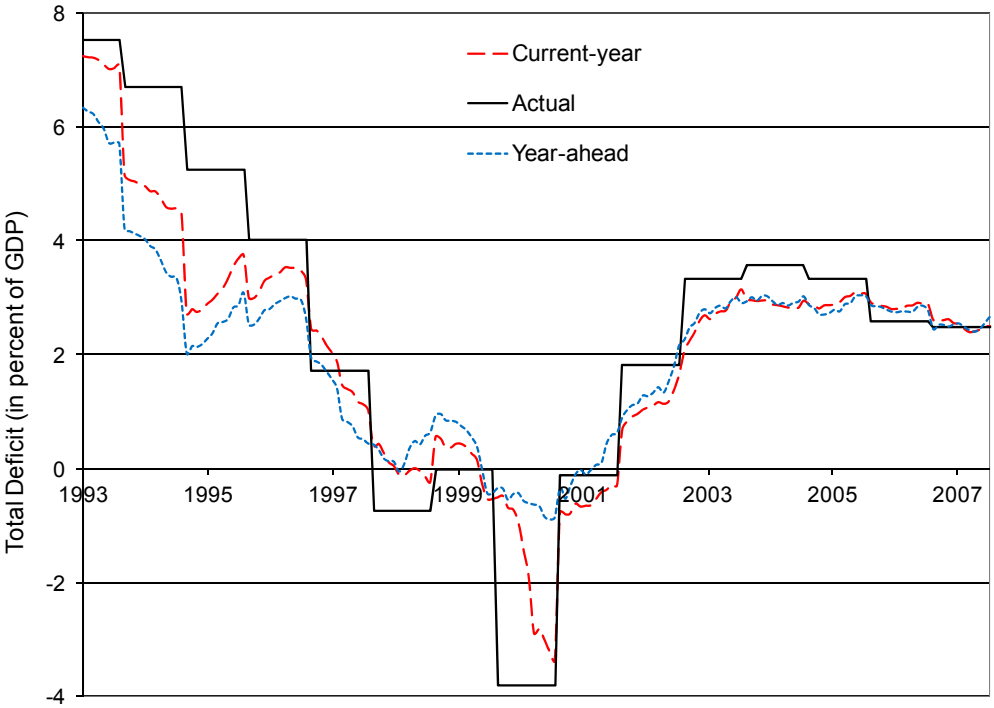
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 3. Italy: Actual and Forecasted Budget Deficit,
May 1993–December 2007



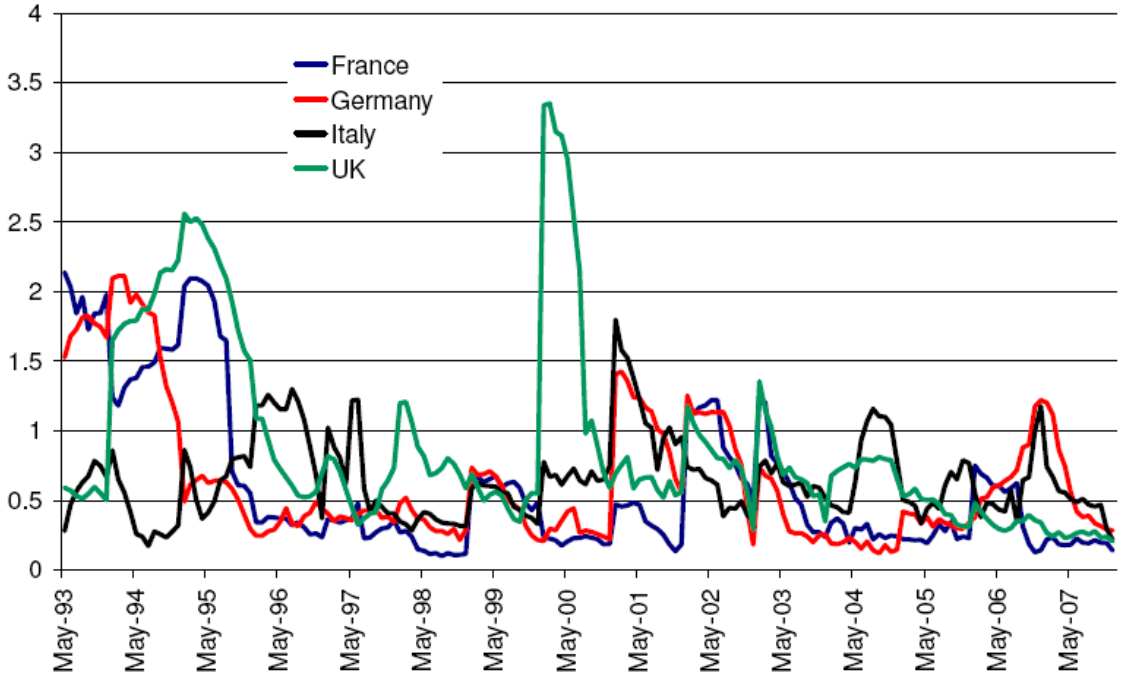
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 4. United Kingdom: Actual and Forecasted Budget Deficit,
May 1993–December 2007



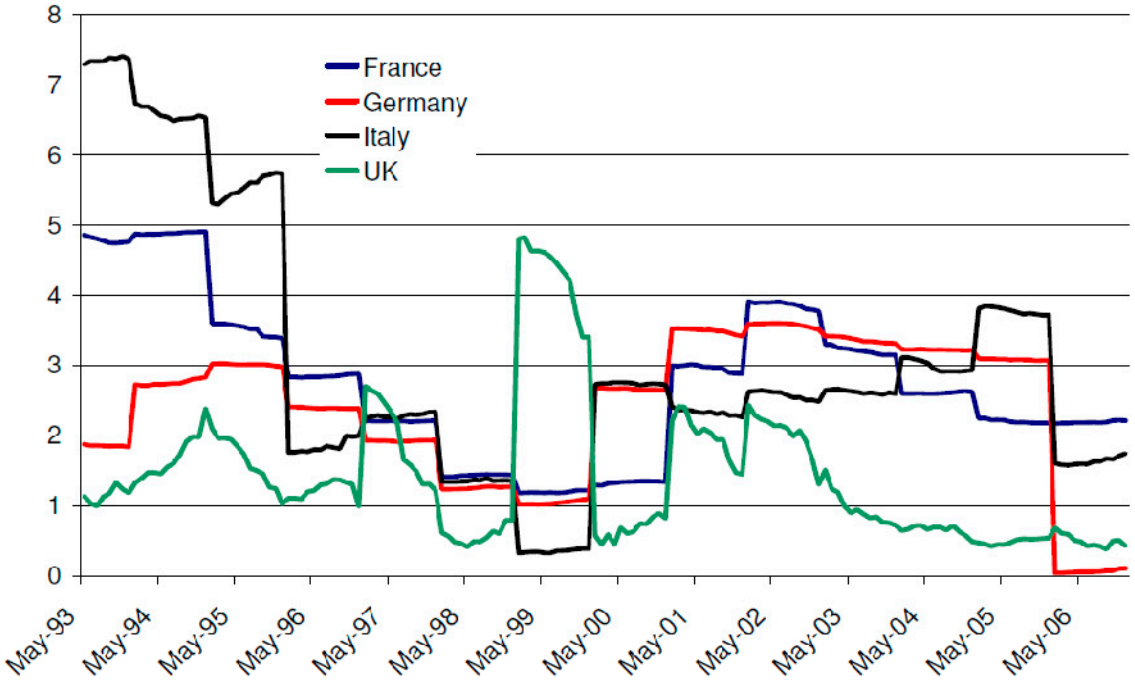
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 5. *RMSE* for the Same-Year Forecasts of Budget Deficit, May 1993–December 2007



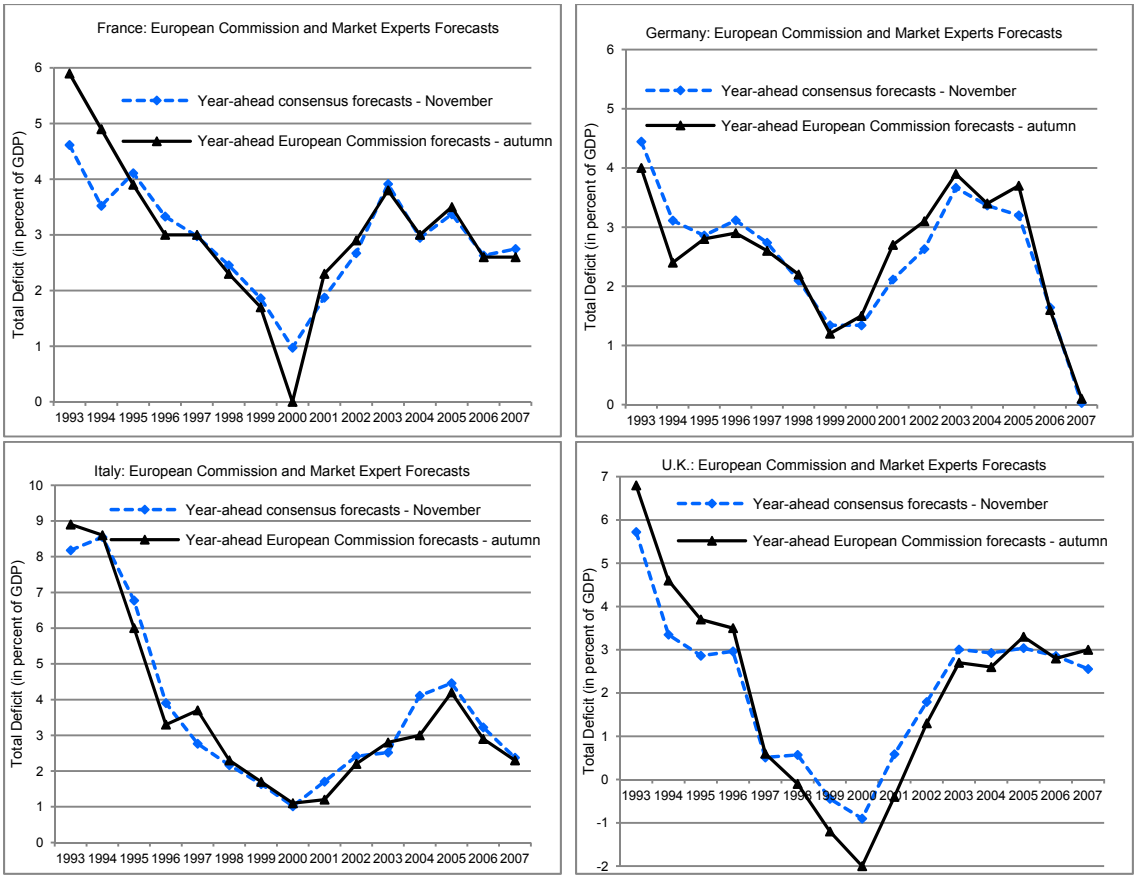
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 6. *RMSE* for the Year-Ahead Forecasts of Budget Deficit, May 1993–December 2007



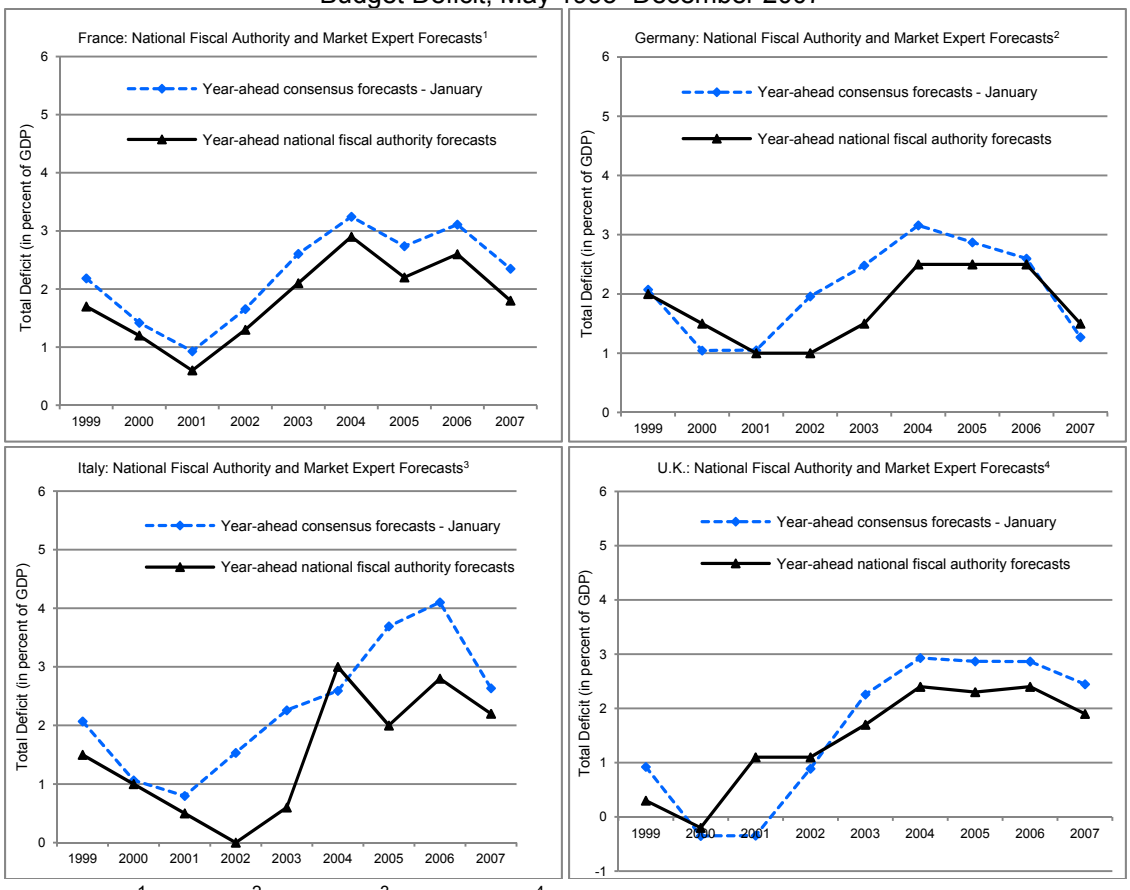
Source: Consensus Economics (2008), IMF (2008b), and authors' calculations.

Figure 7. European Commission and Market Experts Year-Ahead Forecasts of Budget Deficit, May 1993–December 2007



Sources: European Commission (2006) and (2007), Melander et al. (2007), and Consensus Economics (2008).

Figure 8. National Fiscal Authorities and Market Experts Year-Ahead Forecasts of Budget Deficit, May 1993–December 2007



Sources: [1] French, [2] German, [3] Italian, and [4] British Stability and Convergence Programme reports (several years); Consensus Economics (2008); and authors' calculations.

APPENDIX

Calculation of the Forecasted Total Deficit as a Percentage of GDP

The expected nominal GDP forecast of forecaster i is calculated at month m and year t given its GDP and CPI forecasts. For the same-year forecast, the expected nominal GDP is computed at the end of the respective year as:[42]

$$y_{i,t,m}^{t} = y_{t}^{nom} \times \left(1 + \Delta y_{i,t,m}^{t} + cpi_{i,t,m}^{t}\right).$$

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

The realized nominal GDP (y_{t}^{nom}) is obtained from the IMF (2008b). As a robustness check, the nominal GDP known at year $t-1$ is also used to account for different time horizons and the real-time database 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, the same-year expected total deficit in terms of GDP, $d_{i,t,m}^{t}$, is constructed as:[43]

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

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

Analogously, for the year-ahead forecast, the GDP and CPI forecasts for the current and the next year are employed to calculate the expected nominal GDP at the end of the next year.

[42] The same procedure has been applied by Heppke-Falk and Hüfner (2004).

[43] By doing this calculation, def_{t} is assumed not to be correlated with y_{t+k}^{nom} for $k > 0$.

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