How Accurate Are Private Sector Fiscal Forecasts? Evidence from the Great Recession*

Zidong An† João Tovar Jalles‡ Prakash Loungani§ Ricardo Sousa¶

Abstract

We assess the quality of forecasts of the government budget balance made by the private sector for nine advanced economies between 1993 and 2013, with a special focus on the Great Recession period. Private sector forecasts tend to be optimistic; that is, they start out forecasting that the balance will be higher than the eventual outcome. Fiscal forecasts display information rigidity, a feature of forecasts emphasized by Coibion and Gorodnichenko (2012). This information rigidity—namely, the tendency to smooth forecast revisions—proves costly around turning points, as illustrated in this paper using forecasts made during the Great Recession.

JEL codes: C53, E27, E37, E62, D8
Keywords: Great Recession, forecast accuracy, bias, efficiency, information rigidity.

1. Introduction

Governments are often thought to be under pressure to produce forecasts of the budget balance that are too optimistic. Using data for official government forecasts in 33 countries, Frankel (2011) found that the outcome for fiscal balances tends to be lower than initially forecast, i.e., there is a bias towards optimism. Similar results have been found in other studies (see Leal et al., 2008). The findings of bias have prompted calls that fiscal forecasts should be produced by independent agencies or that government forecasts should be complemented by private sector forecasts, which are less likely to be subject to political pressures (Frankel and Schreger, 2014).

The recommendation for using private sector fiscal forecasts leads to an obvious question: how good are these forecasts? This paper builds on the work of Jalles et al. (2015) in assessing the quality of private sector fiscal forecasts. It extends that work by looking at individual countries instead of an aggregate for all advanced countries and by expanding the data set to cover the important period of the Great Recession. The forecasts are taken from the publication *Consensus Economics* and are available for nine advanced economies between 1993 and 2013.

Our main findings can be summarized as follows. First, we show that private sector budget balance forecasts typically display bias towards 'optimism' but the extent of the bias differs across countries. Second, we find that budget balance forecasts exhibit 'information rigidity'; that is, revisions to forecasts tend to be smooth. This tendency proves costly around turning points in the economy, which we illustrate here using the forecast errors made during the Great Recession.

The remainder of the paper is organized as follows. Section 2 describes our data. In Section 3, we discuss the methodology and present the main results. Section 4

*The views expressed are those of the presenters and do not necessarily reflect those of the International Monetary Fund. The usual disclaimer applies. Ricardo Sousa acknowledges support by Operational Programme for Competitiveness Factors - COMPETE and by National Funds through the FCT - Portuguese Foundation for Science and Technology within the remit of the project FCOMP-01-0124-FEDER-037268 (PEst-C/EGE/UI3182/2013).

†American University, College of Arts and Sciences, 4400 Massachusetts Avenue, NW, Washington, DC 20016, USA. Email: zidong.an@gmail.com.

‡International Monetary Fund, Fiscal Affairs Department, 700 19th street NW, 20431 Washington DC, USA. email: jjalles@imf.org.

§International Monetary Fund, Research Department, 700 19th street NW, 20431 Washington DC, USA. email: ploungani@imf.org.

¶University of Minho, Department of Economics and Economic Policies Research Unit (NIPE), Campus of Gualtar, 4710-057 - Braga, Portugal; London School of Economics and Political Science, LSE Alumni Association, Houghton Street, London WC2A 2AE, United Kingdom. E-mails: rjsousa@eeg.uminho.pt, rjsousa@alumni.lse.ac.uk.

takes a closer look at the Great Recession period. The last section concludes.

2. Data and summary statistics

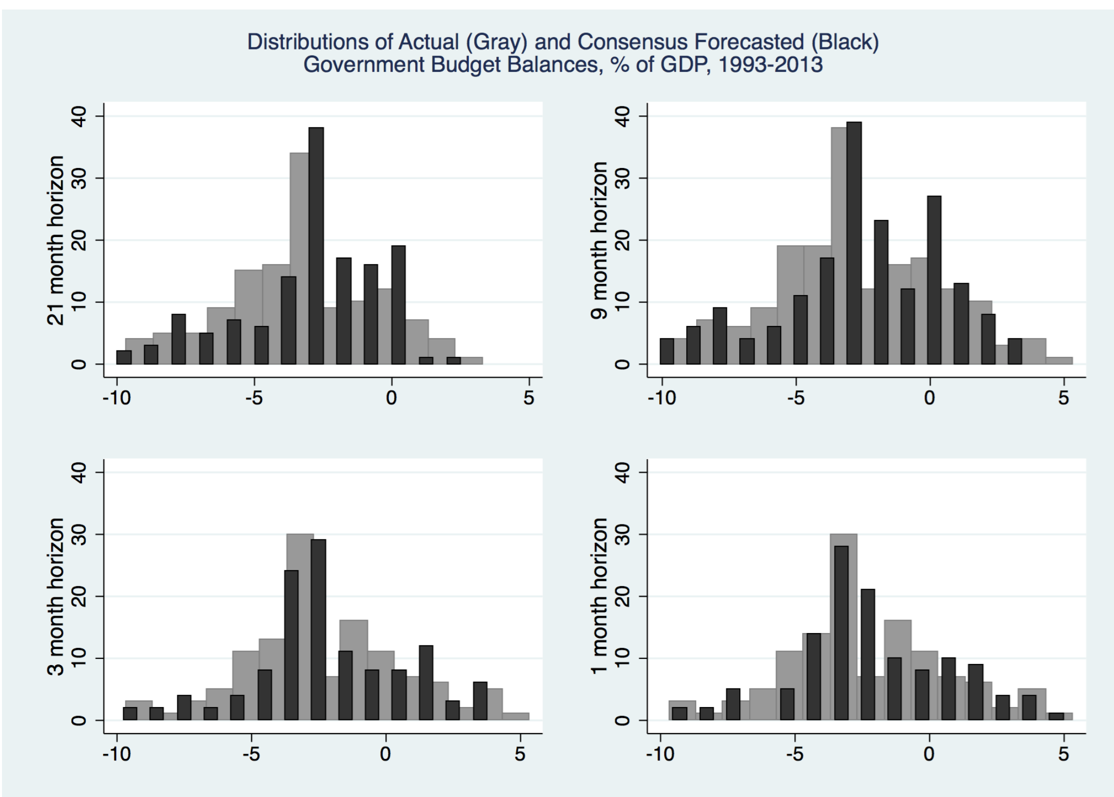
Consensus Economics provides individual country forecasts of several macroeconomic variables, including the annual budget balance for the current year and the year ahead, at the monthly frequency since 1989. Thus, for each year, there is a sequence of 24 forecasts: (i) the first twelve made during the previous year, i.e., the year-ahead forecasts; and (ii) the next twelve made during the target year, i.e., the so called current-year forecasts.

Our sample consists of nine advanced economies for which fiscal forecasts are available. The countries included in our study are Australia, Canada, France, Germany, Italy, Japan, New Zealand, the United Kingdom, and the United States. We look at the arithmetic mean of the forecasts of budget balance for the period from February 1993 to December 2013[1]. In addition, our dataset includes the arithmetic mean of the forecasts of real GDP growth from Consensus Economics, and the actual real GDP growth and budget balance-to-GDP ratio from the IMF World Economic Outlook.

The event being forecasted is the average budget balance-to-GDP ratio for a given target year. For each target year, a number of forecasts are made at various horizons. So, for example, for the target year 2009, the first forecast is typically made in January 2008 and the last one in December 2009. We index the sequence of forecasts by the horizon (h), with $h = 24$ corresponding to the first forecast made and $h = 1$ corresponding to the last. We make a distinction between year-ahead forecasts ($h = 13$ to 24) and current-year forecasts ($h=1$ to 12).

Figure 1 plots the distribution of the budget balance-to-GDP ratios over the sample period. We present the distribution for horizons, $h = 21, 9, 3$, and 1. At $h = 21$, the distribution is centered around a deficit of between 2 and 4 percent of GDP. As the forecast horizon shortens, the distribution of forecasts converges as expected toward the distribution of actual values.

Figure 1: Distributions of actual and forecasted budget balances.



[1]The majority of forecasters are from the private sector and range between 10 and 30.

In Table 1, we show the mean error (ME), the mean absolute error (MAE), and the root mean squared error (RMSE). A positive value corresponds to 'pessimism' about the budget balance and a negative value denotes 'optimism'. Overall, there is bias toward 'optimism'; this feature is larger for the year ahead forecasts than for the current year forecasts (-0.58 vs. -0.46). As expected, current-year forecasts are more accurate than year-ahead forecasts.

Table 1: Summary statistics on budget balance forecast errors.

Stat.	
Full sample	
ME	-0.52
MAE	1.32
RMSE	1.86
Year ahead	
ME	-0.58
MAE	1.52
RMSE	2.14
Current year	
ME	-0.46
MAE	1.14
RMSE	2.58

Notes: This table presents some descriptive statistics for the sample of 9 advanced economies. ME, MAE and RMSE stand for the mean forecast error, the mean absolute forecast error and the mean square forecast error, respectively.

3. Quality of forecasts

3.1. Tests of bias and efficiency

The forecast error is given by

$$A_t - F_{th} = \alpha + \varepsilon_{th} \tag{1}$$

where A_t is the actual value of the budget balance-to-GDP ratio for target year t, F_{th} is the forecast for that target year made at horizon h, ε_{th} is the corresponding forecast error and $h = 1, 2, .., 24$.

To test for bias, a necessary and sufficient condition is that the mean forecast error is significantly different from zero (Holden and Peel, 1990). Thus, forecasts are unbiased if we cannot reject the null hypothesis that $\alpha = 0$. If the estimated coefficient is negative, forecasts are biased toward optimism. Table 2 reports, for four different forecast horizons (i.e., *h = 21, h = 15, h = 9* and *h = 3*), the estimates and the standard errors of α. We find that forecasts are biased towards optimism as the estimates of the constant term are always negative and statistically significant. Compared with year ahead forecasts (i.e., *h = 21* and *h = 15*), current year forecasts (i.e., *h = 9* and *h = 3*) are less biased.

Next, to test for efficiency, we regress actual observations on a constant plus the forecast:

$$A_t = \alpha' + \beta F_{th} + \varepsilon_{th} \tag{2}$$

Forecasts are efficient if we cannot reject the null hypothesis that $\beta = 1$ and $\alpha' = 0$.

Table 3 presents our results for the same four forecast horizons. For the full sample, we reject the null hypothesis of a unit coefficient and a zero constant at all forecast horizons under scrutiny. We thus conclude that the forecasts are not efficient.

Table 2: Test of bias.

	Dependent variable: forecast error			
Regressors	*h = 21*	*h = 15*	*h = 9*	*h = 3*
Constant	-0.71***	-0.55***	-0.50***	-0.36***
	(0.19)	(0.14)	(0.11)	(0.12)
Num. of Obs.	138	180	184	124

Note: The dependent variable is Consensus forecast error. Each cell reports the results of a regression of forecast errors on a constant for the sample of 9 countries. Heteroskedastic-consistent robust standard errors are reported in parenthesis. * Significance at 10%. ** Significance at 5%. *** Significance at 1%.

Table 3: Test of efficiency.

	Dependent variable: “actual” budget balance			
Regressors	*h = 21*	*h = 15*	*h = 9*	*h = 3*
Constant	-1.31***	-0.75***	-0.61***	-0.40***
	(0.30)	(0.19)	(0.16)	(0.14)
Forecast	0.80***	0.92***	0.96***	0.98***
	(0.07)	(0.05)	(0.04)	(0.04)
Adj. R-square	0.48	0.69	0.79	0.82
F-statistic	9.70	8.71	9.77	4.73
p-value	0.00	0.00	0.00	0.01
Num. of Obs.	138	180	184	124

Note: The F-statistic and associated p-value are for the test of the null hypothesis that the constant equals zero and the slope equals one. Heteroskedastic-consistent robust standard errors are reported in parenthesis. *Significance at 10%. ** Significance at 5%. *** Significance at 1%.

3.2. *Tests of information rigidity*

A well-known property of rational forecasts is that successive revisions of forecasts of the same event should be uncorrelated (Nordhaus, 1987). To explain the departure from full information rational expectations—and thus the serial correlation in forecast revisions—two main classes of theories have been put forward: (1) ‘sticky information’ (Mankiw and Reis, 2002); and (2) ‘noisy information’ (Woodford, 2001; Sims, 2003).

According to Coibion and Gorodnichenko (2012), both classes of theories of information rigidities are consistent with the correlation between the forecast error and the forecast revisions. Thus, the coefficient on the forecast revision is zero under the null of full informational rational expectations, whereas a positive value indicates information rigidity.

We implement this test by defining: (i) the ‘initial’ revision of the forecast as the change in the forecast between October and April of the previous year (i.e., between $h = 21$ and $h = 15$); (ii) the ‘middle’ revision as the change between April of the current year and October of the previous year (i.e., between $h = 15$ and $h = 9$), and (iii) the ‘final’ revision as the change between October of the current year and April of the current year (i.e., between $h = 9$ and $h = 3$). In all cases, we use final values of the actual data. Our regression then takes the following form:

$$A_t - F_{th} = \alpha + \beta(F_{th} - F_{t,h+6}) + \varepsilon_{th} \tag{3}$$

We can reject the presence of information rigidity if the null hypothesis that $\beta = 0$ cannot be rejected.

Table 4: Test of information rigidity: Coibion and Gorodnichenko (2015).

	Regressors				
Dependent Var.	Initial revision	Middle revision	Final revision	Constant	Adj. R-square
Forecast error	0.60**			0.01	0.10
	(0.26)			(0.16)	
Forecast error		0.62**		-0.03	0.10
		(0.26)		(0.11)	
Forecast error			0.31**	0.01	0.10
			(0.14)	(0.07)	

Note: The dependent variable is the forecast error. Heteroskedastic-consistent robust standard errors are reported in parenthesis. *Significance at 10%. **Significance at 5%. *** Significance at 1%.

Table 5: Test of information rigidity: Nordhaus (1987).

Dependent Var.	Regressors: Middle revision	Initial revision	Constant	Adj. R-square
Final revision	0.37***		-0.05***	0.23
	(0.02)		(0.01)	
Final revision	0.37***	-0.01	-0.07***	0.23
	(0.03)	(0.02)	(0.01)	

Note: The dependent variable is the final revision. Heteroskedastic-consistent robust standard errors are reported in parenthesis. *Significance at 10%. ** Significance at 5%. *** Significance at 1%.

The results of regressions of forecast errors on 'final', 'middle', and 'initial' forecast revisions are shown in Table 4. While we find evidence of information rigidities for in all the three periods, their presence tends to be higher in the 'middle', and 'initial' periods than in the 'final' periods.

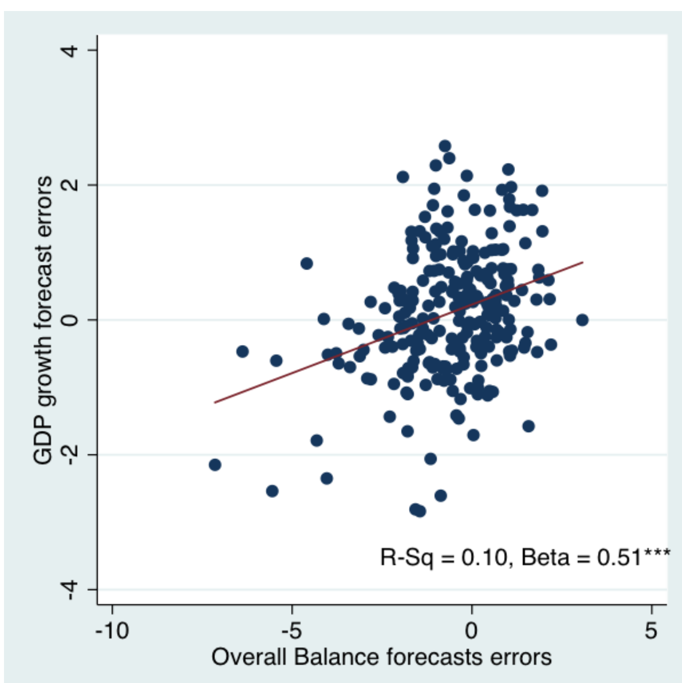
As noted by Coibion (2015) and Dovern et al. (2015), one drawback of the Coibion and Gorodnichenko (2012) test is that it requires the use of the outcomes and hence requires a judgment on whether one should use the latest version of the outcomes or some earlier 'real-time' vintage. An alternative test of information rigidity, following Nordhaus (1987), is to regress forecast revisions on past forecast revisions:

$$F_{t,21} - F_{t,15} = \alpha + \beta_1(F_{t,15} - F_{t,9}) + \beta_2(F_{t,9} - F_{t,3}) + \varepsilon_t \quad (4)$$

In this case, we reject the presence of information rigidity if the null hypothesis that $\beta_1 = 0$ and $\beta_2 = 0$ cannot be rejected.

The results from this alternative test of information rigidity are shown in Table 5. We find a positive and statistically significant correlation among forecast revisions. Moreover, the correlation between final revision and middle revision remains unchanged when we add the initial forecast revision to the set of regressors. Thus, we again reject the efficiency of budget balance forecasts.

Figure 2: Budget balance and GDP growth forecast errors.

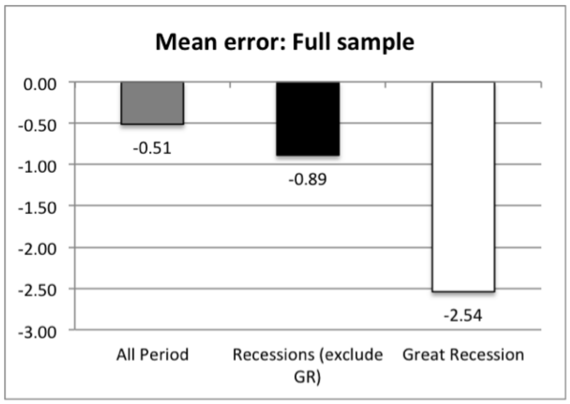


4. Forecasts of budget balances during the Great Recession

The costs of information rigidity—that is, the tendency to smooth forecast revisions—become apparent around turning points. As shown in Figure 2, there is a positive association between budget balance-to-GDP forecast errors and GDP growth forecast errors.

Figure 3 shows that during recessions, forecasters miss the realized actual value by a larger amount, and the Great Recession was a stark example of this failure.

Figure 3: Mean forecast errors: Unconditional, all recessions and Great Recession.



The analysis of the inter-quartile time profile of forecast errors in Figure 4 shows that forecasters did not anticipate a deterioration of the budget balance in the year preceding the Great Recession. This forecast error is also pronounced in the current year panel.

Figure 4: Inter-quartile time profile of forecast errors.

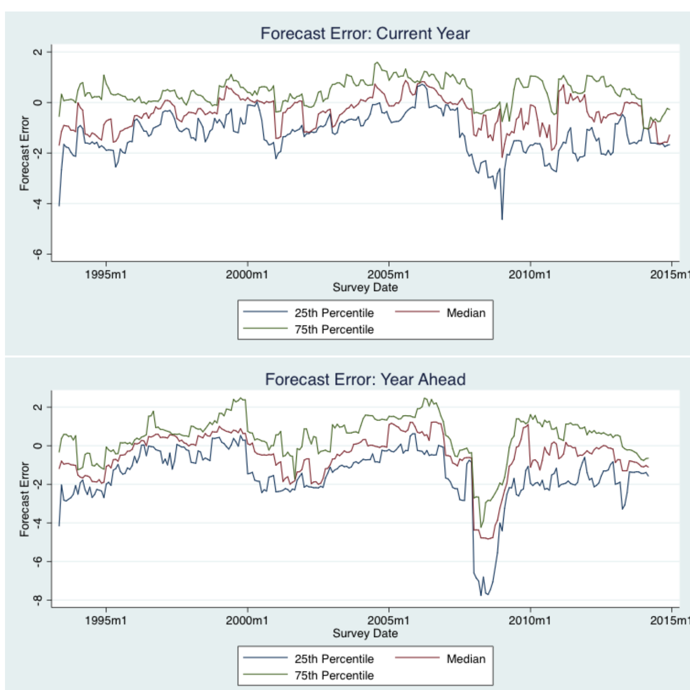
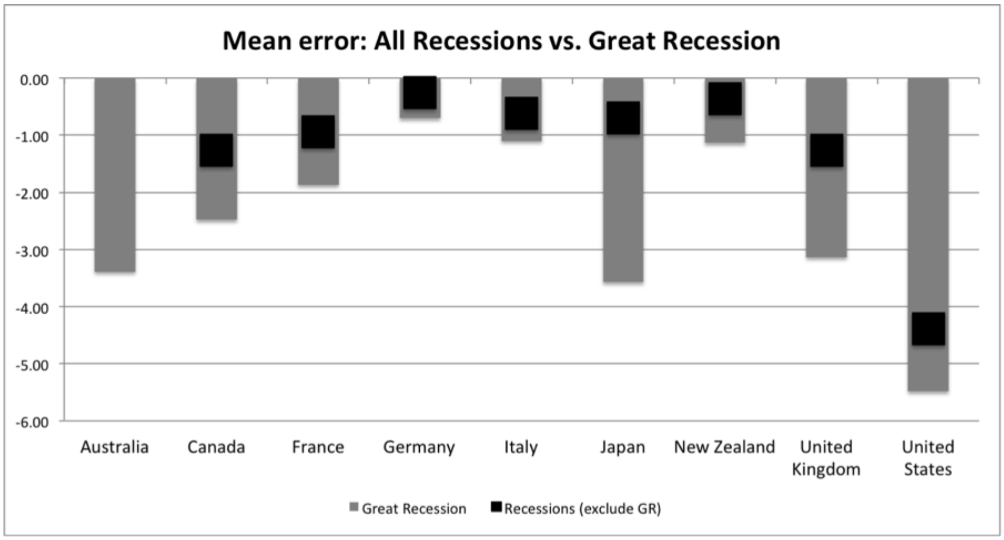


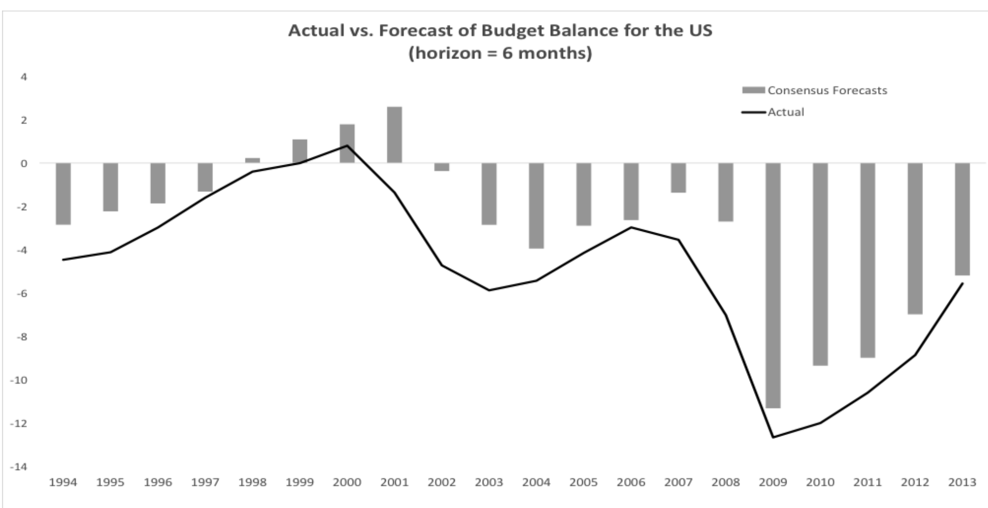
Figure 5: Mean forecast errors of budget balance during all recessions and Great Recession.



A plot of mean forecast errors during all episodes of recessions versus those during the Great Recession confirms that errors were larger during the latter (Figure 5).

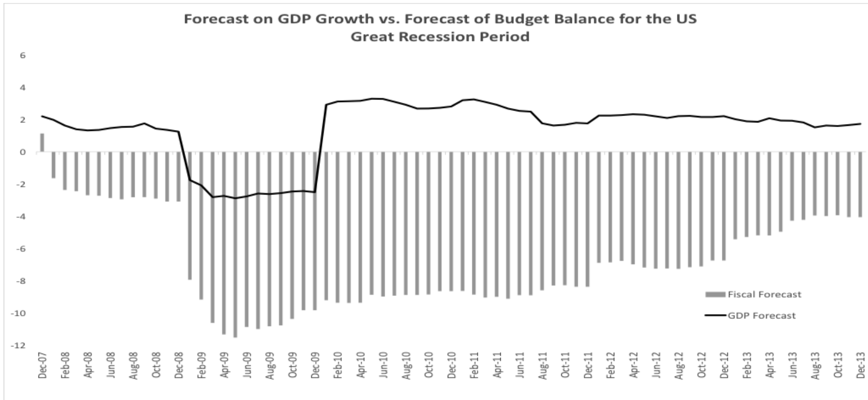
A closer look at U.S. fiscal forecasts provides a clear illustration of some of the key empirical findings of this paper. In Figure 6, taking current year forecasts at the 6-month horizon (i.e., $h = 6$) as the benchmark, large errors were made during the recession of 2001-02 and again during the Great Recession (2007-08). Forecasts errors during the 2009-13 recovery were modest.

Figure 6: Actual and forecasted budget balances in the US.



The positive correlation between budget balance forecasts and GDP growth forecasts is also visible in Figure 7, which zooms in on the months of the Great Recession. The strong downward revision in the real GDP growth forecast in the last quarter of 2008 is accompanied by a similar shift in the budget balance forecast. In early 2010, real GDP growth forecasts were raised substantially and have remained around 2% since then. Correspondingly, budget balance forecasts have been lowered, but at a slow pace reflecting the weak recovery.

Figure 7: US forecast of GDP growth vs. forecast of budget balance during Great Recession



5. CONCLUDING REMARKS

Our paper assesses the quality of private sector monthly forecasts of the budget balance using data for nine advanced economies over the period 1993-2013.

We find that these forecasts exhibit a bias towards 'optimism': forecasts of the budget balance tend to be higher than the outcomes. We also find that forecasts display 'information rigidity': forecast revisions tend to smooth, which is inconsistent with the properties of an efficient forecast. This inefficiency proves costly around turning points, when the data changes a lot but forecasts change little, at least initially. These large forecast errors around recessions substantitally lower the overall accuracy of forecasts. The Great Recession provides a stark illustration of these properties: for most countries, including the United States, large errors were made in forecasting real GDP growth and, hence, fiscal balances.

To conclude, while it is a good idea to complement government fiscal forecasts with those from the private sector, there are steps that the private sector could also take to improve the quality of its own forecasts.

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