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European Commission's Forecasts Accuracy Revisited: Statistical Properties and Possible Causes of Forecast Errors

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European Commission's Forecasts Accuracy Revisited

Statistical Properties and Possible Causes of Forecast Errors

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Abstract

This paper updates a previous assessment of the European Commission's track record for forecasting key economic variables (González Cabanillas and Terzi 2012) by extending the observation period to 2014. It also examines the accuracy of the Commission's forecasts over a shorter and more recent period (2000-2014) so that a comparison can be made between the performance of forecasts made before and after the Great Recession of 2008-2009. Going beyond the 2012 approach, this paper also examines the extent to which forecast errors can be explained by external or technical assumptions that prove incorrect ex post. It also updates the comparison of the Commission's performance vis à vis the OECD, the IMF, a consensus forecast of market economists, and the ECB.

Inclusion of the 2012-2014 period lowers the forecasting error for some key variables or leads to no change in others. Focussing on the years since the turn of the century, current-year and year-ahead forecasting errors for the three main variables examined (GDP growth, inflation and general government balances) have been larger in the crisis and post-crisis period (2008-2014) than in the pre-crisis period (2000-2007) for a large majority of Member States. This appears mainly to be the result of an anomalously large error in 2009, a year which confounded many forecasters. The country-by-country analysis confirms the finding of earlier studies which show that the Commission's forecasts are largely unbiased. The newly-introduced panel data approach also confirms the absence of bias in current-year GDP forecasts across EU Member States but shows that year-ahead forecasts for GDP growth tend to be slightly over optimistic across the whole sample. The analysis also shows that autocorrelation of forecast errors is not a major issue in the Commission's forecasts. Other advanced tests shed more light on the performance of the Commission's forecasts, demonstrating that they are directionally accurate and generally beat a naïve forecast but that they are not always efficient in terms of their use of all available data.

The decomposition of forecast errors shows that unexpected changes in external assumptions seem to have only a limited impact on current-year GDP growth forecasts. However, more than half of the variance in year-ahead forecast errors appears to come from external assumptions that prove to be incorrect ex post. Finally, the Commission's economic forecasts come out as being more accurate than those of the market and comparable to those of the other international institutions considered.

JEL Classification: C1, E60, E66.

Keywords: European Commission's forecasts, accuracy, statistical properties, forecast errors, forecasting performance, bias, crisis, GDP, inflation, government balance, structural balance, decomposition, external assumptions.

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CONTENTS

1. INTRODUCTION

The European Economic Forecasts ([1]) prepared by the staff of the European Commission are the basis for economic policy analysis and economic surveillance, including fiscal surveillance in the EU. High quality is therefore a necessity. The present paper perpetuates a tradition of regular assessments of the Commission's forecasting performance initiated by Keereman in 1999 and then in 2003, with updates by Melander et al. in 2007 and by González Cabanillas and Terzi in 2012. ([2]) All these studies concluded that the European Commission had 'a reasonable track record' in economic forecasting. The latter study which included crises years 2008-11, however, showed a deterioration in the Commission's year-ahead projections, mainly due to larger forecast errors in the recession year 2009. This was a common phenomenon across international institutions, and efforts have been undertaken to measure, understand and learn lessons from the crisis-related forecast errors. ([3])

Since the last Economic Paper on the accuracy of Commission's forecasts was published, the EU economy slipped back into recession in 2012-13 and is currently going through a moderate recovery. With these additional data points available, the first aim of the paper is to analyse whether the ex-post accuracy of the Commission's spring and autumn forecasts has changed in recent years. This is done by extending the observation period to take into account the forecasts and realisations for the years 2012 to 2014. The study then focuses on a shorter and more recent period (2000-14) which allows a comparison between the forecasting performance before and after the Great Recession of 2008-09.

The second aim is to analyse GDP growth forecast errors trying to identify to what extent they can be explained by external or technical assumptions that *ex post* turned out to be different from the outcomes, or by the misperception of the outlook. Indeed, macroeconomic forecasts are conditioned by *ex-ante* assumptions on future development of exogenous factors linked to the global economy, financial markets or fiscal policy which depending on their accuracy, influence the forecasting performance. ([4])

Finally, the third aim of this paper is to update the comparison of the accuracy of European Commission's forecasts to that of other international institutions and those of market participants. Again, the longer period as well as the shorter and more recent period are analysed.

The paper is structured as follows: section 2 presents the variables, observation samples as well as the summary statistics used in the analyses. Section 3 discusses the results of the Commission's forecasts accuracy for the extended observation period (1969-2014) as well as for the shorter and more recent period (2000-14) while section 4 presents the statistical tests of the properties of the Commission's forecasts. The results of the analysis of the forecast errors decomposition are discussed in section 5. Section 6 compares the track record of the Commission's forecasts with that of other institutional forecasters. Finally, section 7 concludes.

([1]) This is their official name. For the ease of the reader, the text will in what follows mostly refer to “Commission's forecasts”. It should however be borne in mind that these forecasts are prepared independently by staff and not subject to approval by the College of Commissioners (i.e. the “Commission”).
([2]) See Keereman, F. (1999), Melander A. et al. (2007) and González Cabanillas L. and A. Terzi (2012).
([3]) For instance by Pain, N., et al. (2014) for the OECD, Kenny G. and J. Morgan (2011) for the ECB, Alessi, L. et al (2014) for the ECB and the US Federal Reserve, and Genberg H. and Martinez (2014) for the IMF.
([4]) Cf. Keereman, F. (2003).

2. DATA DESCRIPTION AND SUMMARY STATISTICS

2.1. DEFINITIONS AND REFERENCE PERIODS

Three main forecast variables are considered in this paper: real GDP growth, inflation (price deflator of private consumption) and the general government balance to GDP ratio. These three variables are essential to economic analysis and policy debate. Summary statistics are also provided in the Annexes for total investment, the unemployment rate and the current-account balance, but results are not discussed in the paper.

The forecast data are collected from the Commission's spring and autumn forecast publications from 1969 until 2015. This paper describes the current-year forecast error and the year-ahead forecast error. The forecast error for a given country *i* is defined as follows:

$$e_{i,t,t} = y_{i,t,t} - y_{i,t} \quad \textit{for the current year}$$

$$e_{i,t+1,t} = y_{i,t+1,t} - y_{i,t+1} \quad \textit{for the year-ahead}$$

where $y_{i,t,t}$ *and* $y_{i,t+1,t}$ *are the f*orecasts made for country *i* at time t, for periods *t* and *t+1* respectively; $y_{i,t}$ *and* $y_{i,t+1}$ *are the realisation*s for country *i* for period *t* and *t+1* respectively. Hence, positive errors indicate an overestimation, whereas negative errors indicate an underestimation of the true value.

Data have been processed in a similar manner as in previous studies of the Commission's forecast accuracy. The current-year forecasts ($y_{i,t,t}$) and current year realisations ($y_{i,t}$) are extracted from the Commission's spring forecast publications, which are published in May. The current year forecast for period t is taken from the spring forecast in period t, while the current year realisation for period t is taken from the spring forecast in period *t+1*. The year-ahead forecasts ($y_{i,t+1,t}$) and realisations ($y_{i,t+1}$) are taken from the Commission's autumn forecasts, which are published in November. The year-ahead forecasts for period *t* are taken from the autumn forecast in *t-1*, while the realisation of the forecast for period t is taken from the autumn forecast *t+1*. For the unexpected changes with respect to the "external assumptions" in section 5, data was processed in a similar manner.

The forecast errors are computed for 27 EU Member States (insufficient number of observations for Croatia) and for the euro-area and European Union (EU) aggregates. For the EU and the euro-area, the aggregate reflects the changing composition over time. This paper will systematically describe the characteristics of the forecast errors in four groups: the euro area and EU aggregates, the "old" Member States (15 EU members before 2004), the "new" Member States that acceded in 2004 and 2007 and the Programme countries which include all Member States that have received financial assistance from the diverse rescue mechanisms, namely Cyprus, Greece, Hungary, Ireland, Latvia, Portugal, Romania and Spain (financial-sector programme).

The forecast errors are examined in two main reference periods. The first reference period is the full sample (1969-2014) and is used to produce an update of the previous study of 2012 ([5]), which analysed the Commission's forecasts from 1969 until 2011. The second reference period is the short sample which refers to the period 2000-14. This shorter sample allows comparing for a similar timespan the forecasting performance of the Commission before and after the start of the Great Recession of 2008-09. The reference period 2000-07 is referred to as the "pre-crisis" period and the reference period 2008-14 as the "crisis and post-crisis" period. Table 2.1 below shows the number of observations per country for each sample period.

([5]) González Cabanillas, L. and Terzi, A. (2012).

Table 2.1:
Number of observations in reference periods

	GDP				Inflation				General government balance			
	'69-'14	'00-'07	'08-'14	'00-'14	'69-'14	'00-'07	'08-'14	'00-'14	'69-'14	'00-'07	'08-'14	'00-'14
Belgium	46	8	7	15	46	8	7	15	44	8	7	15
Germany	46	8	7	15	46	8	7	15	46	8	7	15
Estonia	11	4	7	11	11	4	7	11	11	4	7	11
Ireland	42	8	7	15	42	8	7	15	41	8	7	15
Greece	34	8	7	15	34	8	7	15	33	8	7	15
Spain	29	8	7	15	29	8	7	15	29	8	7	15
France	46	8	7	15	46	8	7	15	46	8	7	15
Italy	46	8	7	15	46	8	7	15	46	8	7	15
Cyprus	11	4	7	11	11	4	7	11	11	4	7	11
Latvia	11	4	7	11	11	4	7	11	11	4	7	11
Lithuania	11	4	7	11	11	4	7	11	11	4	7	11
Luxembourg	46	8	7	15	46	8	7	15	41	8	7	15
Malta	11	4	7	11	11	4	7	11	11	4	7	11
Netherlands	46	8	7	15	46	8	7	15	46	8	7	15
Austria	20	8	7	15	20	8	7	15	20	8	7	15
Portugal	29	8	7	15	29	8	7	15	29	8	7	15
Slovenia	11	4	7	11	11	4	7	11	11	4	7	11
Slovakia	11	4	7	11	11	4	7	11	11	4	7	11
Finland	20	8	7	15	20	8	7	15	20	8	7	15
Euro area	17	8	7	15	17	8	7	15	17	8	7	15
Bulgaria	8	1	7	8	8	1	7	8	8	1	7	8
Czech	11	4	7	11	11	4	7	11	11	4	7	11
Denmark	42	8	7	15	42	8	7	15	38	8	7	15
Hungary	11	4	7	11	11	4	7	11	11	4	7	11
Poland	11	4	7	11	11	4	7	11	11	4	7	11
Romania	8	1	7	8	8	1	7	8	8	1	7	8
Sweden	20	8	7	15	20	8	7	15	20	8	7	15
United Kingdom	42	8	7	15	42	8	7	15	42	8	7	15
EU	46	8	7	15	46	8	7	15	46	8	7	15

2.2. SUMMARY STATISTICS

To measure the European Commission's forecasting performance, several summary statistics are computed in this study. They are described in the paragraphs below.

2.2.1. Mean error

The mean error (ME) is the average forecast error for each country *i* over a given period *T*. It is a basic indicator of quality, as positive and negative errors can offset each other. Nevertheless, this indicator can indicate possible bias in the forecast. Formally,

$$ME_i = \frac{1}{T}\sum_{t=1}^{T} e_{i,t,t}$$

$$ME_i = \frac{1}{T}\sum_{t=1}^{T} e_{i,t+1,t}$$

for the *current year* and the *year-ahead* forecast respectively.

2.2.2. Mean absolute error

The mean absolute error (MAE) is the average of the absolute value of the forecast errors for each country *i* over a given period *T*. Negative errors cannot cancel positive ones, therefore MAE does not limit the size of the error. The MAE, however, does not provide information on the direction of the error (underestimation or overestimation). Also, in the calculation of the MAE, all the errors are equally weighted in the average whatever their size. Formally,

$$MAE_i = \frac{1}{T}\sum_{t=1}^{T}\left|e_{i,t,t}\right|$$

$$MAE_i = \frac{1}{T}\sum_{t=1}^{T}\left|e_{i,t+1,t}\right|$$

for the *current year* and the *year-ahead* forecast respectively.

2.2.3. Root mean square error

The root mean square error (RMSE) is the square root of the average of the squared forecast errors for each country *i* over a given period *T*. Since the errors are squared, large errors have a relatively higher weight. Therefore, RMSE is preferred when large errors are considered particularly harmful. Also, RMSE is not independent of the number of observations and does not provide information on the direction of the errors. Formally,

$$RMSE_i = \sqrt{\frac{1}{T}\sum_{t=1}^{T}e_{i,t,t}^2}$$

$$RMSE_i = \sqrt{\frac{1}{T}\sum_{t=1}^{T}e_{i,t+1,t}^2}$$

for the *current year* and the *year-ahead* forecast respectively.

3. RESULTS OF THE ACCURACY TESTS

This section subjects the Commission's economic forecasts to standard metrics of forecast errors. This analysis is conducted for two different sample periods. The first one covers all available data points, extending the observation period from 1969-2011 (previous study) to 1969-2014. The second one focuses on the more limited and more recent period (2000-2014), comparing pre-crisis years (2000-2007) to the crisis and post-crisis years (2008-2014). MAE and RMSE are presented for real GDP growth, inflation and general government balance in percentage of GDP. The ME is a good pointer to a possible bias in the forecast which is examined in section 4. All summary statistics (MAE and RMSE) as well as results for other variables (unemployment, investment and current-account balance) are provided in Annex 1.

3.1. FORECASTING PERFORMANCE IN RECENT YEARS

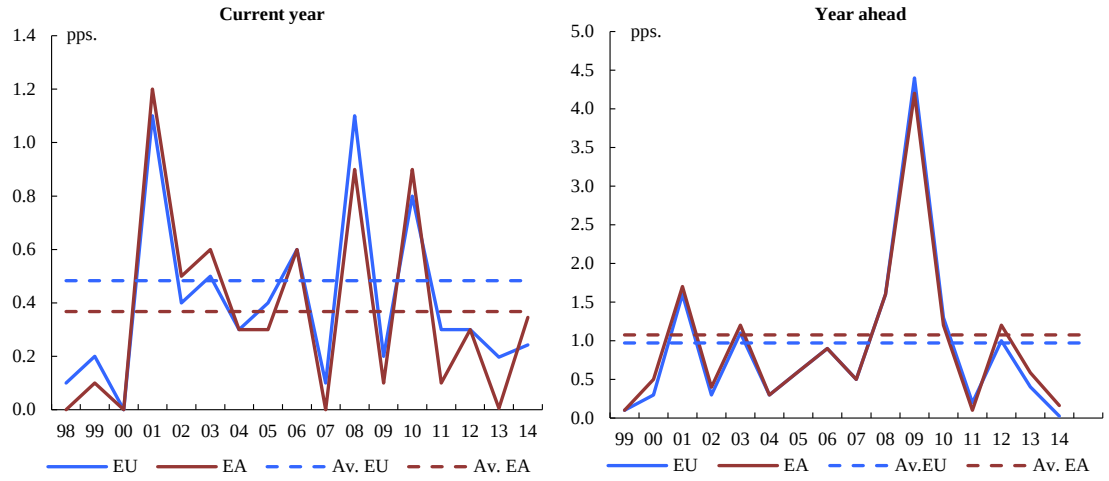
As in previous updates, the forecast accuracy in the observation period 1969-2011 (last study) is first compared to that of the whole period (1969-2014). ([6]) The question examined is whether and how the past three years (observations) affect the forecast accuracy overall.

3.1.1. Gross domestic product

EU and euro-area aggregates

The addition of three years has only a marginal effect on the Mean Absolute Error (MAE) and on the Root Mean Square Error (RMSE, see Annex 1) for the current-year GDP growth forecasts for the EU and the euro-area aggregates. As can be seen from table 3.1, the average absolute forecast error for real GDP growth for the current year – as measured by the MAE – remains broadly unaltered for both the EU and euro-area aggregates. It has decreased only marginally for the EU as a whole (-0.02 pps. to 0.48) and somewhat more for the euro-area aggregate (-0.03 pps. to 0.37). This indicates a very slight improvement in forecast accuracy for the years 2012-2014 for the current year. A below average absolute error in the years 2012-2014 is depicted in Graph 3.1. ([7]) Graph 3.1 shows particularly high forecast errors for the current year for the years 2001 (bursting of the dotcom bubble), 2008 (Great Recession) and 2010 (sovereign debt crisis); all dominated by major shocks.

Graph 3.1: **Gross domestic product, absolute error**



([6]) Since MSE($\hat{\theta}$) = Var($\hat{\theta}$) + Bias(θ, $\hat{\theta}$)^2 and since Var($\hat{\theta}$) = Var(θ)/n, higher accuracy in the longer sample (1969-2014) doesn't necessarily imply a smaller bias. Higher accuracy could be related to the larger n. However, analysis showed that the difference in MSE between both samples is driven by the bias of the estimators, and not by the sample size (n).

([7]) The average for the EU is the average absolute forecast error for the observation period 1969-2014 while the average for the EA is the average absolute forecast error for the observation period 1998-2014.

Table 3.1:
Gross domestic product, MAE for the current year and the year-ahead forecasts

	Current year				Year-ahead			
	1969-2011		1969-2014		1969-2011		1969-2014	
	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE
Belgium	43	0.68	46	0.65	42	1.14	45	1.10
Germany	43	0.83	46	0.78	42	1.32	45	1.25
Estonia	8	2.96	11	2.52	8	5.36	11	4.18
Ireland	39	1.63	42	1.63	38	2.32	41	2.27
Greece	31	0.79	34	0.79	30	1.20	33	1.23
Spain	26	0.53	29	0.50	25	0.90	28	0.93
France	43	0.55	46	0.54	42	0.87	45	0.84
Italy	43	0.85	46	0.85	42	1.33	45	1.35
Cyprus	8	0.68	11	1.17	8	1.01	11	1.44
Latvia	8	3.51	11	3.02	8	5.65	11	4.54
Lithuania	8	1.71	11	1.41	8	4.21	11	3.18
Luxembourg	43	1.48	46	1.44	42	2.09	45	2.04
Malta	8	0.95	11	0.93	8	1.75	11	1.55
Netherlands	43	0.69	46	0.66	42	1.13	45	1.13
Austria	17	0.52	20	0.52	17	1.01	20	0.95
Portugal	26	0.71	29	0.69	25	1.02	28	0.94
Slovenia	8	1.45	11	1.38	8	2.41	11	2.45
Slovakia	8	1.36	11	1.03	8	2.71	11	2.12
Finland	17	1.25	20	1.21	17	1.86	20	1.82
Euro area	14	0.40	17	0.37	13	1.02	16	0.95
Bulgaria	5	1.00	8	0.67	5	2.36	8	1.73
Czech Republic	8	1.19	11	1.03	8	2.44	11	2.09
Denmark	39	0.73	42	0.73	38	1.08	41	1.10
Hungary	8	0.80	11	0.91	8	1.90	11	1.85
Poland	8	1.11	11	0.93	8	1.46	11	1.21
Romania	5	1.56	8	1.34	5	3.14	8	2.39
Sweden	17	0.94	20	0.85	17	1.39	20	1.26
United Kingdom	39	0.68	42	0.67	38	1.13	41	1.09
EU	43	0.50	46	0.48	42	0.95	45	0.92

For the year ahead, forecast errors are significantly larger than for the current year as less information is available at the time of forecasting. The addition of three years shows some improvement in the accuracy for the two aggregates. The MAE for the year-ahead forecast for the EU GDP aggregate fell slightly (-0.03 pps. to 0.92) but decreased somewhat more for the euro-area aggregate (-0.07 pps. to 0.95). The RMSEs display similar results. Graph 3.1 shows the slight improvement in year-ahead forecast accuracy (errors below average) in particular for the years 2013 and 2014 for both the euro area and the EU aggregates. The year-ahead forecast for 2012 projected some slowdown in economic activity in both the EU and the euro area, but failed to anticipate the contraction. Graph 3.1 also shows for the year ahead, the elevated forecast error in the recession year 2009, which by all standards proved exceptional and unanticipated by forecasters. In contrast, for the current year, the forecast error for 2009 was small, as the economy was already formally in recession and that forecasters had more information at the time of forecasting.

For both current and year-ahead forecasts, the larger change in the MAE for the euro-area aggregate than for the EU can in part be explained by the shorter sample size of the euro area, i.e., recent years have thus a larger weight in the calculation of the MAE for the euro area.

EU Member States

At the Member State level, one should distinguish between the 'old' EU Member States and the 'new' Member States (the 12 Member States that joined the EU in 2004 and 2007 ([8])) as the sample of the latter consists of maximum 11 observations. For the 'old' EU Member States, forecast errors remain broadly

([8]) Given the very limited number of data points, the analysis of forecast accuracy for Croatia is not possible.

unchanged (difference < 0.5 pps.) for the current year (Table 3.1). In that group of countries, Sweden and Germany stand out as the exceptions, with forecast errors having decreased by 0.09 pps. and 0.05 pps. respectively, when adding the new observations. Differences in forecast errors remain sizeable across old Member States, with smaller countries continuing to depict the largest forecast errors. In particular, Ireland, Luxembourg and Finland show a lower forecast accuracy, with a MAE of 1.63, 1.44 and 1.21 pps. respectively. In contrast, Spain, Austria and France show the highest forecast accuracy, with a MAE of about 0.5 pps. for the full sample.

For the year-ahead forecast, results show an improvement in forecast accuracy in some of the 'old' Member States or broadly unaltered forecast errors in others. When adding the new observations, the MAE has significantly decreased (difference $\geq$ 0.05 pps.) for Germany, Ireland, Luxembourg, Austria, Portugal and Sweden. Differences in forecast errors remain sizeable across Member States, with the same small countries as in the case of the current year forecast depicting the largest forecast errors (Ireland, Luxembourg and Finland). France stands out as the country for which forecast accuracy is the highest, with a MAE at about 0.8 pps. for the year-ahead forecast, followed by Spain, Portugal and Austria at about 0.9 pps..

For the Member States that acceded in 2004 and 2007, GDP growth forecast errors are significantly above the EU average. This is true for both the current and year-ahead forecasts. The largest forecast errors could, to some extent, be explained by the smaller sample size for the 'new' Member States, for which recent years (and thus crisis years) have a larger weight in the calculation of the MAE. ([9]) However, comparing forecast errors for the same shorter sample period, confirms higher forecast errors for the 'new' Member States. ([10]) A significant improvement in forecast accuracy can be seen for most of the 'new' Member States for both the current and year-ahead when adding the new observations. The limited size of the observation sample for these countries matters again, as the 3 new observations have a larger impact in the calculations of the MAE. In this group of countries, the forecast accuracy improved particularly strongly for Estonia, Latvia and Lithuania for both the current and year-ahead forecasts. Despite this improvement, forecast errors for Latvia and Estonia remain the highest across EU countries. Cyprus stands out as the only 'new' Member States for which GDP growth forecast accuracy deteriorated strongly for both the current and year-ahead forecast. The economic downturn in this country was very sharp and the uncertainty very large.

3.1.2. Inflation

The annual rate of change in the price deflator of private consumption is being used for inflation in order to allow for comparability with earlier studies of the European Commission.

EU and euro-area aggregates

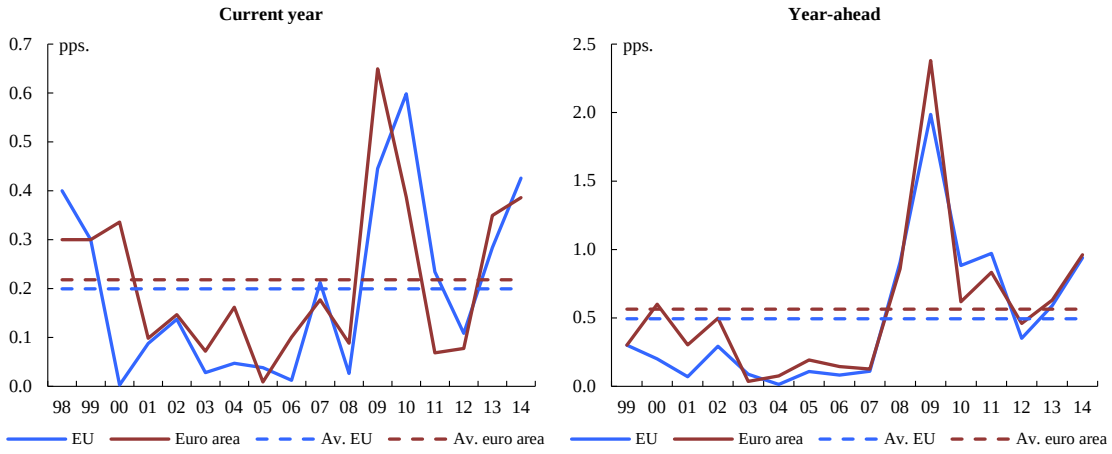
The forecast errors for inflation are lower than those for GDP growth as the latter is somewhat more volatile. The addition of three years has barely any effect on the MAE and RMSE for the current and year-ahead inflation forecasts for the EU and the euro-area aggregates. As can be seen from table 3.2, the average absolute forecast error for inflation – as measured by the MAE – has remained broadly unchanged for both the current and year-ahead forecasts for both aggregates. For the EU, the MAE stands at 0.30 pps. and 0.80 pps. respectively for t and t+1 and at 0.22 pps. and 0.56 pps. respectively for the euro area. Inflation forecast errors were particularly small during the period of the “Great Moderation” of 2001-07 and spiked during the crisis (Graph 3.2). In 2013-14, inflation was overestimated, mainly due to the decrease in energy prices.

([9]) For the 'new' Member States, the observation sample covers the period 2004-2014 for those Member States that acceded in 2004 or 2007-2014 for those that acceded in 2007.
([10]) See González Cabanillas, L. and Terzi, A. (2012).

Table 3.2:
Price deflator of private consumption, MAE for the current year and the year-ahead forecasts

	Current year				Year-ahead			
	1969-2011		1969-2014		1969-2011		1969-2014	
	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE
Belgium	43	0.54	46	0.51	42	1.05	45	1.02
Germany	43	0.30	46	0.30	42	0.70	45	0.68
Estonia	8	0.96	11	0.79	8	2.26	11	1.98
Ireland	39	0.96	42	0.93	38	1.82	41	1.71
Greece	31	0.81	34	0.84	30	1.26	33	1.23
Spain	26	0.46	29	0.46	25	0.67	28	0.72
France	43	0.42	46	0.43	42	0.91	45	0.91
Italy	43	0.61	46	0.60	42	1.34	45	1.32
Cyprus	8	0.58	11	0.76	8	0.90	11	1.15
Latvia	8	2.43	11	1.99	8	3.37	11	2.81
Lithuania	8	1.01	11	0.91	8	1.64	11	1.58
Luxembourg	43	0.51	46	0.52	42	1.18	45	1.19
Malta	8	0.86	11	0.84	8	1.05	11	1.04
Netherlands	43	0.41	46	0.39	42	0.72	45	0.71
Austria	17	0.41	20	0.39	17	0.65	20	0.59
Portugal	26	0.56	29	0.55	25	1.09	28	1.05
Slovenia	8	0.96	11	0.82	8	1.31	11	1.27
Slovakia	8	0.57	11	0.62	8	1.41	11	1.36
Finland	17	0.46	20	0.42	17	0.96	20	0.86
Euro area	14	0.21	17	0.22	13	0.54	16	0.56
Bulgaria	5	1.66	8	1.70	5	2.90	8	2.74
Czech Republic	8	0.52	11	0.60	8	0.95	11	0.75
Denmark	39	0.53	42	0.53	38	1.03	41	1.01
Hungary	8	0.62	11	0.59	8	0.75	11	1.06
Poland	8	0.45	11	0.53	8	1.11	11	1.28
Romania	5	1.41	8	1.19	5	1.92	8	1.52
Sweden	17	0.35	20	0.33	17	0.61	20	0.59
United Kingdom	39	0.75	42	0.72	38	1.40	41	1.32
EU	43	0.31	46	0.30	42	0.81	45	0.80

Graph 3.2: **Inflation, absolute error**



EU Member States

At the Member State level, broadly unaltered forecast errors (difference < 0.05 pps.) for the current year are also evident for the 'old' Member States. For the year-ahead, the forecast accuracy for 'old' Member States increased significantly for Ireland, Austria, Finland and the UK and remained broadly unchanged for the others, when adding the new observations. Spain stands out as the only exception, where the MAE

of year-ahead inflation forecasts has increased by 0.05 pps. to 0.72 pps. Forecast errors continue to differ across Member States, but this difference is less marked than for GDP.

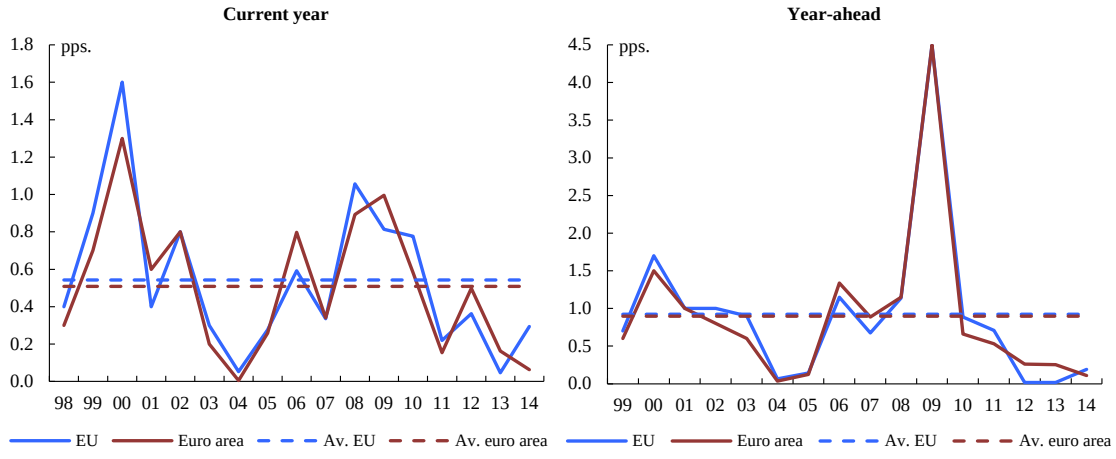
As in the case of GDP, inflation forecast errors for the Member States that acceded in 2004 and 2007 are significantly above the EU average. The only exception is the Czech Republic for the year-ahead forecast (0.75 pps.). For the current year forecast, the results are rather mixed when adding the new observations. For some of the 'new' Member States, the MAE decreases significantly (i.e. Slovenia, Estonia, Latvia, Lithuania and Romania) while for others it increases (Cyprus, Czech Republic, Slovakia and Poland). For Cyprus and Czech Republic, the current year forecasts systematically overestimated inflation for the three additional observations. For the year ahead, the forecast accuracy increased in most of the 'new' Member States, except for Cyprus, Hungary and Poland. For Cyprus again, the year-ahead forecasts systematically overestimated inflation for the additional observations.

3.1.3. General Government balance

EU-EA aggregates

Turning to the general government balance-to-GDP ratio, errors in current-year forecasts were larger around the turn of the century than during the crisis, as in the case of GDP current-year forecast errors. The addition of three years leads to a general improvement in forecasting performance in terms of both the MAE (see table 3.3) and RMSE and for both horizons. For the EU aggregate, the MAE has marginally decreased for the current year outlook (-0.02 pps. to 0.50 pps.), while for the year ahead, forecast errors have declined somewhat more (-0.05 pps. to 0.78 pps.). For the euro area, the decline in the forecast errors is more marked for both horizons (-0.06 pps. to 0.51 pps. for the current year and -0.16 pps. to 0.90 pps. for the year ahead). Below average absolute errors in the years 2012-2014 explain the higher forecast accuracy when extending the observation period (see Graph 3.3). Graph 3.3 also depicts the steep deterioration in forecast accuracy in 2009 for the year ahead, which is linked to the GDP forecast error for that same year.

Graph 3.3: **General government balance, absolute error**



EU Member States

At the Member State level, forecast errors for the current year are found to be slightly smaller or broadly stable for the 'old' Member States when extending the observation period. The forecast accuracy of general government balance for Greece and to a lesser extent for Spain, however, declined, with the MAE increasing by respectively 0.25 pps. and 0.06 pps. In the case of Greece, this deterioration can in part be

explained by the considerable forecast error for 2013 (+8.9 pps.) which results from the fact that the bank recapitalisation in the first half of 2013 was not taken into account in the 2013 spring forecast as the details of the operations were at the time not known in sufficient detail. For Spain, the lower forecast accuracy is explained by the large forecast error in 2012, which is almost entirely due to bank recapitalisation during that year. For these two countries, current year forecasts systematically underestimated the deficit for the period 2012-2014. For the year-ahead forecast, the forecast accuracy seems to have improved in most Member States when adding the new observations. Greece and Spain stand out again as the only two exceptions where the MAE increased (by respectively +0.07 pps. and +0.04 pps.) but the deterioration in forecast accuracy is less marked than for the current year forecast. For the year ahead, the forecasts for Greece continued to underestimate the deficit for the 3 additional observations. A positive bias for the year-ahead GDP growth forecast for Greece will be confirmed in section 4 for the 2000-2014 period.

Table 3.3:
General government balance, MAE for the current year and the year-ahead forecasts

	Current year				Year-ahead			
	1969-2011		1969-2014		1969-2011		1969-2014	
	Sample	MAE	Sample	MAE	sample	MAE	sample	MAE
Belgium	41	0.44	44	0.45	41	1.12	44	1.08
Germany	43	0.82	46	0.80	42	1.10	45	1.08
Estonia	8	1.74	11	1.57	8	2.48	11	2.00
Ireland	38	2.15	41	2.03	38	2.82	41	2.69
Greece	30	1.79	33	2.04	30	2.63	33	2.70
Spain	26	1.06	29	1.12	25	1.48	28	1.52
France	43	0.62	46	0.60	42	0.80	45	0.78
Italy	43	0.88	46	0.86	42	1.30	45	1.26
Cyprus	8	1.76	11	1.91	8	2.17	11	1.83
Latvia	8	1.49	11	1.22	8	3.15	11	2.57
Lithuania	8	1.22	11	1.10	8	2.01	11	1.66
Luxembourg	38	1.45	41	1.40	37	1.95	40	1.91
Malta	8	0.79	11	0.76	8	1.04	11	0.92
Netherlands	43	0.97	46	0.95	42	1.32	45	1.28
Austria	17	0.53	20	0.53	17	0.80	20	0.79
Portugal	26	0.88	29	0.88	25	1.37	28	1.32
Slovenia	8	0.49	11	1.29	8	1.50	11	2.38
Slovakia	8	0.95	11	0.75	8	1.42	11	1.16
Finland	17	0.96	20	0.93	17	1.46	20	1.40
Euro area	14	0.57	17	0.51	13	1.06	16	0.90
Bulgaria	5	1.51	8	1.21	5	2.70	8	1.95
Czech Republic	8	1.42	11	1.31	8	1.88	11	1.71
Denmark	35	0.91	38	0.92	35	1.49	38	1.49
Hungary	8	1.30	11	1.11	8	2.39	11	1.88
Poland	8	1.08	11	1.71	8	1.36	11	1.79
Romania	5	1.72	8	1.21	5	1.52	8	1.12
Sweden	17	1.17	20	1.02	17	1.39	20	1.31
United Kingdom	39	0.81	42	0.79	38	1.47	41	1.45
EU	43	0.52	46	0.50	42	0.83	45	0.78

As in the case of GDP and inflation, general government balance forecast errors for the 'new' Member States are significantly above those of the 'old' Member States. The only exceptions are Malta and Slovakia. For the current year forecast, when adding the new observations, the results are rather similar to those of the 'old' Member States, with the forecast accuracy improving for most 'new' Member States (except Poland, Slovenia and Cyprus). For the year ahead, the forecast accuracy also improved in most 'new' Member States, except in Poland and Slovenia.

3.1.4. Unemployment, Investment and Current account

For the three variables: unemployment, investment and the current-account balance, the addition of three years has barely no impact in terms of both the MAE and the RMSE (see Annex 1) on the EU and euro-area forecasts for the current year. At the Member State level, the forecast accuracy seems to have improved in the majority of Member States, particularly in the 'new' Member States.

For the year ahead, broadly unaltered forecast errors for the year ahead are also evident for the EU. In contrast, for the euro-area aggregate, the year-ahead forecast accuracy seems to have deteriorated somewhat for the three variables (in terms of both MAE and RMSE), except for investment where the RMSE declined when adding the 3 new observations. This suggests that although the absolute error increased, unusually large errors were avoided in these additional observations. At the Member State level, lower forecast errors were found for the majority of Member States when adding the new observations, particularly in the 'new' Member States. For unemployment, the MAE, however, increased significantly for Greece, Spain, Cyprus, Slovenia and Hungary. For Greece, the forecasts systematically underestimated the unemployment rate in the 3 new observations while for Hungary, it overestimated unemployment. For investment, the MAE increased significantly for Greece, Spain, Italy and Cyprus. For Greece, Italy and Cyprus, the forecasts systematically overestimated investment growth. Finally, for the current-account balance, the MAE increased significantly for Germany, Spain and the UK. For Germany, the forecasts underestimated the current-account surplus for the period 2012-2014 while for the UK, they systematically underestimated the deficit.

3.2. FORECASTING PERFORMANCE IN PRE-CRISIS AND CRISIS/POST-CRISIS

This section analyses the accuracy of the Commission's forecast over a smaller sample period, focusing on the three main variables and on the period 2000-2014. It compares the forecast accuracy in the pre-crisis years (2000-2007) and the crisis and post-crisis years (2008-2014). Due to non-availability of data for Bulgaria and Romania before 2007, forecast accuracy results for these countries, while being presented in the tables, are not discussed in this section.

3.2.1. Gross domestic product

Comparing the average absolute forecast error before and after the start of the crisis for the current-year forecast for real GDP growth shows mixed results at the aggregate level. The forecast accuracy – as measured by the MAE – remained broadly unchanged (+0.02 pps.) for the EU aggregate while it improved somewhat for the euro-area aggregate (-0.06 pps.). The improvement at the euro-area level can be explained on the one hand by the larger forecast error for the euro-area aggregate (compared to the EU) during the 2000-2007 period, which is essentially driven by the very large forecast error in 2001, and on the other hand by the smaller forecast errors in the years 2008, 2011 and 2013 (Graph 3.1). Overall, current-year forecasting errors for 2008-2014 are very similar to those for 2000-2007 (Table 3.4) thus suggesting no deterioration in forecast accuracy in the crisis / post crisis period for the aggregates.

For year-ahead forecasts, the accuracy strongly deteriorated in the crisis and post-crisis period compared to the pre-crisis period for both the EU and euro-area aggregates (Table 3.4). This is mainly due to an anomalously large forecast error for the year 2009. The deterioration in year-ahead forecast accuracy was somewhat stronger in the EU than in the euro area (+0.58 pps. versus +0.53 pps.), but overall MAEs are similar in both areas, at 1.0 pps. in the 2000-2014 observation sample..

At the Member State level, a deterioration in forecast accuracy in the crisis period compared to the pre-crisis period can be seen for most EU Member States ('old' and 'new') for both the current year and year-ahead forecasts. The deterioration is in general much more pronounced for the year-ahead forecast. For the current year forecasts, the largest increase in the MAE in the crisis (and post-crisis) period compared

to the pre-crisis period can be seen for Cyprus (+1.44 pps.), Latvia (+1.05) and Greece (+0.81); three Programme countries. ([11]) These countries have been facing unusually large economic and political uncertainty. There are however some exceptions where forecast accuracy improved for the current year (France, the Netherlands, Belgium and Slovakia, Czech Republic and Poland). In this short sample, forecasts for Spain show the highest accuracy, with a MAE of below 0.4 pps., followed by the UK, Austria, Germany and France, all with a MAE of about 0.5 pps. Compared to the whole sample, forecasts for Spain, the UK and Germany in the short sample have become significantly more accurate while for Austria and France, the accuracy has remained broadly unchanged.

Table 3.4:
Gross domestic product, MAE for the current year and the year-ahead forecasts

	Current year						Year-ahead					
	2000-07		2008-14		2000-14		2000-07		2008-14		2000-14	
	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE
Belgium	8	0.72	7	0.42	15	0.58	8	1.06	7	1.04	15	1.05
Germany	8	0.50	7	0.57	15	0.53	8	1.03	7	1.39	15	1.20
Estonia	4	2.18	7	2.71	11	2.52	4	3.48	7	4.59	11	4.18
Ireland	8	1.48	7	1.77	15	1.61	8	1.79	7	2.79	15	2.26
Greece	8	0.43	7	1.24	15	0.81	8	0.49	7	2.66	15	1.50
Spain	8	0.36	7	0.38	15	0.37	8	0.44	7	1.43	15	0.90
France	8	0.59	7	0.48	15	0.54	8	0.65	7	0.83	15	0.73
Italy	8	0.60	7	0.80	15	0.69	8	0.84	7	2.00	15	1.38
Cyprus	4	0.25	7	1.69	11	1.17	4	0.33	7	2.08	11	1.44
Latvia	4	2.35	7	3.40	11	3.02	4	3.05	7	5.39	11	4.54
Lithuania	4	0.95	7	1.67	11	1.41	4	1.48	7	4.15	11	3.18
Luxembourg	8	1.34	7	1.56	15	1.44	8	2.23	7	2.30	15	2.26
Malta	4	0.73	7	1.05	11	0.93	4	1.78	7	1.42	11	1.55
Netherlands	8	0.80	7	0.37	15	0.60	8	1.13	7	1.44	15	1.27
Austria	8	0.50	7	0.53	15	0.52	8	0.81	7	1.34	15	1.06
Portugal	8	0.68	7	0.78	15	0.73	8	0.94	7	1.03	15	0.98
Slovenia	4	1.08	7	1.56	11	1.38	4	1.45	7	3.03	11	2.45
Slovakia	4	1.68	7	0.66	11	1.03	4	2.23	7	2.05	11	2.12
Finland	8	1.25	7	1.49	15	1.36	8	1.33	7	2.79	15	2.01
Euro area	8	0.44	7	0.38	15	0.41	8	0.76	7	1.29	15	1.01
Bulgaria	1	0.10	7	0.75	8	0.67	1	0.20	7	1.95	8	1.73
Czech Republic	4	1.38	7	0.83	11	1.03	4	1.75	7	2.28	11	2.09
Denmark	8	0.65	7	1.08	15	0.85	8	0.78	7	1.89	15	1.29
Hungary	4	0.70	7	1.03	11	0.91	4	0.70	7	2.51	11	1.85
Poland	4	0.98	7	0.91	11	0.93	4	1.63	7	0.97	11	1.21
Romania	1	0.70	7	1.43	8	1.34	1	0.20	7	2.71	8	2.39
Sweden	8	0.76	7	1.20	15	0.97	8	0.90	7	2.07	15	1.45
United Kingdom	8	0.34	7	0.67	15	0.49	8	0.50	7	1.37	15	0.91
EU	8	0.43	7	0.45	15	0.44	8	0.70	7	1.28	15	0.97

For year-ahead forecasts, the same countries reported the largest increases in the MAE (Latvia (+2.34 pps.), Greece (+2.17 pps.) and Cyprus (+1.55 pps.). On top of these countries, Lithuania registered the largest increase in the MAE (+2.67 pps.). Poland, Slovakia and Belgium stand out as the countries for which forecast errors have decreased in the crisis period compared to the pre-crisis period for both the current year and year-ahead forecasts. Year-ahead forecasts for France show the highest accuracy in the short sample, with a MAE of about 0.7 pps., followed by Spain and the UK, with a MAE of about 0.9 pps. Compared to the whole sample, forecasts for France and the UK have become more accurate while for Spain, the accuracy has remained unchanged.

([11]) The forecast for Programme countries are agreed among the Troïka and with the authorities of the Member States concerned.

3.2.2. Inflation

Comparing the average absolute forecast error for the pre-crisis and crisis/post-crisis period shows that the forecast accuracy for inflation for both the current and year-ahead forecast – as measured by the MAE – deteriorated significantly for both the EU and euro-area aggregate in the crisis and post-crisis years. For the current year, the MAE increased by 0.23 pps. for the EU and by 0.15 pps. for the euro area. For year-ahead forecasts, it increased even more sharply, by 0.83 pps. for the EU as a whole and by 0.71 pps. for the euro area. This deterioration in forecast accuracy can be explained by the large forecast errors for the current year for 2009 (overestimation of inflation) and 2010 (underestimation of inflation) and for both horizons for 2014 (overestimation) (see Graph 3.2). The forecast errors for 2009 and 2010 show the difficulty of forecasting abrupt changes in inflation developments.

At the Member State level, a significant increase in inflation forecast errors for the current year and the year ahead is evident for most of the ('old' and 'new') Member States. The only exceptions are the forecasts for Belgium, Lithuania, Austria, Slovenia and Poland for current year forecast and Latvia, Finland and Hungary for both horizons. Overall, the deterioration in forecast accuracy for the current year is the sharpest in Greece, Cyprus, Estonia, Luxembourg and Ireland.([12]) For the year ahead, the sharpest deterioration can be seen for Cyprus, Lithuania, Greece and Spain.

Table 3.5:
Price deflator of private consumption, MAE for the current year and the year-ahead forecasts

	Current year						Year-ahead					
	2000-07		2008-14		2000-14		2000-07		2008-14		2000-14	
	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE	Sample	MAE
Belgium	8	0.47	7	0.36	15	0.42	8	0.60	7	1.14	15	0.85
Germany	8	0.15	7	0.33	15	0.23	8	0.22	7	0.77	15	0.48
Estonia	4	0.57	7	0.92	11	0.79	4	1.50	7	2.25	11	1.98
Ireland	8	0.61	7	0.86	15	0.73	8	1.07	7	1.52	15	1.28
Greece	8	0.33	7	0.90	15	0.59	8	0.49	7	1.54	15	0.98
Spain	8	0.42	7	0.56	15	0.48	8	0.52	7	1.32	15	0.89
France	8	0.27	7	0.33	15	0.30	8	0.24	7	0.95	15	0.57
Italy	8	0.30	7	0.41	15	0.35	8	0.49	7	1.10	15	0.77
Cyprus	4	0.52	7	0.89	11	0.76	4	0.30	7	1.63	11	1.15
Latvia	4	3.22	7	1.29	11	1.99	4	2.84	7	2.79	11	2.81
Lithuania	4	1.11	7	0.80	11	0.91	4	0.83	7	2.01	11	1.58
Luxembourg	8	0.35	7	0.66	15	0.49	8	0.50	7	1.06	15	0.76
Malta	4	0.78	7	0.88	11	0.84	4	0.82	7	1.16	11	1.04
Netherlands	8	0.25	7	0.42	15	0.33	8	0.43	7	0.92	15	0.66
Austria	8	0.42	7	0.29	15	0.35	8	0.32	7	0.96	15	0.62
Portugal	8	0.48	7	0.58	15	0.52	8	0.52	7	1.21	15	0.84
Slovenia	4	0.87	7	0.79	11	0.82	4	1.15	7	1.34	11	1.27
Slovakia	4	0.58	7	0.64	11	0.62	4	0.95	7	1.59	11	1.36
Finland	8	0.44	7	0.32	15	0.38	8	0.99	7	0.89	15	0.95
Euro area	8	0.14	7	0.29	15	0.21	8	0.25	7	0.96	15	0.58
Bulgaria	1	3.55	7	1.44	8	1.70	1	3.80	7	2.59	8	2.74
Czech Republic	4	0.53	7	0.63	11	0.60	4	0.32	7	0.99	11	0.75
Denmark	8	0.31	7	0.41	15	0.36	8	0.32	7	0.66	15	0.48
Hungary	4	0.65	7	0.55	11	0.59	4	1.10	7	1.04	11	1.06
Poland	4	0.60	7	0.50	11	0.53	4	1.02	7	1.44	11	1.28
Romania	1	0.42	7	1.30	8	1.19	1	0.30	7	1.69	8	1.52
Sweden	8	0.26	7	0.37	15	0.31	8	0.43	7	0.55	15	0.48
United Kingdom	8	0.51	7	0.63	15	0.57	8	0.59	7	0.98	15	0.78
EU	8	0.07	7	0.30	15	0.18	8	0.12	7	0.95	15	0.51

([12]) Results for Bulgaria and Romania are not discussed here as only one observation is available in the pre-crisis sample.

3.2.3. General Government balance

For the current year forecast, the accuracy of the general government balance (in % of GDP) improved marginally for the EU and somewhat more for the euro-area aggregate in the crisis (and post-crisis) period compared to the pre-crisis period (2000-2007). In contrast, the accuracy for the year-ahead forecast deteriorated significantly in the crisis years compared to the pre-crisis period. This deterioration is in part the result of the very large forecast error for 2009, which mirrors the forecast error in terms of GDP growth.

At the Member State level, the forecast accuracy, as measured by the MAE, has decreased in the period 2008-2014 compared to 2000-2007 in a majority of Member States for both horizons. The largest increases in forecast errors were recorded in Ireland (+2.95 pps. for t and +3.35 pps. for t+1) and Greece (+2.85 pps. for t and +2.93 pps. for t+1), two Programme countries. For these countries, the increase in the forecast errors can to some extent be explained by the fact that fiscal consolidation measures were implemented throughout the year and were therefore unknown in sufficient detail at the time of the forecast (cf. section 5).

Table 3.6:
General government balance, MAE for the current year and the year-ahead forecasts

	Current year						Year-ahead					
	2000-07		2008-14		2000-14		2000-07		2008-14		2000-14	
	Sample	MAE	Sample	MAE	Sample	MAE	sample	MAE	sample	MAE	sample	MAE
Belgium	8	0.37	7	0.75	15	0.55	8	0.64	7	1.40	15	0.99
Germany	8	0.87	7	0.78	15	0.83	8	1.15	7	1.09	15	1.12
Estonia	4	1.27	7	1.75	11	1.57	4	2.06	7	1.97	11	2.00
Ireland	8	1.77	7	4.72	15	3.15	8	1.99	7	5.34	15	3.55
Greece	8	0.95	7	3.80	15	2.28	8	1.79	7	4.72	15	3.16
Spain	8	0.60	7	2.10	15	1.30	8	0.74	7	3.26	15	1.92
France	8	0.44	7	0.53	15	0.48	8	0.61	7	1.18	15	0.88
Italy	8	0.45	7	0.52	15	0.48	8	0.86	7	0.85	15	0.86
Cyprus	4	1.53	7	2.13	11	1.91	4	2.00	7	1.73	11	1.83
Latvia	4	1.22	7	1.22	11	1.22	4	1.80	7	3.00	11	2.57
Lithuania	4	0.84	7	1.24	11	1.10	4	1.24	7	1.90	11	1.66
Luxembourg	8	1.26	7	0.73	15	1.01	8	2.10	7	1.72	15	1.92
Malta	4	0.50	7	0.91	11	0.76	4	0.75	7	1.02	11	0.92
Netherlands	8	1.24	7	0.86	15	1.06	8	1.53	7	1.47	15	1.50
Austria	8	0.47	7	0.56	15	0.51	8	0.67	7	0.99	15	0.82
Portugal	8	0.71	7	1.18	15	0.93	8	1.16	7	1.65	15	1.39
Slovenia	4	0.63	7	1.66	11	1.29	4	0.96	7	3.20	11	2.38
Slovakia	4	0.78	7	0.74	11	0.75	4	0.91	7	1.31	11	1.16
Finland	8	1.15	7	0.88	15	1.03	8	1.34	7	1.80	15	1.55
Euro area	8	0.54	7	0.48	15	0.51	8	0.79	7	1.07	15	0.92
Bulgaria	1	1.43	7	1.18	8	1.21	1	1.70	7	1.99	8	1.95
Czech Republic	4	1.85	7	1.01	11	1.31	4	1.95	7	1.57	11	1.71
Denmark	8	0.75	7	1.42	15	1.06	8	1.12	7	1.91	15	1.49
Hungary	4	1.63	7	0.81	11	1.11	4	2.13	7	1.75	11	1.88
Poland	4	1.38	7	1.90	11	1.71	4	0.97	7	2.26	11	1.79
Romania	1	0.73	7	1.28	8	1.21	1	0.00	7	1.28	8	1.12
Sweden	8	0.94	7	0.75	15	0.85	8	1.34	7	1.16	15	1.26
United Kingdom	8	0.87	7	0.86	15	0.87	8	1.26	7	2.09	15	1.65
EU	8	0.54	7	0.51	15	0.53	8	0.83	7	1.06	15	0.94

4. PROPERTIES OF THE FORECAST ERRORS

This section focuses on the characteristics of GDP growth, inflation and the general government balance forecast errors. As in González Cabanillas and Terzi (2012), biasness and error persistence tests are run. Additional properties assessed here include whether the projections of the European Commission are qualitatively useful (i.e. better than a naïve projection of past realisations), directionally accurate, contain statistically significant information and whether they are efficient. These additional tests are more difficult to pass.

Generally the tests are performed using linear regressions for each of the 27 Member States examined as well as for the EU and euro-area aggregates where feasible. The feasibility depends mainly on the sample size (see Table 2.1). In case the sample size is too small to perform reliable regression analyses, non-parametric equivalents are used. In case non-parametric tests are not suitable or not available, panel regressions are used to get an overall picture across Member States. The tests are performed for the full period 1969-2014 but also for the shorter sample period 2000-2014 ([13]) and distinguishing between the periods 2000-2007 and 2008-2014.

4.1. ARE THE PROJECTIONS BIASED?

Forecasts from public national or international institutions are often suspected of being too optimistic. Criticism was notably voiced against the Commission's forecast during the Great Recession of 2008 and the subsequent slower than expected recovery. The issue at stake is the absence of bias. It implies that on average the forecast error is zero or in other words that there is no systematic over- or underestimation.

In order to test whether the Commission's forecasts are biased, the projection errors (e) are regressed on a constant (α):

$$e_{i,t,t} = \alpha + \varepsilon_{i,t,t}$$

$$e_{i,t+1,t} = \alpha + \varepsilon_{i,t+1,t}$$

Where $e_{i,t,t}$ *and* $e_{i,t+1,t}$ stand for the current year and year-ahead forecast errors for country i at time t respectively, and ε for an independently and identically distributed error term. In the absence of bias, α = 0 (see Box 4.1).

The bias was investigated for the euro-area and EU aggregates as well as for Member States in the whole sample and subsample periods. For some periods and for some countries the assumption of normal error distribution was violated due to small sample size (in particular for the 'new' Member States in the pre-crisis period 2000-2007). To account for this, the regression described above was complemented by a Wilcoxon signed rank test with the null hypothesis H0: median (E) = 0, with E being the estimate of the variable of interest. The Wilcoxon signed rank test is a non-parametric test that can be used as an alternative for the one sample t-test when the estimate cannot be assumed to be normally distributed. This test is therefore suited for analysing distributional properties in small samples. On top of the country analyses, a panel regression was performed (see Box 4.1 for details). The advantage of this test is that it increases the power of the test without losing the country specificities in the data. The weakness of the test is that it only gives an average result across countries.

The results of the bias tests for the long period are presented in Table 4.1 while those for the shorter periods are shown in Annex 2 (Tables A2.2, A2.3, and A2.4 respectively). As explained above, for the shorter samples, because of the loss of precision and power, a country by country analysis based on

([13]) For the 'new' Member States, the test results for the whole sample and the short sample are the same since data for these countries is only available since 2004 or 2007.

statistical tests might be misleading. For these short reference periods, it is more insightful to consider the panel regression (indicated as "Overall" in the tables), which gives an idea of the average bias across the 27 Member States tested. Nevertheless, some clear and interesting trends show up in the individual country data, regardless of the statistical significance of the results. The results are described in detail below. An estimate is considered statistically significant when the corresponding p-value is below 0.05. The null hypothesis of absence of a bias is then rejected at the 5% level.

4.1.1. Gross Domestic Product

González Cabanillas and Terzi (2012) found, in line with the preceding studies, that there was no evidence of a bias in Commission's projections for GDP growth for the EU and euro-area aggregates. For current year forecasts, this still holds. It however has to be qualified for the year-ahead in light of the newest results. The single-series regressions for the EU and euro area indicate a positive but statistically not significant bias in the year-ahead forecasts, as in the 2012 paper. However, the newly introduced panel regression shows different results across EU Member States. This more powerful tool shows that the positive bias in the year-ahead forecast is statistically significant at the 1% level. Results are presented in Table 4.1.

At the Member State level, Italy remains the only country to have a bias that is statistically significant at the 1% level, for both the current year and year-ahead forecasts. This bias was already present in the previous study. Italian GDP is found to be overestimated on average by 0.45 pps. for the current year and 0.83 pps. for the year ahead. Compared to the previous Commission study, additional cases of bias have been detected when extending the observation sample to 2014. For the year ahead, positive biases were found for the forecasts for France (0.35) and Denmark (0.45).

Looking at the most recent period (2000-2014), the panel regression resulted in a significant overall year ahead bias estimate of +0.54 pps. suggesting that European Commission's forecasts tended to overestimate growth for that period. At the Member State level, using the simple test, forecasts for Italy continue to exhibit positive bias for the current year as in the whole sample and forecasts for Italy, France and Denmark for the year ahead continued to exhibit positive biases. One additional country, Portugal, comes out with a positive bias in the shorter sample for the year-ahead forecast.

For the pre-crisis sample (2000-2007) and the crisis and post crisis sample (2008-2014), the number of observations is rather limited. Therefore, results should be taken with caution. For the 2000-2007 sample, the results of the panel regression show a significant overall current year bias estimate of -0.19 pps. and a significant year-ahead bias estimate of -0.30 pps. This suggests that GDP growth was underestimated in pre-crisis years. In contrast, in the 2008-2014 period, GDP growth was overall overestimated (+0.29 pps. and +1.27 pps, respectively).

At the Member State level, a negative coefficient was found for 14 Member States for the current-year projection and for 15 Member States for the year-ahead projection in the pre-crisis period, which could explain the overall downward bias. However, a positive bias is found for the EU and euro-area aggregates stemming from the positive bias in a majority of the large Member States. In contrast, for the 2008-2014 period a positive coefficient was found for 22 Member States for the current-year and for all Member States for the year-ahead projections. Although most of these coefficients are not statistically significant, it shows that there is a clear tendency in the pre-crisis period to underestimate growth and to overestimate growth in the crisis and post crisis period.

4.1.2. Inflation

The inflation forecasts for the two aggregates display no bias in the whole sample. At the Member States level, however, some bias exists. For the current year, projections underestimated inflation for two countries: Spain (-0.24) and Latvia (-1.62). In the previous Commission study, these two countries

already displayed the negative bias, while for Portugal the bias has disappeared (at the 5% level) once the observation period has been extended. The year-ahead forecast for inflation is negatively biased for two Member States: Italy (-0.87) and Latvia (-1.9) and positively biased for Sweden (0.42). These biases were already present in the previous study. In contrast, the inflation bias for the year ahead forecast for Spain is no longer significant. As in the case of GDP, the panel regression shows a negative bias for year-ahead inflation forecasts, that is statistically significant.

Table 4.1:
Tests for unbiasedness ('69-'14)

	GDP		Inflation		General government	
	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	-0.07	0.26	-0.03	0.00	0.15	0.33
Germany	0.01	0.33	0.08	0.04	-0.29**	-0.20
Estonia	0.01	0.97	-0.27	-0.11	-0.80	-1.16
Ireland	-0.46	-0.38	0.07	-0.13	0.43	0.64
Greece	0.11	0.38	-0.06	-0.52	1.18**	1.59**
Spain	-0.15	0.11	-0.24**	-0.34*	0.44	0.76*
France	0.05	0.35**	0.06	-0.26	-0.04	0.10
Italy	0.45***	0.83***	-0.07	-0.87***	0.17	0.43*
Cyprus	-0.31	0.78	0.34	0.52	0.28	-0.08
Latvia	-0.34	0.69	-1.62**	-1.9**	-0.57	-0.77
Lithuania	0.00	0.48	-0.28	-0.26	-0.04	-0.27
Luxembourg	-0.46	0.05	0.02	-0.07	-0.74***	-1.34***
Malta	-0.49	-0.15	0.38	0.44	-0.01	-0.15
Netherlands	0.00	0.11	0.02	0.21	-0.3*	-0.11
Austria	0.04	0.35	-0.03	0.09	-0.3**	-0.37*
Portugal	0.10	0.41*	-0.25*	-0.43	-0.13	0.26
Slovenia	0.09	0.62	0.01	0.60	0.73	0.86
Slovakia	-0.50	-0.14	0.11	0.36	0.14	0.30
Finland	0.28	0.52	-0.01	0.08	-0.26	-0.21
Euro area	0.14	0.53	0.01	-0.02	-0.02	0.17
Bulgaria	0.47	1.29	-0.07	0.16	0.43	1.40
Czech Republic	-0.10	0.43	0.22	0.46	-0.71	-0.77
Denmark	0.28*	0.45**	-0.14	-0.30	-0.28	-0.19
Hungary	0.11	0.71	0.05	-0.01	-0.11	-0.58
Poland	-0.50	-0.28	-0.01	0.15	0.76	0.81
Romania	0.31	1.51	0.29	-0.26	0.37	0.77
Sweden	-0.04	0.34	-0.03	0.42***	-0.85***	-0.78**
United Kingdom	0.04	0.30	0.06	-0.28	0.01	0.31
EU	0.10	0.38*	0.02	-0.18	-0.06	0.14
Overall	-0.02	0.33***	-0.04	-0.14**	-0.02	0.08

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

In the 2000-2014 period, the panel regression shows no bias for either t or t+1 inflation forecasts. At the Member State level, on top of the biases for Latvia and Sweden already present for the whole sample, forecasts for Belgium and France also come out with a significant bias in the shorter sample for the current year forecast. It is noteworthy though that the biases for Spain for the current year and for Italy for the year-ahead forecast in the whole sample are no longer statistically significant in the shorter sample.

In the pre-crisis period (2000-2007), both current-year and year ahead inflation was on average underestimated across Member States (-0.29 and -0.26) while in the 2008-2014 period, inflation projections were unbiased at both horizons. At the Member State level, the coefficient was negative for 20 countries for the current-year inflation and for 17 countries for the year-ahead inflation in the 2000-2007 sample, suggesting an underestimation of inflation during that period. In the 2008-2014 sample, positive coefficients (though most non-significant) were recorded for most of the Member States for both horizons, suggesting an overestimation of inflation.

4.1.3. General government balance

In the case of general government balance, the Commission uses a no-policy change assumption. Only the budgetary measures known in sufficient details or approved by the national parliaments are taken into account. This may have had a particular impact on the forecast errors and bias, notably for year-ahead forecasts (cf. Section 5).

For the whole sample, the government balance projections for the EU and euro-area aggregates appear as unbiased for both the current year and the year ahead. At the Member State level, Luxembourg and Sweden continue to show a tendency for relatively large underestimation for both horizons (-0.74 pps. and -1.34 pps. for Luxembourg and -0.85 pps. and -0.78 pps. for Sweden, respectively for t and t+1). Greece which already displayed a substantial positive bias for the year-ahead forecast in the previous Commission study, now also shows a large positive bias for the current year (+1.18 pps.). For the current year, two additional countries, Austria and Germany, now display a tendency to systematically underestimate the government balance.

For the 2000-2014 period, the panel regression shows no bias for general government balance forecasts. At the Member State level, most of the significant biases already existed for the long sample. Greece and Luxembourg continue to exhibit respectively a positive and a negative bias for both horizons. The same negative bias was found for Austria for the current year. One additional country, Denmark, now exhibits a negative bias in the shorter sample for the current year forecast. In contrast, the bias for Sweden for the year-ahead forecast which existed for the long sample, does not appear statistically significant in the shorter sample. Depending on the country and the year, a negative bias for the government balance can either mean that the surplus was underestimated or that the deficit was overestimated. For Greece, the positive bias for that period clearly refers to an underestimation of the deficit.

In the pre-crisis period, both the current-year and the year-ahead projections for government balance appear overall negatively biased (-0.44 and -0.50, respectively). At the Member State level, it can be seen that for 21 countries the coefficient was negative for the current-year government balance and for 19 countries for the year-ahead. This suggests either an underestimation of the surplus or an overestimation of the deficit in the pre-crisis period. Since a large majority of countries exhibited a deficit during that period, it rather indicates an overestimation of the deficit. The opposite result was found for the 2008-2014 period. The overall government balance bias estimate for the current-year (0.48) and the year-ahead (0.72) were positive and highly significant, pointing to an underestimation of the public deficit on average, since most Member States exhibited a deficit during that period. For the current-year, bias estimates (not all significant) were positive for 17 Member States and for 19 Member States for the year-ahead projections.

4.2. ARE THE PROJECTION ERRORS PERSISTENT?

If forecasters repeat the same mistakes (or compensate past mistakes by subsequent errors of the opposite sign), forecast errors will be positively (negatively) autocorrelated. Such persistency of forecast errors was examined with the Ljung-Box test (see Box 4.1 for details). Autocorrelation properties of the errors were investigated up to three lags. A negative sign of the autocorrelation coefficients suggests that an over(under)estimation of the selected variable in year t is compensated by an under(over)estimation of this variable in year t+1. A positive coefficient implies that once an over(under)estimation is made, it leads to subsequent over(under)estimations. Tests are run for the full sample and for the shorter samples. The results of the tests for the long period are presented in Tables 4.2 and 4.3, while those for the shorter periods are shown in Annex 2, Tables A2.5 to A2.12. An estimate is considered statistically significant when the corresponding p-value is below 0.05. The null hypothesis of absence of autocorrelation in forecast errors up to that number of lags (1, 2, or 3 respectively) is then rejected at the 5% level.

4.2.1. Gross Domestic Product

For GDP growth in the whole sample, no evidence of persistence in forecast errors for the EU and euro area aggregates was found neither for the current year nor for the year-ahead projections. At the Member State level, auto-correlation was found for Estonia, Greece, Latvia, and Malta for the current year forecasts and for Estonia, Ireland Greece and Italy for the year ahead. For the 'new' Member States, only 11 data points are available, therefore results should be interpreted with caution.

In the shorter sample period (2000-2014), the persistency tests broadly give the same results for GDP forecasts. No cases of persistence in forecast errors are found for the EU and euro-area aggregates neither for the current year nor for the year-ahead forecasts. At the Member State level, the results are also similar to those of the long sample. A first difference is reported for Ireland for which serial correlation is now detected in the short sample for the current year forecast while the persistence for the year ahead forecast has disappeared. A second difference is that the error persistency in year-ahead forecasts for Italy has disappeared.

Table 4.2:
Tests for persistency in current-year forecast ('69-'14)

	GDP			Inflation			General government balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	0.15	0.03	-0.11	0.05	0.08	-0.24	0.09	-0.11	0.11
Germany	0.06	0.12	0.03	0.02	-0.17	-0.18	0.05	-0.15	-0.17
Estonia	0.42	-0.41*	-0.67***	-0.24	-0.40	0.29	0.16	-0.39	-0.22
Ireland	-0.06	0.09	0.05	-0.20	-0.04	-0.07	0.19	0.16	-0.01
Greece	0.38**	0.18**	0.05*	0.12	-0.17	0.04	0.17	0.00	0.01
Spain	0.33*	-0.04	-0.13	-0.23	-0.04	0.04	0.17	-0.04	0.13
France	0.17	0.01	-0.11	-0.09	0.08	-0.05	0.05	-0.17	0.05
Italy	-0.14	-0.10	0.21	0.18	-0.11	-0.19	-0.21	0.00	-0.08
Cyprus	0.01	-0.32	0.24	0.23	-0.13	0.20	-0.16	-0.19	0.41
Latvia	0.36	-0.36	-0.49**	0.41	0.02	-0.18	-0.01	-0.27	-0.28
Lithuania	0.15	-0.42	-0.35	-0.24	0.36	-0.27	0.18	-0.05	-0.19
Luxembourg	0.24*	-0.19	-0.11	0.08	0.06	0.09	-0.24	-0.11	0.03
Malta	-0.14	-0.61**	0.14*	-0.15	0.00	0.04	-0.02	-0.28	-0.11
Netherlands	0.15	0.09	-0.02	-0.05	-0.10	-0.05	0.05	0.04	-0.20
Austria	0.18	0.02	-0.27	0.12	-0.03	0.22	-0.10	-0.03	0.00
Portugal	0.28	0.22	-0.03	0.24	0.16	0.17	0.06	0.00	0.05
Slovenia	0.16	-0.05	-0.01	-0.06	-0.28	-0.05	-0.04	0.07	-0.05
Slovakia	0.20	-0.12	-0.08	-0.05	-0.27	-0.51	0.29	-0.25	-0.11
Finland	-0.11	-0.19	-0.13	0.04	0.03	-0.03	-0.14	-0.02	-0.10
Euro area	0.02	-0.26	-0.14	-0.07	-0.14	0.06	0.24	-0.45*	-0.29*
Bulgaria	-0.35	0.11	-0.20	0.16	-0.16	0.00	0.18	-0.51	-0.35
Czech Republic	0.31	-0.05	0.05	0.04	-0.02	-0.02	-0.10	-0.11	0.39
Denmark	0.16	0.04	0.04	0.02	-0.08	-0.13	0.22	0.06	-0.01
Hungary	0.19	-0.57*	-0.15	0.37	-0.40	-0.69***	0.18	-0.27	0.10
Poland	-0.22	-0.18	0.11	0.21	-0.03	-0.10	0.00	0.10	-0.12
Romania	-0.06	-0.07	0.01	-0.54*	0.13	0.10	-0.07	-0.30	0.14
Sweden	-0.04	-0.34	-0.25	-0.19	0.14	-0.01	0.23	-0.06	-0.12
United Kingdom	-0.16	-0.10	0.06	0.05	0.22	0.10	0.22	-0.07	-0.01
EU	-0.07	-0.03	-0.06	0.10	0.09	-0.22	0.09	-0.21	-0.16

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

In the 2000-2007 period, very little evidence was found for error persistency in the projections for GDP growth. Serial correlation among forecast errors for the euro-area and EU errors was absent. Only two Member States showed high auto-correlation coefficients for the current year forecast (Ireland and Czech Republic) and only three countries for the year-ahead forecast (Ireland, France and Sweden). In the 2008-2014 period, similar results were found. No evidence was found for error persistency for the euro-area and EU aggregates and only persistency in the current year forecast errors for Hungary was found. In terms of the sign of the auto-correlation coefficients, there was not a clear distinction between the pre- and post-crisis period.

4.2.2. Inflation

For inflation, no error persistency was identified for the EU and euro-area aggregates for the current year in the whole sample. However, serial correlation among year-ahead forecast errors for the EU exists. For the Member States, for the current year, Hungary is the only country for which serial correlation is found. For the year-ahead inflation forecasts, autocorrelation comes out as statistically significant for six countries: Germany, Ireland, Luxembourg, Portugal, Denmark and the UK.

In the shorter sample period (2000-2014), the persistency tests on inflation errors give the exact same results as in the full sample for the current year (no error persistence except for HU). For the year ahead, however, results show that the serial correlation that existed in the long sample (six countries plus EU) for inflation seems to have been resolved. Serial correlation is now completely absent.

In the pre-crisis period, no error persistency was found in the current-year projections for the euro-area aggregate and the EU, while some autocorrelation was detected in the year-ahead projections for the EU. At the Member State level, only two countries showed somewhat high auto-correlation coefficients in the year-ahead projections (Denmark and Hungary). In the post-crisis period, the results were very similar. No error persistency could be detected for the aggregates in current-year and year-ahead projections. At the Member State level, serial correlation among current-year forecast existed in three countries (Slovenia, Hungary and Romania) and only in one country for the year-ahead forecast (Malta). For both periods, the majority of auto-correlation coefficients was negative, suggesting no clear differences between the pre- and post-crisis period.

Table 4.3:
Tests for persistency in year-ahead forecast ('69-'14)

	GDP			Inflation			General government balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	0.11	-0.07	0.06	0.22	-0.08	-0.13	0.08	-0.06	0.04
Germany	-0.08	-0.21	-0.09	0.31**	0.19**	-0.12*	0.02	-0.34*	-0.12*
Estonia	0.44*	-0.30	-0.57**	-0.14	-0.42	-0.13	0.21	-0.5*	-0.43**
Ireland	0.34**	0.09*	0.12*	0.32**	-0.13*	-0.22*	0.48***	0.1***	-0.17***
Greece	0.45***	0.14**	0.21**	0.22	0.15	-0.01	0.26	-0.01	0.02
Spain	0.26	-0.16	0.06	-0.01	-0.24	-0.21	0.3*	-0.05	0.12
France	0.03	-0.10	-0.10	0.13	0.01	0.08	0.18	-0.11	-0.13
Italy	0.08	-0.34**	0.13*	0.21	0.13	-0.18	0.09	-0.18	-0.07
Cyprus	-0.22	-0.19	0.06	0.10	0.02	0.05	0.04	-0.31	0.00
Latvia	0.33	-0.31	-0.40	0.03	-0.06	0.08	0.32	-0.42	-0.47**
Lithuania	0.01	-0.36	-0.14	0.00	-0.09	0.01	0.13	-0.24	-0.15
Luxembourg	0.10	-0.17	-0.11	0.49***	0.11***	-0.15***	0.11	-0.20	0.12
Malta	-0.05	-0.41	-0.19	-0.34	0.27	-0.21	0.12	-0.25	-0.13
Netherlands	-0.01	0.09	-0.10	0.17	0.05	-0.10	0.23	-0.03	-0.25
Austria	-0.10	-0.24	-0.37	-0.11	-0.39	0.16	-0.14	-0.27	-0.03
Portugal	0.09	0.04	-0.08	0.35**	-0.02	0.09	0.16	-0.17	-0.08
Slovenia	0.07	-0.23	0.07	-0.01	-0.35	-0.32	-0.37	0.06	-0.20
Slovakia	-0.03	-0.21	-0.19	-0.22	-0.15	-0.42	0.19	-0.28	-0.05
Finland	-0.05	-0.19	-0.05	0.01	-0.06	-0.25	-0.05	-0.23	-0.05
Euro area	-0.13	-0.34	-0.12	-0.21	-0.22	-0.18	0.10	-0.38	-0.28
Bulgaria	-0.34	-0.16	0.12	0.06	-0.40	0.02	0.22	-0.16	-0.26
Czech Republic	0.14	-0.17	-0.12	-0.07	0.00	-0.49	-0.02	-0.27	0.28
Denmark	0.20	-0.04	-0.07	-0.31**	0.02	0.20	0.41***	0.05**	-0.15**
Hungary	-0.05	-0.07	0.07	-0.17	-0.02	-0.07	0.07	-0.18	0.00
Poland	-0.27	-0.54*	0.18*	0.14	-0.43	-0.20	0.11	-0.17	-0.21
Romania	-0.01	-0.29	0.04	-0.43	0.19	0.04	0.23	-0.06	-0.20
Sweden	-0.09	-0.30	-0.26	0.05	0.04	0.00	0.19	-0.21	-0.12
United Kingdom	0.18	-0.06	-0.18	0.38***	-0.06**	-0.1*	0.17	-0.15	-0.19
EU	-0.04	-0.26	-0.04	0.31**	-0.09*	-0.19*	0.08	-0.29	-0.11

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

4.2.3. General government balance

The general government balance errors did not show persistency for the EU and euro-area aggregates for neither t nor t+1 in the whole sample. As regards the Member States, serial correlation is absent for the current year but exists for the year-ahead forecasts for Estonia, Latvia, Ireland, and Denmark.

In the 2000-2014 sample, error persistency was identified for Italy for the current year forecast. For the year-ahead forecasts, serial correlation was found for Italy, in addition to Estonia, Ireland and Latvia. The error persistence that was identified for Denmark for the whole sample has however been resolved. No qualitative nor quantitative differences could be detected between the pre- and post-crisis period in terms of error persistency.

4.3. ARE THE PROJECTIONS QUANTITATIVELY ACCURATE?

The Diebold-Mariano test (see Box 4.1 for details) is used here to test whether the Commission's forecast could beat a naïve forecast. An estimate is considered statistically significant when the corresponding p-value is below 0.05. The null hypothesis that the naïve forecast performs as well as the Commission's forecast is then rejected. All results can be found in Annex 2, Tables A2.13 to A2.16. Results for the whole sample are reported in Table 4.4 below.

4.3.1. Gross Domestic Product

In the whole sample, Commission's current-year projections for euro-area and EU aggregates were significantly more accurate than the naïve forecast. The naïve forecast is here defined as being the latest available actual value. This was also the case for most Member States. Only projections for Estonia, Cyprus, Lithuania, Malta, Slovenia, Slovakia, Bulgaria, Romania, and Sweden did not outperform the naïve forecast. It should be noted that all but one (Sweden) of these countries are 'new' Member States, for which the sample size is considerably smaller than for 'old' Member States. Therefore, the non-significant results could be due to lack of statistical power. Commission's year-ahead GDP projections also perform in general better compared to the naïve forecast. Both euro-area and EU aggregates are projected more accurately by the Commission, as well as projections for 24 Member States (all except Bulgaria, Romania, and Sweden).

In the short sample (2000-2014), Commission's forecast for euro-area and EU aggregates are found significantly more accurate than the naïve forecast. At the Member State level, the number of countries for which the Commission's forecasts outperforms the naïve forecast is lower than in the whole sample for both horizons (only about half of them for the current year but still a large majority for the year-ahead forecasts). In pre-crisis years, Commission current year forecasts for the euro area and the EU were significantly more accurate than the naïve forecast. Also the year-ahead forecasts for the EU beat the naïve forecast, but this is not the case for the euro-area aggregate. In the crisis and post-crisis years, the Commission's forecasts for the two aggregates did not outperform the naïve forecast. As regards Member State's projections in the pre-crisis period, most estimates are positive, (implying that the Commission's forecasts show a tendency to be more accurate than the naïve forecast), but very few results reach statistical significance. Most probably this is due to the lack of statistical power. In crisis and post-crisis years, all estimates are positive, but only a few are statistically significant.

4.3.2. Inflation

In the 1969-2014 sample, the Commission's current-year inflation forecast for the euro area was not more accurate than the naïve forecast. The projections for the EU however outperformed the naïve forecast. The projections for 21 Member States were significantly more accurate than the naïve forecast. This was

not the case for four euro-area countries (Estonia, Cyprus, Latvia, and Slovenia) and two non-euro area countries (Bulgaria and Czech Republic).

For year-ahead inflation projections, conclusions are broadly the same. Again, no evidence is found that euro-area projections are more accurate than the naïve forecast, while EU projections performed statistically better. Concerning the Member States, projections for 20 countries outperformed the naïve forecast. This was not the case for Cyprus, Latvia, Malta, Austria, Slovenia, Slovakia, and Romania. It should be noted that all of these countries except Austria are 'new' Member States. Only a few data points are available for these countries and as a result the statistical tests suffer from low power.

For the shorter period (2000-2014), Commission's forecasts for the euro-area and EU aggregates do not outperform the naïve forecast for either horizon. At the Member State level, all coefficients are positive, suggesting that the Commission's forecasts show a tendency to be more accurate than the naïve forecasts. Only half of the coefficients are significant. Looking at the two sub periods shows that inflation projections for the euro area and EU aggregates were not more accurate than the naïve forecast, except for the year-ahead forecasts in the post-crisis period.

Table 4.4:
Diebold-Mariano tests ('69-'14)

	GDP		Inflation		General government balance	
	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	3.68***	4.08***	2.95***	2.87***	2.47***	4.54***
Germany	2.64***	3.12***	4.17***	3.77***	2.25***	3.22***
Estonia	1.75*	2.36**	1.41*	1.83**	0.53	0.71
Ireland	3.67***	1.92**	3.46***	2.65***	1.00	1.69**
Greece	2.24**	2.1**	3.21***	2.47***	0.58	1.8**
Spain	2.63***	2.72***	2.13**	2.29**	1.33*	1.18
France	2.54***	3.06***	2.23**	2.22**	2.04**	3.33***
Italy	2.85***	4.35***	2.51***	2.18**	2.47***	1.93**
Cyprus	1.5*	2.44**	1.53*	1.69*	0.94	1.39*
Latvia	1.84**	2.14**	1.39*	1.19	1.79**	2.13**
Lithuania	1.64*	2.53**	3***	4.78***	1.62*	2.32**
Luxembourg	2.14**	3.22***	3.67***	2.35***	0.67	1.25
Malta	1.77*	35801.12***	1.95**	-1.08	0.91	0.79
Netherlands	2.49***	3.81***	3.78***	3.35***	1.32*	2.38***
Austria	1.85**	1.89**	2.02**	1.57*	2.23**	2.13**
Portugal	3.47***	3.75***	2.93***	1.82**	1.89**	1.63*
Slovenia	1.65*	2.45**	1.4*	1.31	1.56*	-0.32
Slovakia	1.64*	2.21**	3.19***	1.10	1.43*	1.82**
Finland	1.86**	1.81**	2.08**	2.79***	1.89**	2.41***
Euro area	1.91**	2.27**	1.64*	1.61*	1.55*	1.81**
Bulgaria	1.29	1.35	1.41*	2.01**	1.25	0.01
Czech Republic	1.9**	3.5***	1.44*	31096.27***	0.93	1.52*
Denmark	3.16***	3.13***	2.01**	1.81**	2.16**	2.73***
Hungary	1.94**	2.33**	2.46**	2.1**	1.7*	1.98**
Poland	3.38***	37960.21***	1.91**	2.32**	-0.66	-0.24
Romania	1.31	1.38	2.53**	1.6*	1.44*	4.43***
Sweden	1.52*	1.57*	2.3**	3.17***	1.77**	1.68*
United Kingdom	3.12***	3.47***	2.65***	2.32***	2.47***	2.89***
EU	2.82***	3.45***	3.48***	3.08***	2.38***	2.92***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

4.3.3. General government balance

The Commission's current-year projections for the EU outperformed the naïve forecast in the whole sample, but this was not the case for the euro-area projections. Forecasts for 11 Member States were more accurate than the naïve forecast, most of which were 'old' Member States (Belgium, Germany, France, Italy, Latvia, Austria, Portugal, Finland, Denmark, Sweden, and UK).

The year-ahead projections for the euro area and the EU were also more accurate than the naïve forecast. This was also the case for most of the Member States (for 16). Year-ahead projections for Estonia, Spain, Cyprus, Luxembourg, Malta, Portugal, Slovenia, Bulgaria, Czech Republic, Poland, Sweden did not significantly outperform the naïve forecast.

In the shorter period (2000-2014), only year-ahead forecasts for the euro-area and EU aggregates were found to outperform the naïve forecasts. In the subsamples, Commission's forecasts for the general government balance for both aggregates were not statistically more accurate than the naïve forecast. Overall, estimates for individual Member States turned out to be positive, suggesting a tendency for the Commission's forecasts to outperform a naive forecast but for most of them, but they were non statistically significant.

4.4. ARE THE PROJECTIONS DIRECTIONALLY ACCURATE?

The next test examines whether a pick-up or a slowdown (in GDP growth, inflation, or government balance) has been predicted accurately. Pesaran-Timmermann tests were performed (see Box 4.1 for details). Tests results are presented in Annex2, Table A2.17. An estimate is considered statistically significant when the corresponding p-value is below 0.05, the null hypothesis (not directionally accurate) is then rejected. The results can be seen in Table 4.5 below.

4.4.1. Gross Domestic Product

In the entire sample, pick-ups and slowdowns in the economy were found to be predicted successfully by the Commission's forecast. Current-year forecast predicted pick-ups in 84% of the cases (forecasts identified correctly 274 cases out of the 326) and slowdowns in 86% of the cases (forecasts identified correctly 320 cases out of the 371). The year-ahead forecasts were also directionally accurate, but less so for slowdowns. Year-ahead forecasts predicted 83% of pick-ups, but only 64% of slowdowns correctly. This may partly explain the finding of a positive bias in year-ahead GDP forecasts.

In the shorter sample, Commission's forecasts are also found to be directionally accurate and by broadly the same magnitude as in the whole sample. The lower directional accuracy in predicting slowdowns for year-ahead forecasts is also found in the shorter sample (60%). Higher GDP growth forecast directional accuracy is found in the 2008-2014 period than in the 2000-2007 period for both current and year-ahead forecasts.

4.4.2. Inflation

In the large sample, also inflation pick-ups and slowdowns were predicted successfully by Commission forecasts. Current-year forecast correctly predicted pick-ups in 81% of the cases and slowdowns in 88% of the cases. The year-ahead forecasts were also directionally accurate, but somewhat less than the current-year forecasts. Year-ahead forecasts predicted just 69% of the pick-ups and 79% of the slowdowns correctly.

In the shorter sample, pick-ups and slowdowns were correctly identified by the Commission. As in the large sample, they were better predicted for the current year than for the year-ahead forecasts. The directional accuracy of current year forecasts in the short sample is broadly similar to that in the whole sample. For the year ahead, the forecast directional accuracy is even significantly higher in the most recent period for predicting pick-ups in inflation (75% versus 69%). Higher inflation forecast directional accuracy is found in the period 2008-2014 than in the 2000-2007 period for both current and year-ahead forecasts.

4.4.3. General government balance

Finally, directional changes in the government balance could also be predicted successfully in the Commission's forecasts. The accuracy is found to be lower than in the case of GDP growth and inflation, but still statistically significant. Current-year forecasts predicted correctly positive balance changes in

74% of the cases and negative ones in 79% of the cases. Year-ahead forecasts were also directionally accurate for positive changes (72%), but negative changes were close to chance level (53%).

In the shorter sample, the same conclusions are valid and the magnitudes of directional accuracy are very similar. For year-ahead forecasts, the directional accuracy is significantly higher in the shorter period when predicting decreasing general government balance (60% versus 53%). Higher forecast directional accuracy is found in the period 2008-2014 than in the 2000-2007 period for both current and year-ahead forecasts.

Table 4.5:
Tests for directional accuracy

		GDP							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase
Current-year	actual decrease	320	51	55	15	73	11	154	27
	actual increase	52	274	21	44	5	78	26	123
	Accuracy (%)	0.85***		0.73***		0.90***		0.84***	
Year-ahead	actual decrease	229	130	32	35	57	28	108	71
	actual increase	52	262	18	49	5	77	24	126
	Accuracy (%)	0.73***		0.60***		0.80***		0.71***	
		Inflation							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	342	45	61	9	100	18	160	27
	actual increase	58	247	23	49	6	50	29	122
	Accuracy (%)	0.85***		0.77***		0.86***		0.83***	
Year-ahead	actual decrease	287	77	41	19	93	20	132	40
	actual increase	91	200	23	49	12	45	41	113
	Accuracy (%)	0.74***		0.68***		0.81***		0.75***	
		General government balance							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	241	66	59	13	56	14	133	30
	actual increase	97	275	29	39	22	82	49	124
	Accuracy (%)	0.76***		0.70***		0.79***		0.76***	
Year-ahead	actual decrease	155	136	39	27	48	22	93	64
	actual increase	102	266	29	42	32	70	60	113
	Accuracy (%)	0.64***		0.59**		0.68***		0.62***	

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

4.5. DO THE PROJECTIONS ENCOMPASS THE NAÏVE FORECAST?

The encompassing test examines whether the Commission's forecasts add information to the naïve forecast in explaining the outcome value. As explained in Box 4.1, this can be examined with a multiple regression analysis. A panel regression is run which gives an overall idea across countries whether the Commission's forecasts contain new information compared to the naïve forecast, but not on a country by country basis. Only the results of the whole sample (1969-2014) and the short sample (2000-2014) are commented here as no clear difference could be detected between the two subsamples. All results can be found in Annex 2, Table A2.18. For the current year, the European Commission's forecasts encompass the naïve forecast if $\beta=0$ and $\delta>0$ and for the year-ahead forecast if $\beta=0$; $\gamma=0$ and $\delta>0$.([14]) An estimate is considered statistically significant when the corresponding p-value is below 0.05, the null hypothesis is then rejected. Results are shown in Table 4.6.

([14]) α is irrelevant for the encompassing test.

4.5.1. Gross Domestic Product

In both samples, for the current year, the Commission's GDP growth projections contain significantly more information than was contained in the naïve forecast across countries ($\delta \neq 0$). The panel regression yielded a significantly positive coefficient for the Commission's forecast (1.18), indicating a positive correlation between projection and outcome (See Table 4.6). However, the regression coefficient of the naïve forecast is also found to be statistically significant ($\beta \neq 0$). This indicates that the naïve forecast also contains additional information about the outcome that is not contained in the Commission's forecast. Overall, the Commission's current year forecasts add information on top of the naïve forecast in explaining the outcome, but they do not fully encompass the naïve forecast.

For the year-ahead projections, a similar conclusion applies for both samples. The Commission's forecast contains information that is not contained in the naïve forecast. The Commission's forecast coefficient (1.74) implies that it moves in the same direction as the outcome, which is what can be expected from an encompassing projection. However, the same significant result is found for the coefficient of the naïve forecast but also for the spring forecast coefficient, which suggests that the autumn year ahead forecast on average does not encompass the naïve forecast.

Table 4.6:
Forecast encompassing tests

		GDP				Inflation				General government balance			
		'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14
Current-year	**α = 0**	-0.06	0.45	-0.07	-0.16*	0.08	1.28***	-0.23	-0.16*	-0.08	0.14	-1.36***	0.03
	β = 0	-0.14***	-0.57***	-0.16***	-0.19***	-0.01	-0.20***	-0.07**	-0.05*	0.04	-0.28**	-0.09	-0.12
	δ = 0	1.18***	1.49***	1.18***	1.23***	0.99***	0.78***	1.11***	1.14***	0.93***	1.04***	0.84***	0.98***
	Serial corr.	0.17***	0.05	0.01	0.10*	-0.03	-0.21**	0.03	-0.06	0.09**	0.06	-0.02	0.07
Year-ahead	**α = 0**	-0.69***	2.14***	-0.06	-1.31***	-0.17*	0.19	0.87*	0.02	-0.62***	0.01	-1.29**	-0.78***
	β = 0	-0.13***	0.03	-0.08**	-0.13***	-0.04	-0.08	-0.06	0.07	-0.03	-0.33**	-0.22**	-0.03
	γ = 0	-0.53***	-0.24	-0.30***	-0.72***	-0.08	0.28*	-0.12	-0.40***	-0.21**	-0.21	0.26	-0.28*
	δ = 0	1.74***	0.59***	1.03***	2.03***	1.20***	0.83***	0.71***	1.30***	1.08***	1.02***	0.60***	1.11***
	Serial corr.	0.13***	-0.17*	0.06	0.12**	0.07	-0.23***	0.47***	0.05	0.21***	-0.19*	-0.13	0.12**

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

It should be noted that for the whole sample, in both the current-year and year-ahead panel regressions, some auto-correlation was found in the error terms, which is a violation of the model assumptions. Therefore, these results should be taken with some caution. This is not the case for the shorter sample.

4.5.2. Inflation

The Commission's current-year forecast for inflation encompasses the naïve forecast across countries in both samples and contains significant information on top of the information contained in the naïve forecast ($\beta=0$ and $\delta>0$).

The same conclusions apply to the year-ahead inflation projection for the whole sample. A significantly positive Commission coefficient (1.2) was found, while the naïve forecast did not help explain the outcome. For the shorter sample, the year-ahead Commission's projections also encompass the naïve forecast. A significantly positive Commission autumn forecast coefficient (1.30) was found. The naïve forecast did not help explain the outcome. However, the autumn forecast did not encompass the information of the spring forecast, which was the previous projection for the same year. This implies that the spring projection contains some information about the outcome which is not taken on board in the subsequent autumn projection.

4.5.3. General government balance

In the large sample, the current-year Commission's projections for the general government balance encompass the naïve forecast across countries (coefficient of 0.93) and the naïve forecast does not add any information in explaining the outcome. The same conclusion is valid for the 2000-2014 sample (coefficient of 0.98).

The year-ahead Commission's forecast coefficient is significantly positive (1.08) in the whole sample, while the naïve forecast coefficient is not statistically significant, suggesting that the former encompasses the information contained in the latter. However, the coefficient of the previous forecast (-0.21) for the same year (which was produced in spring) also reached statistical significance, implying that the projection in autumn does not fully encompass the projections done in spring. For the short sample, though, the year-ahead Commission's forecast encompasses the information of the naïve forecast and that available at the time of the spring forecast.

For the whole sample, for both the current-year and year-ahead panel regressions, some auto-correlation was found in the error terms, which is a violation of the model assumptions. This is also the case for the year-ahead projections in the short sample. Therefore, these results should be treated with some caution.

4.6. ARE THE PROJECTIONS EFFICIENT?

The efficiency analysis goes a step further than the encompassing test. The test investigates whether all information available at the time of the forecast was considered and is contained in the projection. There are various ways of testing this (see Holly and Weale (2000) for an overview). A test of weak efficiency was used based on a regression analysis with the outcome as dependent variable and as predictors an intercept and the projection (see Box 4.1 for technical details). The results are described below (See also Annex 2, Table A2.19). The Commission's forecast can be considered efficient if it jointly holds that $\alpha=0$ and $\beta=1$ in Table 4.7. Only then does the expectation of the outcome equal the expectation of the projection. Hence, only the F statistic is examined. As for the previous test, only the results of the whole sample (1969-2014) and the short sample (2000-2014) are commented here. An estimate is considered statistically significant when the corresponding p-value is below 0.05. Then the null hypothesis ($\alpha=0$, $\beta=1$) is rejected at the 5% significance level. Results are shown in Table 4.7

4.6.1. Gross Domestic Product

Neither current-year or year-ahead GDP projections are found to be efficient in either the whole or small sample ($\alpha\neq0$ or $\beta\neq1$). This means that not all relevant information was taken into account in the Commission's forecasts at the time of forecasting.

Table 4.7:
Forecast efficiency tests

		GDP				Inflation				General government balance			
		'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14
Current-year	**α = 0**	-0.17**	0.26	-0.32**	-0.27***	0.09*	0.71	-0.38***	-0.20**	-0.08	0.33***	-1.20***	0.05
	β = 1	1.09***	0.98	1.05***	1.11***	0.99	0.83***	1.11***	1.11***	0.97	0.9	0.80***	1.05
	F(α=0, β=1)	8.78***	2.98**	3.42**	8.57***	1.43	19.70***	5.89***	7.67***	1.10	13.62***	8.60***	0.8
	Serial corr.	0.12***	-0.24***	0.09	0.08	0.04	-0.28***	-0.15**	0.02	0.11	-0.02	-0.07	0.07
Year-ahead	**α = 0**	-0.58	2.00***	-1.17***	-0.84**	-0.15	0.73***	-0.03	0.03	-0.49	0.19	-2.37***	-0.41**
	β = 1	1.11***	0.47***	0.8	0.71***	1.07***	0.81*	0.92	0.99	0.87***	0.73***	0.51***	0.89**
	F(α=0, β=1)	8.54***	12.20***	19.92***	15.13***	9.04***	9.88***	1.32	0.01	11.3***	16.22***	26.12***	2.83*
	Serial corr.	0.13***	-0.14*	-0.01	0.01	0.11***	0.05	-0.21***	-0.06	0.27***	0.15*	0.01	0.18***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

4.6.2. Inflation

In the whole sample, current-year inflation projections are found to be efficient, while this is not the case for the year-ahead projections. In the short sample, current year forecasts are found to be non-efficient while year-ahead forecasts appear efficient.

4.6.3. General government balance

In the whole sample, current-year government balance projections are found to be efficient, while this is not the case for the year-ahead projections. In the short sample, both projections are found to be efficient.

Box 4.1: **Description of statistical tests**

This box provides some technical background on the statistical tests that were used in the univariate analysis of the forecast error.

1. FORECAST BIAS TEST

A forecast is unbiased when the expectation of the projection equals the expectation of the true value:

$$E(y_{i,t,t}) = E(y_{i,t}) \text{ for current year forecasts}$$
$$E(y_{i,t+1,t}) = E(y_{i,t+1}) \text{ for year-ahead forecasts}$$

A simple method for testing this is regressing the forecast error on a constant α:

$$e_{i,t,t} = \alpha + \varepsilon_{i,t,t}$$
$$e_{i,t+1,t} = \alpha + \varepsilon_{i,t+1,t}$$

With $e_{i,t,t}$ ($e_{i,t+1,t}$) the current year (year ahead) forecast error for country i at time t, and $\varepsilon_{i,t,t}$ ($\varepsilon_{i,t+1,t}$) an independently and identically distributed error term. In the absence of bias, $\alpha = 0$.

2. FORECAST ERROR PERSISTENCY TEST

Next to being unbiased, forecast errors should also not persist. An error made in the past should not feed into the next forecast. This can be tested by checking the autocorrelation structure of the forecast errors. A negative autocorrelation coefficient implies that an over(under)estimation in the projection at time t will be compensated by an under(over)estimation in the projection at a subsequent year. A positive autocorrelation coefficient implies that once an over(under)estimation in the projection is present, it will lead to subsequent over(under)estimations. If forecast errors are not persistent, the autocorrelation coefficients should equal zero. The Ljung-Box test (Ljung&Box, 1978) was used for this purpose. Autocorrelation coefficients were considered up to 3 lags. Instead of testing each distinct autocorrelation coefficient, Ljung-Box tests the overall randomness of the autocorrelation coefficients up to a certain lag and is therefore a portmanteau test. The null hypothesis states that the data are independently distributed, the alternative hypothesis states that the series exhibit serial correlation. The test statistic is:

$$Q = n\,(n+2) \sum_{k=1}^{h} \frac{\hat{\rho}_k^2}{n-k}$$

where n is the sample size, $\hat{\rho}_k$ is the sample autocorrelation at lag k, and h is the number of lags being tested.

(Continued on the next page)

Box (continued)

3. DIEBOLD-MARIANO TEST

The accuracy of a forecast projection can be tested by using the ME, MAE, and RMSE like was done in section 2. It can also be tested by comparing it to a so called *naïve* forecast. Here the naïve forecast is defined as being the latest available actual value. For example, the naïve forecast for the current year GDP growth in Spain for period t would be the actual GDP growth in Spain in period t-1, while the year-ahead inflation forecast in France for period t would be the actual inflation in France for period t-2. The null hypothesis of the Diebold-Mariano test (Diebold&Mariano, 1995) states that this naïve forecast performs as good as the Commission's forecast. The alternative hypothesis states that the Commission forecast outperforms the naïve forecast. The test statistic is defined as:

$$S = \frac{\frac{1}{T} * \sum_{t=1}^{T} \{g(e_{1t}) - g(e_{2t})\}}{\sqrt{2\pi \hat{f}(0)/T}}$$

with T the number of observations, e_{1t} and e_{2t} the errors at time t for two forecast models respectively (in our case, the naïve and the Commission forecast), g() a function of the forecast error (usually the identity or squared function), and the denominator the auto-covariance of the loss function. In our tests the squared loss function was used, giving somewhat more weight to the large errors. For the current-year projections, only the variance of the loss function was considered in the denominator. For the year-ahead projections, the auto-covariance of the loss function was also considered. In case the auto-covariance is negative and in absolute terms larger than the variance, the sum of the two is negative. This means that the standard error, which is the square root of this number, cannot be computed. This problem can be solved by setting the denominator to a very small positive number. This explains the sometimes very large test statistics in the tables (Tables A2.13 to A2.16).

4. DIRECTIONAL ACCURACY TEST

Rather than focussing on how close the projection is to the actual outcome, directional accuracy tests check whether the projection and the actual value move in the same direction. A qualitative forecast story implies that the projection and the outcome should at least have the same sign (growth versus recession, inflation versus deflation,…). A more stringent test in this regard is whether pick-ups and slowdowns in the economy can be forecasted. A pick-up of GDP growth means that the difference between GDP growth in year t and year t-1 is positive. A slowdown in GDP growth would yield the opposite effect. If the forecast story can accurately predict these slowdowns (pick-ups), then the changes in the projections should have the same sign as the changes in the realisations.

The change in the projections were based on the data available at the time of the forecast. For the change in the current-year projection, the difference between the projection and the previous year realisation was used. For the year-ahead projection change, the difference between the year-ahead projection made in autumn and the current-year projection made in spring was used. The data were analysed using the Pesaran-Timmermann test (1992). This is a non-parametric test to examine the ability of a projection to detect the sign of the change in a series. The test statistic under the null hypothesis follows a standard normal distribution. Accepting the null hypothesis implies that the forecast story is not able to predict the direction of the movements in the series (see table below).

	Projected decrease	**Projected increase**
Actual decrease	Valid forecast story	Invalid forecast story
Actual increase	Invalid forecast story	Valid forecast story

(Continued on the next page)

Box (continued)

5. FORECAST ENCOMPASSING TEST

A forecast encompassing test (Fair&Schiller, 1990) was used to examine whether the forecast contains significant information on top of the information contained in an alternative forecast (cfr. naïve forecast). Two nested models were compared where the restricted model contains only the naïve forecast, while the full model also contained the Commission forecast. The full model for the current year forecast is:

$$y_{i,t} = \alpha + \beta y_{i,t-1} + \delta y_{i,t,t} + \varepsilon_{i,t}$$

With $y_{i,t}$ being the actual value for country i at time t, $y_{i,t-1}$ the previous year actual value for country i (which serves as naïve forecast), $y_{i,t,t}$ the current year projection for country i at time t, and $\varepsilon_{i,t}$ an independently and identically distributed error term. If the projection encompasses the naïve forecast and contains significant information on top of the information contained in the naïve forecast, then $\beta = 0$ and $\delta > 0$.

A similar test was constructed for checking the information contained in the year-ahead forecast. The full model is:

$$y_{i,t+1} = \alpha + \beta y_{i,t-1} + \gamma y_{i,t,t} + \delta y_{i,t+1,t} + \varepsilon_{i,t+1}$$

With $y_{i,t+1}$ being the actual value for country i at time t+1, $y_{i,t-1}$ the previous year actual value for country i, $y_{i,t,t}$ the projection for country i at time t, $y_{i,t+1,t}$ the projection for country i at time t+1, and $\varepsilon_{i,t+1}$ an independently and identically distributed error term. In case the year-ahead projection encompasses all the information available at the time of the forecast and contains additional information, then $\beta = \gamma = 0$ and $\delta > 0$.

6. FORECAST EFFICIENCY TEST

The encompassing test allows to check whether the Commission forecast encompasses the naïve forecast and contains additional information. A stronger requirement of the Commission projections is whether they contain *all* available information at the time of the forecast. To test for this, the following regression analyses was performed:

$$y_{i,t} = \alpha + \beta y_{i,t,t} + \varepsilon_{i,t}$$
$$y_{i,t+1} = \alpha + \beta y_{i,t+1,t} + \varepsilon_{i,t+1}$$

With $y_{i,t}$ ($y_{i,t+1}$) being the actual value for country i at time t (t+1) and $y_{i,t,t}$ ($y_{i,t+1,t}$) the current year (year ahead) projection for country i at time t (t+1), and $\varepsilon_{i,t}$ ($\varepsilon_{i,t+1}$) an independently and identically distributed error term. If projections are efficient, then $\alpha = 0$ and $\beta = 1$, which implies that the average outcome equals the average projection.

(Continued on the next page)

Box (continued)

7. PANEL REGRESSION

For the panel regressions in this paper, linear fixed effects models were used. The general form of the models can be written as

$$y_{it} = X_{it}\beta + \alpha_i + \varepsilon_{it}$$

With y_{it} the outcome for country i at time t, X_{it} the matrix of predictors for country i at time t, β the regression coefficients, α_i the time independent effect for each country i, and ε_{it} an independently and identically distributed error term. In the fixed effects model, α_i is allowed to be correlated with the time dependent predictors X_{it}. In this paper, panel regressions have been performed for the bias test, the forecast encompassing test, and the forecast efficiency tests. The time dependent predictors of these respective panel regressions are explained in sections 1, 5, and 6 above.

5. INFLUENCE OF EXTERNAL ASSUMPTIONS ON FORECAST ERRORS

This section examines to what extent Commission GDP growth forecast errors are driven by assumptions that are "external" to the forecast process and may not be confirmed *ex post*. To ensure consistency of forecasts across Member States, a number of common assumptions are imposed on Commission's forecasters (cf. box I.5 in the autumn 2015 European Economic Forecast). This tool to ensure consistency in forecasts that cover a large number of countries is also common practice in other international institutions. These common assumptions cover financial market developments, commodity prices and GDP growth outside the EU. Similarly, the forecasters' assessment of fiscal policy is subject to a set of centrally defined rules.

Technical assumptions on short-term and long-term interest rates and commodity prices are set according to market expectations reflected in futures contracts. As exchange rates generally follow a random walk (implying that it is not possible to beat a naïve forecast), an assumption of unchanged nominal exchange rates is applied for all currencies.

A forecast for *GDP growth in the rest of the world* (RoW) is produced ahead of the forecasts for EU Member States and is treated by Commission forecasters as largely exogenous.

Concerning the *future stance of fiscal policy*, a rule of "no-policy change" applies. It stipulates that only fiscal measures that are known with a sufficient degree of detail and certainty can be reflected in the forecast. Often, forecasters may consider additional measures as likely, but as long as they do not satisfy the criteria of sufficient detail and certainty, they cannot be included in the forecast.

Since these common assumptions and rules constrain forecasters, it is fair to ask to what extent projection errors are due to external assumptions that *ex post* turn out to be different, and to what extent they are due to the desk officer's genuine misperception of the economic outlook. To answer these questions a regression approach is followed, in the spirit of OECD (2014). The forecast error for GDP growth is regressed on the *unexpected change* in: (i) the structural fiscal balance (SB); (ii) GDP growth outside the EU (RoW); (iii) the nominal effective exchange rate of the euro (NEER); (iv) the oil price (OIL) and; (v) long-term interest rates (LTIR). Regarding the links between dependent variable and covariates the expectations are for a negative relation between GDP forecast error and the unexpected change in structural fiscal balance ([15]): fiscal consolidation improves the structural balance and dampens GDP growth in the short run. Stronger-than-expected growth in the rest of the world affects EU GDP growth positively via higher external demand, while an unexpected appreciation of the exchange rate reduces growth. Likewise, unexpectedly higher oil prices and long-term interest rates dampen economic growth.

During the crisis, GDP growth forecast errors triggered a heated debate on the size of fiscal multipliers and their possible underestimation by forecasters (Blanchard and Leigh (2013); box I.5 in the Commission's autumn 2012 forecast; Möhlmann and Suyker (2015)). By focussing on the role of unanticipated changes in the fiscal stance, this section offers an alternative explanation of forecast errors related to fiscal policy. It confirms the finding in box I.5 in the Commission's autumn 2012 forecast that unanticipated fiscal consolidation but also changes in long-term interest rates, which surged during the sovereign-debt crisis, play an important role for understanding GDP growth forecast errors during the crisis years.

([15]) The change in structural balance at time *t* is the structural balance at time *t* minus the structural balance at time *t-1*.

5.1. DATA AND METHODOLOGY

The sample ranges from 2007 to 2014 as before 2007, structural balances were not calculated. Data are available for 27 EU countries (all except Croatia). Overall, the maximum number of observations is 176.

Given the nature of the dataset, 27 countries observed over a period of 8 years, a panel regression approach is chosen to allow for country heterogeneity. A country fixed effect specification is used (i.e. assumes that the specificities of particular countries do not change over the relatively short observation period).([16]) The general formulation of the panel regression is: ([17])

$$e_{it} = \boldsymbol{x'}_{it}\boldsymbol{\beta} + u_i + \varepsilon_{it}$$

As before, e_{it} *is the fore*cast error for country i at time t; $\boldsymbol{x'}_{it}$ *is the* set of the covariates with their vector of coefficients β; u_i *is t*he country specific fixed effect; ε_{it} is the idiosyncratic vector.

In order to deal with autocorrelation in the residuals, the model is estimated using the Baltagi and Wu (1999) estimator for fixed effects. ([18])

5.2. RESULTS FOR CURRENT-YEAR GDP GROWTH FORECASTS

Table 5.1 shows regression results of GDP growth forecast errors, for the current year (*t*), on the unexpected change of the five variables identified above. It also displays regressions which include the squared value of the unexpected change in the structural balance (SB^2) and a measure of uncertainty (UNC1) based on survey results. Different models are listed by column. BASE is the model using all the observations without the squared value of SB and the measure of uncertainty (column 1). Column 2 and 3 report the same models as BASE, but for programme (Progr) and non-programme countries separately (No-Progr). ([19])

Looking at the first three specifications, an unexpected change in growth in the rest of the world has the expected sign, but is not statistically significant. Deviations from the technical assumption on the exchange rate do not seem to contribute to the forecast error in any systematic way: the estimated coefficient does not have the expected sign (except for programme countries), varies in size across specifications and is generally not statistically significant. In contrast, unanticipated changes in long-term interest rates affect forecast errors as expected. An unforeseen one percentage point increase in the long-term interest rate is associated with weaker-than-expected GDP growth of around 0.6 pps. in the BASE model. The impact of unexpected oil price variations has the expected sign and is strongly statistically significant (at the 1% level), except in the small sample of programme countries. However, the impact of an unexpected change in the oil price appears to be small (about -0.03).

([16]) The Hausman test supports this choice.
([17]) Greene (2012), p. 359.
([18]) Autocorrelation in the residuals would undermine inference. To check for the presence of autocorrelation, the Drukker (2003) implementation of the Wooldridge (2002) test is used. It tests the significance of the coefficient of an AR(1) model on the residuals obtained from a regression of the original model, but in first difference The test confirms the presence of serial correlation, so that the Baltagi and Wu (1999) estimator for fixed effects – i.e. an estimator obtained after removing the group mean from the original variables, obtaining the autocorrelation coefficient of the residual and then transforming the data so that the AR(1) component disappears - is finally used. For additional details see ***xtregar*** in Stata13 documentation.
([19]) A model containing all the observation but an additional dummy for programme countries was estimated, but this additional variable was not significant. Regressions using (the unexpected change of) other budget deficit metrics did not produce superior outcomes than the regression using the structural balance.

The results for the structural fiscal balance look puzzling. As mentioned above, higher-than-expected fiscal consolidation should be negatively correlated with the GDP growth forecast error. For Programme countries, unanticipated fiscal consolidation has the expected sign and a strong statistical significance. In contrast, unanticipated consolidation appears to lead to an underestimation of GDP growth in non-programme countries as well as across all EU Member States.

Overall, according to the baseline specification, the impact of the external assumptions on the current-year forecast error does not appear to be large, with a modest R^2 (except for Programme countries).

Table 5.1:

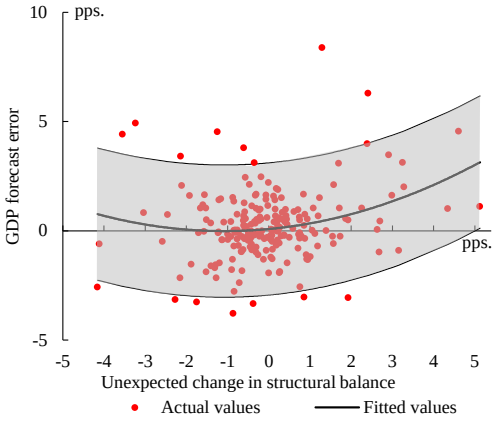
Regression results - Spring forecast for year t

Variables	AR Base	AR Progr	AR No-Progr	AR non-Linear	AR Unc	NL AR Unc
SB	0.233**	-1.383**	0.360***	0.067	0.097	0.013
	(0.100)	(0.559)	(0.116)	(0.108)	(0.080)	(0.087)
SB^2				0.128***		0.071**
				(0.038)		(0.031)
RoW	0.130	3.484	0.310	0.289	-0.132	-0.024
	(0.200)	(8.046)	(0.223)	(0.199)	(0.160)	(0.164)
NEER	0.149	-0.242	0.269*	0.143	0.074	0.074
	(0.115)	(0.278)	(0.138)	(0.111)	(0.090)	(0.089)
OIL	-0.026***	0.180	-0.031***	-0.023**	-0.013*	-0.012
	(0.009)	(0.310)	(0.009)	(0.009)	(0.008)	(0.007)
LTIR	-0.649***	-0.736	-0.450**	-0.630***	-0.378***	-0.377***
	(0.175)	(0.672)	(0.207)	(0.170)	(0.140)	(0.138)
Unc1					0.010***	0.010***
					(0.001)	(0.001)
Constant	0.444***	-1.442	0.393***	0.206	0.281***	0.156
	(0.129)	(2.829)	(0.134)	(0.144)	(0.103)	(0.114)
Observations	176	22	146	176	176	176
Number of countries	27	7	27	27	27	27
Overall R^2	0.133	0.368	0.143	0.199	0.483	0.506
R^2 within	0.195	0.444	0.264	0.253	0.508	0.526
LogLik	-306.2	-29.80	-246	-299.6	-262.8	-259.8
F test	6.958	1.599	8.186	8.081	24.61	22.49

Standard errors in parentheses. Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Concerning the unanticipated fiscal stance, it needs to be borne in mind that at the time of the spring forecast, the authorities' fiscal-policy intentions for the current year are usually known by forecasters. Large differences between the planned budget and its execution only occur in exceptional circumstances; e.g. during the crisis years, some governments struggled to compensate an unforeseen decrease in the tax intensity of growth. Graph 5.1 reveals a possible non-linear relation: forecasters have tended to overestimate growth both in the context of large fiscal stimulus and large fiscal tightening. To take the non-linearity specificity into account, the fourth specification includes the quadratic term of SB (SB^2) (column 4), which turns out to have the expected sign (positive, i.e. uncertainty about the fiscal stance leads to an overestimation of growth) and strong statistical significance. SB is then no longer statistically significant. Conclusions on the other estimated parameters remain the same and the explanatory power of this model (R^2) increases somewhat.

Graph 5.1: **GDP forecast error and unexpected change in structural balance**



To further investigate the possible role of uncertainty, a direct measure of it is introduced (UNC1). This measure is a revised measure of uncertainty suggested by Girardi and Reuter (2015) which modifies the Bachmann *et al.* (2013) measure. This measure is modified in order to allow for both positive and negative values.

Bachmann *et al.* measure uses the dispersion of business and consumer surveys responses (DISP) to assess the uncertainty. $DISP_{qt} = \sqrt{fraction^{+}_{qt} + fraction^{-}_{qt} - (fraction^{+}_{qt} - fraction^{-}_{qt})^2}$. Girardi and Reuter (2015) standardise this measure to have a zero mean and a unit standard deviation and then rescale to have a mean of 100 and a standard deviation of 10 (as it is done for the European Commission Economic Sentiment Indicator). The limit of this measure is that it is always positive.

In general, uncertainty should influence equally positive and negative forecast errors. But it is then not possible to estimate this relationship. ([20]) Therefore, the uncertainty measure has been modified. For a positive forecast error, it is equal to the original Girardi and Reuter's measure, while for a negative error it is equal to the opposite. The estimated coefficient of UNC1 can thus be interpreted as the impact of uncertainty on absolute forecast errors. Column 5 reports the estimation results of this model. The uncertainty measure corresponds to the value of the variable at the time of the forecast. In this model, uncertainty, interest rate and the oil price are statistically significant and have the expected signs. However, SB is no longer statistically significant. Uncertainty is found to play an important role in the explanation of the current-year forecast error (scale of UNC is 100). The explanatory power (R^2) of this specification is almost three times the BASE model.

A final model (column 6) including the previous specification with uncertainty as well as the quadratic term of SB shows that the latter is statistically significant and has the expected negative sign. Comparing columns 4 and 6 suggests that the non-linear relation of the unanticipated changes in the fiscal stance and the forecast error is not due to economic uncertainty as captured by the UNC indicator since both coefficients are statistically significant in the final model.

([20]) In a Cartesian plane, the relation between the error (y) and uncertainty (x) would be a parable with a horizontal axis. But in this case, the function would not be invertible, preventing an estimation of this relationship..

5.3. RESULTS FOR YEAR-AHEAD GDP GROWTH FORECASTS

The error analysis for the year-ahead forecast is carried out using the same specifications (Table 5.2). In this case, a larger share of the forecast error seems to be explained by unexpected changes in the external/technical assumptions, the R^2 increases to above 0.7 in the baseline specification. The unanticipated change of the structural balance (SB) now has consistently the expected sign and is strongly statistically significant. Its impact on the forecast error is larger for programme countries than for the other countries. The non-linear specification loses its explanatory power (column 4). ([21]).

The impact of unanticipated changes in long-term interest rates on the forecast error is confirmed for the year ahead. Unexpectedly strong growth in the rest of the world leads to higher EU GDP growth and thereby an underestimation of year-ahead GDP growth across EU Member States, and the parameter becomes significant in contrast to the current year (except for the programme countries). There continues to be no evidence of an impact of deviations from the technical assumption on the exchange rate on the forecast error, while the parameter of oil price changes has an unexpected sign and is statistically significant. A possible explanation could be that this parameter picks up endogenous variations of demand that drive up GDP growth and oil prices at the same time. Finally, uncertainty remains a significant driver of absolute forecast errors. ([22])

Despite the quite good explanatory power of the models, the lack of stability in the coefficient of some variables suggests that some elements may still be missing in the models explaining the forecast errors. The "genuine" forecast error, that is the error stemming from forecasters' misperception of the outlook, plays obviously a role in explaining the residual error, not attributable to the external/technical assumptions, but a further analysis could give a deeper insight in the origins of the error.

Table 5.2:

Regression results - Autumn forecast for year t+1

Variables	AR Base	AR Progr	AR NO-Prog	AR non-Linear	AR Unc	NL AR Unc
SB	-0.407***	-0.918***	-0.258*	-0.405***	-0.384***	-0.382***
	(0.115)	(0.259)	(0.138)	(0.116)	(0.111)	(0.111)
SB²				0.005		-0.011
				(0.034)		(0.034)
RoW	0.776**	-0.198	1.131***	0.794**	0.637*	0.651**
	(0.328)	(0.688)	(0.365)	(0.331)	(0.324)	(0.326)
NEER	0.021	-0.004	-0.001	0.021	0.017	0.019
	(0.053)	(0.121)	(0.059)	(0.054)	(0.050)	(0.051)
OIL	0.051***	0.051	0.030*	0.050***	0.049***	0.049***
	(0.014)	(0.028)	(0.017)	(0.014)	(0.015)	(0.015)
LTIR	-0.697***	-0.364*	-0.815***	-0.698***	-0.648***	-0.646***
	(0.088)	(0.179)	(0.106)	(0.088)	(0.085)	(0.085)
UNC1					0.006***	0.006***
					(0.002)	(0.002)
L.Unc1					-0.002	-0.002
					(0.002)	(0.002)
Constant	0.959***	0.115	0.974***	0.947***	0.968***	0.986***
	(0.164)	(0.320)	(0.199)	(0.174)	(0.157)	(0.165)
Observations	151	21	123	151	151	151
Number of country	27	7	26	27	27	27
Overall R^2	0.686	0.488	0.736	0.688	0.725	0.724
R^2 within	0.7580	0.7950	0.7800	0.7580	0.7850	0.7850
LogLik	-286.7	-23.01	-226.2	-286.8	-278.9	-278.8
F test	74.72	6.98	65.41	61.45	60.86	52.79

Standard errors in parentheses. Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

([21]) The SB coefficient estimate remains strongly significant and negative when the forecast error of the outer forecast year t+2 is examined (not reported here).

([22]) Here the L operator in L.rUnc1 is the lag operator which shifts the uncertainty variable. This shift is necessary because of the database arrangement. L.rUnc1 for forecasts of *t+1* means the uncertainty in the forecast year.

6. COMPARING GDP FORECAST ERRORS WITH THOSE OF OTHER INTERNATIONAL INSTITUTIONS

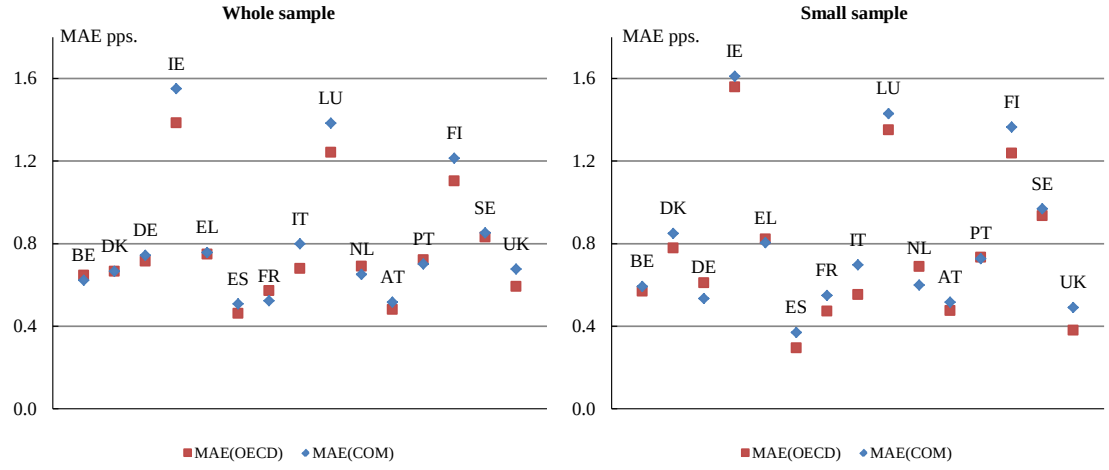
This chapter compares the accuracy of the Commission's GDP growth forecast with that of other international institutions. Forecasts from the OECD, IMF, Consensus Economics and the ECB (in this case only for the euro-area aggregate) are compared with those of the Commission for an equally long sample period and for the shorter sample period (2000-2014), both for current and year-ahead forecasts. For the long sample, the observation period of the Commission's forecasts has been adapted in order to match the timeframe of the other forecasters.

Forecast and realisation data for the other institutions has been collected and compiled in the same way as for the Commission. The current-year and year-ahead forecasts from the OECD are taken respectively from the June and the December OECD Economic Outlook. The IMF forecasts come from the April and October World Economic Outlook. The Consensus forecast means refer to the April and October reports, which are close to the cut-off date of the Commission's spring and autumn forecasts. The forecasts from the ECB are taken from the March ECB Staff macroeconomic projections and the September projections. The outturn data is taken from the publications from the respective institutions in the same way as described in Section 2. The MAE statistic is computed for the various institutions and compared with that of the Commission forecast for both horizons. A complete set of summary statistics is provided in Annex 3.

6.1. COMMISSION VERSUS OECD

The comparison with the *OECD* forecasts for the whole sample period shows that in general MAEs for the 'old' Member States are very similar for the **current year forecasts** (see Graph 6.1). For some countries (Ireland, Italy, Luxembourg and Finland) however, the Commission's forecast errors are found significantly larger (more than 0.1 pps. difference). This broadly confirms the conclusions of the previous European Commission study. ([23])

Graph 6.1: **MAE of current year GDP forecast: COM vs. OECD**



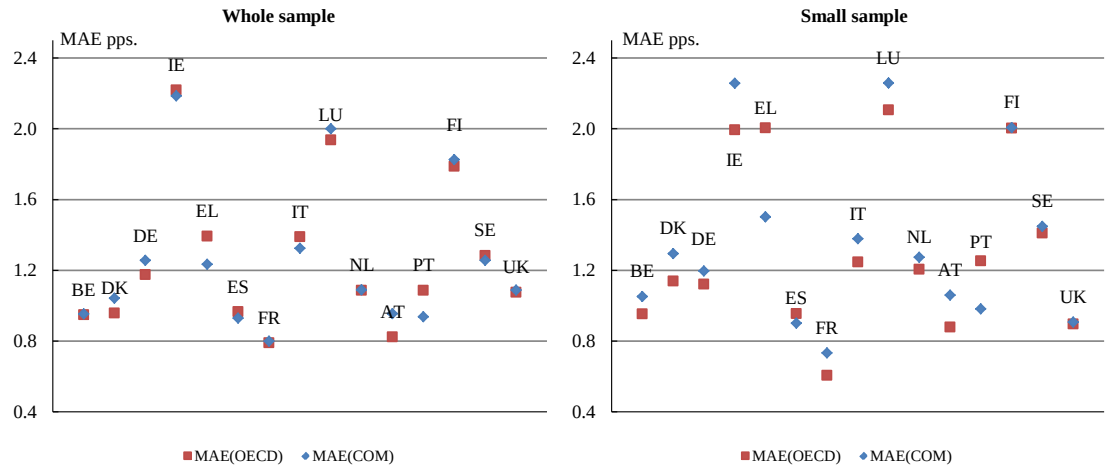
For the shorter sample period (2000-2014), OECD forecasts come out in general as more accurate, but the difference in the MAE for the large majority of countries is found to be below 0.1 pps. As in the large sample, the Commission's forecast errors for Finland and Italy are found significantly larger than OECD

([23]) González Cabanillas, L. and Terzi, A. (2012).

forecast errors. In addition, the Commission's forecasting performance for the UK seems to have deteriorated compared to the OECD in the shorter sample; with a difference in the MAE above 0.1 pps.

For **the year-ahead forecast**, for the whole sample, MAEs for the 'old' Member States are in general very similar. The OECD forecasts appear significantly more accurate for Austria but less accurate for Greece and Portugal (see Graph 6.2). In the short sample period, the OECD forecasts clearly appear more accurate than the Commission forecasts (except for Greece, Spain and Portugal).

Graph 6.2: **MAE of year-ahead GDP forecast: COM vs. OECD**



For the Member States that acceded in 2004 and 2007 ([24]), the forecast errors are also larger for the outlook prepared by the Commission when compared to the OECD for both the current and the year ahead (see Annex 3), except for Hungary and Poland.

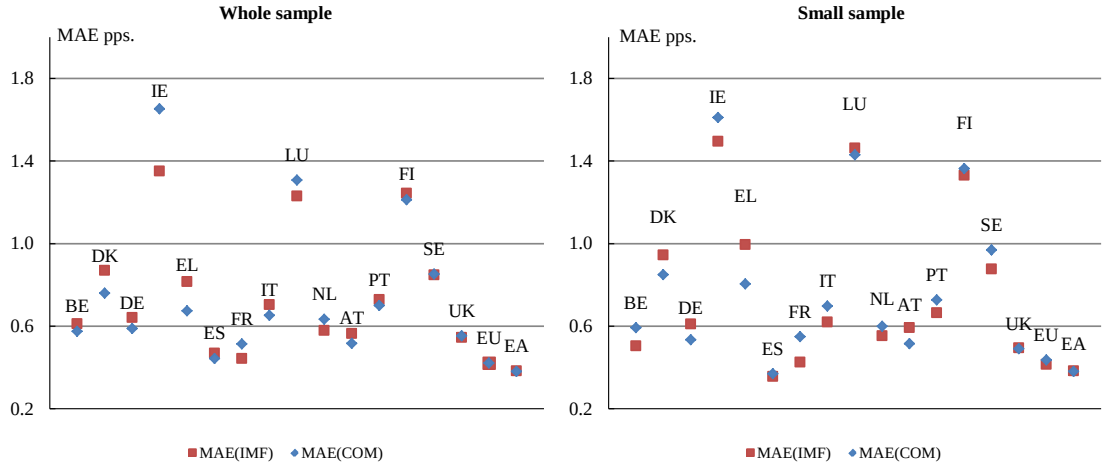
The difference in the timing of the respective publications could explain, to a large extent, the difference in forecasting performance. The OECD's Economic Outlook, which are published in June and December (a month later than the Commission's spring and autumn forecasts respectively) include additional information, such as GDP growth rates (for the first and third quarters of the current year) and the first soft data (surveys) for the following quarter. This should clearly help reducing the forecast error for the current year but should also allow for a better assessment of the carry-over to apply to the year-ahead forecast.

6.2. COMMISSION VERSUS IMF

Relative to the *IMF*, the Commission's forecast accuracy for the **current-year forecast** (Graph 6.3) for the whole sample period comes out as very similar, with the difference in forecast errors for most countries below 0.1 pps. The Commission clearly outperforms the IMF for two Member States (i.e. Denmark and Greece) while the IMF outperforms the Commission for one (i.e. Ireland). For the EU and euro-area aggregates, the forecast accuracy is similar. This confirms the conclusions of the previous European Commission study. For the shorter sample period (2000-2014), the conclusions are the same as for the long sample period with very similar forecast errors for the current year. The errors associated with the Commission's forecasts continue to be significantly smaller for Greece while the IMF forecast continues to outperform the Commission's for Ireland but also now for France.

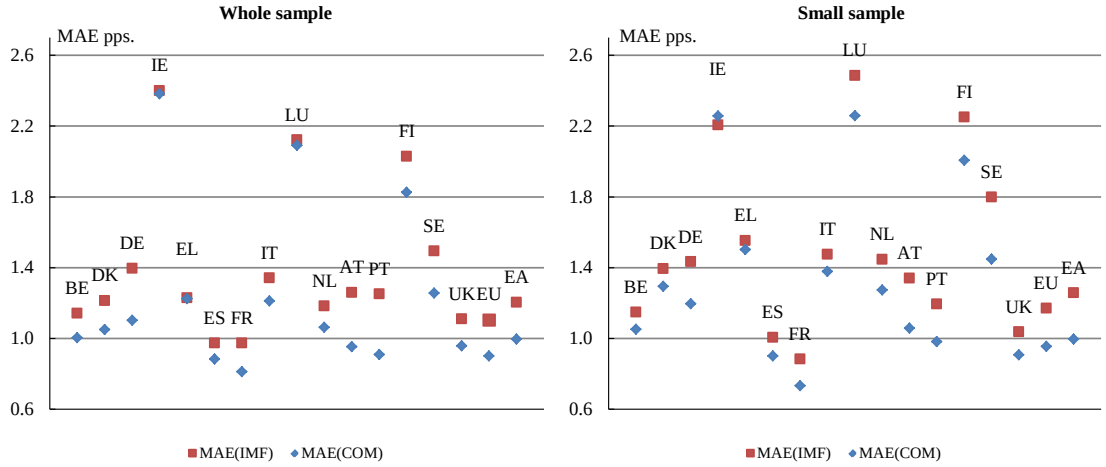
([24]) The OECD carries out forecast for 8 of the 'new' Member States: Slovakia, Czech Republic, Hungary, Poland, Estonia, Latvia, Lithuania and Slovenia. For Slovenia only since 2010, Estonia since 2011 and for Latvia and Lithuania only since 2014, therefore these countries are not analysed here.

Graph 6.3: **MAE of current year GDP forecast: COM vs. IMF**



For **the year ahead**, the Commission's forecasts display smaller errors than the IMF's for all Member States, excluding Greece (same error) in the whole sample and Ireland in the shorter sample. This holds true also when looking at the EU and euro-area aggregates (see Graph 6.4).

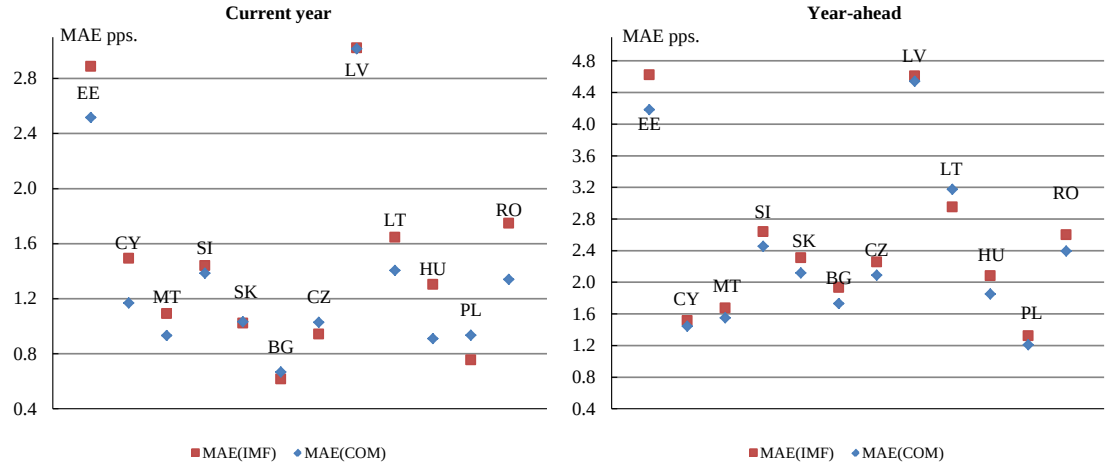
Graph 6.4: **MAE of year-ahead GDP forecast: COM vs. IMF**



For the 'new' Member States, the errors for the current year seem larger for the forecasts prepared by the IMF, except for Poland and Czech Republic (for the latter the difference is just below 0.1 pps.). For the year ahead, European Commission's forecasts also come out in general as more accurate than the IMF's, except for Lithuania (Graph 6.5).

In this case, the timing factor also plays a role and is in favour of the Commission, whose forecasts are published about a month later than the IMF's.

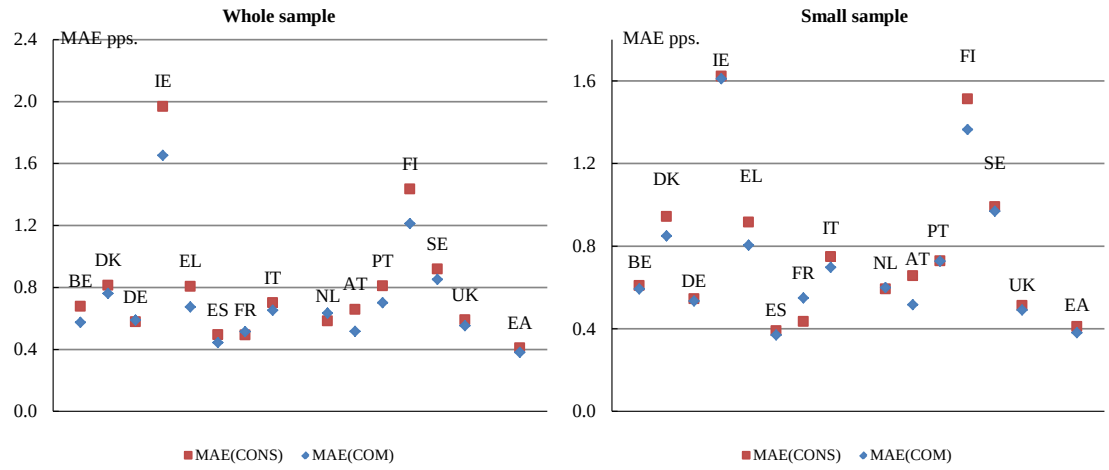
Graph 6.5: **MAE of current year and year-ahead GDP forecast: COM vs. IMF, new Member States**



6.3. COMMISSION VERSUS CONSENSUS

For the **current year**, the errors associated with the Commission's forecasts are smaller than those of *Consensus* in nearly all Member States in the long observation sample (Graph 6.6) ([25]). The errors are significantly smaller for Belgium, Ireland, Greece, Austria, Portugal and Finland. Comparing for the shorter sample period yields some different results. Consensus' forecast accuracy for the current-year forecast (Graph 6.6) then appears more similar to that of the Commission, with the difference in forecast errors for most countries below 0.1 pps. Commission's errors remain however significantly smaller for Greece, Austria and Finland but are significantly larger than Consensus' for France.

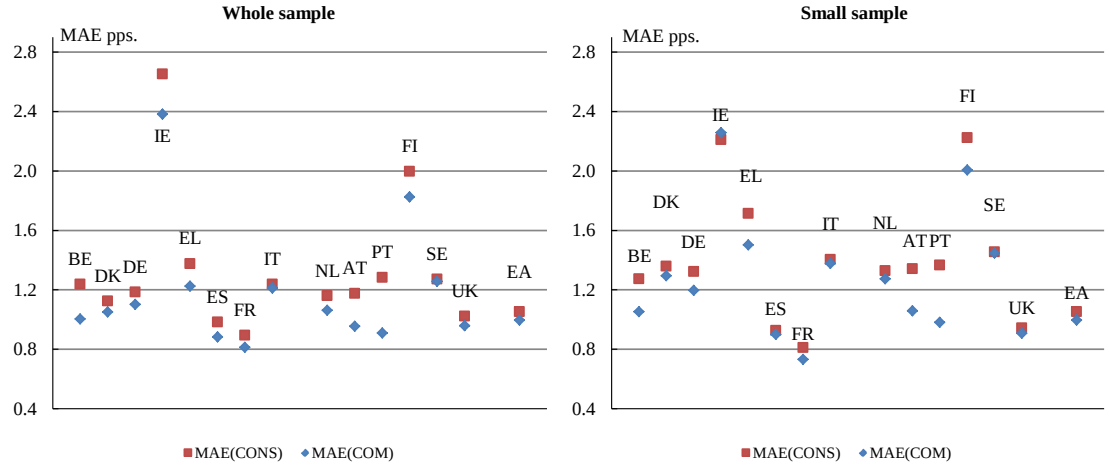
Graph 6.6: **MAE of current year GDP forecast: COM vs. Consensus Economics**



For **the year ahead**, Consensus forecasts come out in general as less accurate in both the large and short samples (see Graph 6.7).

([25]) Due to data availability, the comparison of forecasting performance with Consensus is limited to the 'old' Member States and the euro-area aggregate.

Graph 6.7: **MAE of year-ahead GDP forecast: COM vs. Consensus Economics**



As regards the timing issue, the monthly Consensus reports coincide better with the Commission cut-off dates. Therefore, timing should not play a large role in explaining the differences in forecast accuracy. Also, private sector forecasters are less bound by policy assumptions (absence of no-policy change assumption) than international institutions but apparently this does not lead to higher accuracy.

6.4. COMMISSION VERSUS ECB

The comparison with the ECB is limited to the forecast for the euro area since the ECB does not publish country forecasts and to the period 2001-2014. For the **current year**, the forecast accuracy is found to be similar (MAE of 0.4 pps. for both institutions). For the **year ahead**, the Commission's forecast error appears somewhat lower than the ECB's (1.0 pps. vs 1.3 pps. respectively). The different cut-off dates also play an important role, in this case in favour of the Commission, since the forecasts of the latter are published about two months later than the ECB's Staff projections.

7. CONCLUSIONS

This paper updates the previous assessment of the Commission's forecasts track record from 2012, by extending the observation period to 2014. It also examines the Commission's forecast accuracy by focusing on a shorter and more recent period (2000-2014) which allows comparing the forecasting performance before and after the Great Recession of 2008-2009. The track record of three main variables is assessed: real GDP growth, inflation and general government balance (in % of GDP). To ensure comparability to the greatest degree possible, data are chosen and processed in a similar manner as in the previous studies. Going beyond the approach of González Cabanillas and Terzi (2012), this paper also examines to which extent forecast errors can be explained by external or technical assumptions that *ex post* turned out to be different.

The extension of the observation period to include 2012-2014 suggests unaltered or smaller forecast errors for the key variables. GDP growth forecast errors for both horizons remain about the same for a majority of 'old' Member States but are significantly lower for the 'new' Member States. For the current year, a slight improvement in forecast accuracy or broadly unaltered forecast errors can be seen for the EU and euro-area aggregates as well as for a majority of 'old' Member States. For the 'new' Member States, an improvement in GDP current-year forecast accuracy is found in all but one Member State (Cyprus). For year-ahead forecasts, the MAE decreased for a majority of countries (including all 'new' Member States, except Cyprus).

For inflation, broadly unaltered forecast errors are found for a majority of Member States for both horizons, with some improvement though for year-ahead forecasts for many countries, most of which 'new' Member States. For the current year, the MAE for inflation forecasts remained broadly unchanged for the EU and euro-area aggregates as well as for all 'old' EU Member States. It increased significantly however for four 'new' Member States (Cyprus, Czech Republic, Slovakia and Poland). For the year ahead, inflation forecast accuracy remained unchanged for both aggregates as well as for all, except one 'old' EU Member States (Spain) for which the year-ahead inflation forecast accuracy slightly deteriorated. For the 'new' Member States, the forecast accuracy for t+1 increased for most of them, except for Cyprus, Hungary and Poland.

The addition of three years shows a general improvement in forecasting the general government balance-to-GDP ratio for both aggregates and a large majority of Member States for both horizons. Forecast errors for the current year are found to be slightly smaller or broadly stable for the 'old' Member States but more significantly smaller for the 'new' Member States. The forecast accuracy of general government balance for Slovenia, Greece, Cyprus and to a lesser extent for Spain, however, declined. For these four countries, the accuracy of the year-ahead forecast also deteriorated, while it improved for most of the other Member States.

Focussing on the years since the turn of the century, forecast errors have been larger in the crisis and post-crisis period (2008-2014) than in the pre-crisis period (2000-2007) for the three variables for a large majority of Member States and for both horizons, with a sharper deterioration for the year ahead. This is mainly the result of an anomalously large forecast error for the year 2009. There are however some exceptions. For instance, GDP forecast accuracy increased in the crisis and post-crisis period for the euro-area aggregate, France, the Netherlands, Belgium, Slovakia, Czech Republic for the current year and for Poland for both horizons. Inflation forecast errors for the current year decreased for nine countries but only for four countries for the year ahead (Latvia, Finland, Bulgaria and Hungary). For the general government balance (in % of GDP), forecast accuracy increased for nine countries as well as the EU and euro are aggregates for the current year and remained unchanged in two. For the year-ahead, forecast errors fell for three countries and are broadly unchanged in one. For all three variables, some programme countries exhibit among the largest increases in the MAE in the crisis (and post-crisis) period compared to the pre-crisis for both the current and year-ahead forecasts. These countries have been facing unusually large economic and political uncertainty.

The country-by-country analysis confirms the finding in earlier studies that Commission's forecasts are largely unbiased. A panel data approach is also used in this paper, which pools the data for all EU Member States in order to circumvent the small size of the shorter observation samples. For the whole sample, it also confirms that there is no evidence of bias for current-year GDP forecasts across EU Member States. According to this test, however, year-ahead forecasts appear to have been slightly overestimating GDP growth. For the shorter samples, this analysis shows that GDP growth tended to be underestimated in the pre-crisis years 2000-2007 while GDP growth was overestimated in the crisis and post-crisis years 2008-2014. Similar conclusions were found for the general government balance where public deficit was found to be overestimated in the pre-crisis period and underestimated in the crisis-and post crisis period. Inflation projections were underestimated on average in the pre-crisis period but no bias was found for the post-crisis period.

There is generally no persistence of Commission's forecast errors. At the EU and euro-area level, there are no cases of autocorrelation in forecast errors for the current-year outlook for any of the three variables for the long and short period. The only case of serial correlation is noted for EU inflation for year-ahead forecasts for the large sample. At the Member State level, a few cases of serial correlations are however found but overall, forecast errors do not tend to persist in subsequent projections.

Other advanced tests shed more light on the forecasting performance and show that Commission's forecasts generally beat a naïve forecast and are directionally accurate but are not always efficient in terms of their use of all available data.

Commission's GDP growth forecast tend to be **more accurate than a naïve forecast** (the latest available realisation) for both horizons and both samples for a large majority of Member States. For inflation projections, the same conclusion holds but only for the large sample while for the general government balance, Commission's forecasts outperform the naïve forecast for less than half of the countries.

Commission's forecasts are found to be **directionally accurate**, meaning that they anticipate well pick-ups and slowdowns in the three variables, though slightly less for the general government balance. Pick-ups and slowdowns turn out to be better predicted for the current year than for the year ahead. Higher forecast directional accuracy is found for the three variables in the period 2008-2014 than in the pre-crisis period (2000-2007). The directional accuracy is however weakest when it comes to predicting slowdowns of GDP growth in the year ahead. This may partly explain the finding of a positive bias in year-ahead GDP forecasts.

The encompassing test which examines whether the Commission's forecasts contain significant information on top of the information contained in the naïve forecast and in the previous forecast, shows that GDP growth forecasts do not **encompass** the naïve projections. In contrast, inflation and general government balance do encompass the naïve forecast though their year-ahead projections do not always add information to the information already contained in the previous forecast.

The **efficiency** tests examines whether the Commission's forecasts contain all available information at the time of the forecast. This test shows that Commission's forecasts were not always efficient. GDP projections were found to be non-efficient while inflation and general government forecasts were found efficient depending on the sample size and the horizon.

"External" assumptions seem to explain part of the GDP forecast errors, in particular for the year ahead. One potential source of forecast errors is the setting of assumptions about growth outside the EU, commodities prices, and financial variables that are treated by the forecaster as exogenous. Moreover, the forecasts are produced under the assumption of unchanged fiscal policies. These assumptions may turn out to be erroneous *ex post* and thus lead to forecast errors that are unavoidable for the desk officer who prepares the forecast for a particular Member State. The decomposition of forecast errors shows a limited impact of unexpected changes in external assumptions on GDP growth forecast errors for the current

year. However, more than half of the variance in year-ahead forecast errors seems to be explained by external assumptions that prove to be incorrect *ex post*. The assumption of unchanged fiscal policy, reflected in the unexpected change in the structural fiscal balance, has a large impact on the error for the year-ahead GDP forecast. Unexpected changes in long term interest rates and uncertainty play an important role in explaining forecast errors for both horizons. Unexpected strong growth in the rest of the world leads to an underestimation of GDP growth across EU Member States, but the size and significance of the impact varies across time horizons and model specifications. Deviations from the technical assumption on the exchange rate are not found to be a systematic driver of forecast errors, and the evidence on oil price variations is inconclusive.

The accuracy of Commission's forecasts is comparable to that of other international institutions and better than that of Consensus Economics forecasts. The Commission's forecasts accuracy over the whole sample is found to be very similar to that of the OECD and IMF for all forecast horizons. The Commission's projections, however, have continued to score better than the average of private sector forecasts (compiled by Consensus Economics). In the shorter and more recent sample period, however, the accuracy of Consensus' forecasts for current year forecasts appears to have improved compared to the whole sample and become more similar to those of the Commission and the other institutions. For the year ahead, Commission's forecasts come out as more accurate than the IMF's and Consensus in the shorter sample but less accurate than the OECD's. Informational advantage as well as the assumptions that institutions make clearly play a role in the difference of forecasting performance across institutions.

Overall, the European Commission’s forecasts continue to display a reasonable track record, similar to that of the other international institutions. Their accuracy deteriorated in the crisis and post-crisis period (2008-14) compared to the pre-crisis period (2000-07) mainly due to the anomalously large forecast error in the recession year 2009 (this difficulty applied to all forecasters, both institutional and private). For the more recent years (2012-2014), however, the accuracy of the European Commission's forecasts has improved again or remained similar for the key variables.

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Table A1.1:

Gross domestic product, volume

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	43	-0.08	0.68	0.83	46	-0.07	0.65	0.81	42	0.24	1.14	1.53	45	0.26	1.10	1.48
Germany	43	0.00	0.83	1.13	46	0.01	0.79	1.09	42	0.33	1.32	1.76	45	0.33	1.25	1.70
Estonia	8	-0.04	2.96	3.36	11	0.01	2.52	2.98	8	1.11	5.36	6.46	11	0.97	4.18	5.54
Ireland	39	-0.44	1.61	1.99	42	-0.46	1.61	1.99	38	-0.38	2.32	2.86	41	-0.38	2.27	2.80
Greece	31	0.08	0.79	1.06	34	0.11	0.79	1.06	30	0.33	1.20	1.74	33	0.38	1.23	1.78
Spain	26	-0.14	0.53	0.73	29	-0.15	0.50	0.70	25	0.07	0.90	1.25	28	0.11	0.93	1.27
France	43	0.04	0.55	0.72	46	0.05	0.54	0.70	42	0.35	0.87	1.21	45	0.35	0.84	1.17
Italy	43	0.43	0.85	1.17	46	0.45	0.85	1.15	42	0.76	1.33	1.84	45	0.83	1.35	1.84
Cyprus	8	0.10	0.68	0.96	11	-0.31	1.17	1.58	8	0.51	1.01	1.72	11	0.78	1.44	2.05
Latvia	8	-0.19	3.51	4.12	11	-0.34	3.02	3.69	8	1.13	5.65	7.36	11	0.69	4.54	6.34
Lithuania	8	0.11	1.71	2.08	11	0.00	1.41	1.81	8	0.64	4.21	5.97	11	0.48	3.18	5.09
Luxembourg	43	-0.46	1.48	1.99	46	-0.46	1.44	1.94	42	0.09	2.09	2.75	45	0.05	2.04	2.68
Malta	8	-0.45	0.95	1.20	11	-0.49	0.93	1.14	8	0.05	1.75	2.12	11	-0.15	1.55	1.90
Netherlands	43	-0.01	0.69	0.88	46	0.00	0.66	0.85	42	0.07	1.13	1.46	45	0.11	1.13	1.44
Austria	17	-0.05	0.52	0.66	20	0.04	0.52	0.68	17	0.30	1.01	1.44	20	0.35	0.95	1.37
Portugal	26	0.14	0.71	0.88	29	0.10	0.68	0.85	25	0.44	1.02	1.27	28	0.41	0.94	1.20
Slovenia	8	0.35	1.45	1.95	11	0.09	1.38	1.79	8	0.94	2.41	4.11	11	0.62	2.45	3.82
Slovakia	8	-0.64	1.36	1.52	11	-0.50	1.03	1.30	8	-0.14	2.71	3.91	11	-0.14	2.12	3.34
Finland	17	0.16	1.25	1.55	20	0.28	1.21	1.50	17	0.32	1.86	2.79	20	0.51	1.82	2.66
Euro area	14	0.13	0.40	0.55	17	0.14	0.37	0.51	13	0.50	1.02	1.47	16	0.53	0.95	1.36
Bulgaria	5	0.80	1.00	1.60	8	0.47	0.67	1.27	5	1.76	2.36	4.26	8	1.29	1.73	3.41
Czech Republic	8	-0.36	1.19	1.30	11	-0.10	1.03	1.18	8	0.21	2.44	3.21	11	0.43	2.09	2.83
Denmark	39	0.24	0.72	0.95	42	0.28	0.72	0.95	38	0.38	1.08	1.50	41	0.45	1.10	1.50
Hungary	8	0.25	0.80	0.92	11	0.11	0.91	1.01	8	1.08	1.90	2.88	11	0.71	1.85	2.62
Poland	8	-0.69	1.11	1.41	11	-0.50	0.93	1.23	8	-0.36	1.46	1.59	11	-0.28	1.21	1.40
Romania	5	0.80	1.56	1.81	8	0.31	1.34	1.60	5	2.54	3.14	5.41	8	1.51	2.39	4.34
Sweden	17	-0.05	0.94	1.33	20	-0.04	0.85	1.24	17	0.31	1.39	1.99	20	0.34	1.26	1.84
United Kingdom	39	0.07	0.68	0.87	42	0.04	0.66	0.86	38	0.35	1.13	1.48	41	0.30	1.09	1.43
EU	43	0.10	0.50	0.71	46	0.10	0.48	0.69	42	0.37	0.95	1.37	45	0.38	0.92	1.33

Table A1.2:

Price deflator of private consumption

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	43	-0.04	0.54	0.68	46	-0.03	0.51	0.66	42	-0.02	1.05	1.56	45	0.00	1.02	1.51
Germany	43	0.06	0.30	0.42	46	0.08	0.30	0.41	42	0.01	0.70	0.90	45	0.04	0.68	0.88
Estonia	8	-0.48	0.96	1.10	11	-0.27	0.79	0.97	8	-0.36	2.26	2.79	11	-0.11	1.98	2.48
Ireland	39	0.06	0.96	1.31	42	0.07	0.93	1.27	38	-0.14	1.82	2.73	41	-0.13	1.71	2.63
Greece	31	-0.09	0.81	1.19	34	-0.06	0.84	1.18	30	-0.65	1.26	1.93	33	-0.52	1.23	1.87
Spain	26	-0.27	0.46	0.60	29	-0.24	0.46	0.59	25	-0.39	0.67	0.90	28	-0.34	0.72	0.94
France	43	0.04	0.42	0.63	46	0.06	0.43	0.63	42	-0.32	0.91	1.42	45	-0.26	0.91	1.39
Italy	43	-0.11	0.61	0.88	46	-0.07	0.60	0.86	42	-0.96	1.34	2.34	45	-0.87	1.32	2.28
Cyprus	8	0.02	0.58	0.66	11	0.34	0.76	0.92	8	0.05	0.90	1.29	11	0.52	1.15	1.54
Latvia	8	-2.43	2.43	2.90	11	-1.62	1.99	2.52	8	-2.92	3.37	3.68	11	-1.90	2.81	3.22
Lithuania	8	-0.60	1.01	1.24	11	-0.28	0.91	1.13	8	-0.89	1.64	1.89	11	-0.26	1.58	1.82
Luxembourg	43	-0.03	0.51	0.68	46	0.01	0.52	0.69	42	-0.16	1.18	1.55	45	-0.07	1.19	1.54
Malta	8	0.22	0.86	0.94	11	0.38	0.84	0.93	8	0.22	1.05	1.27	11	0.43	1.04	1.24
Netherlands	43	0.02	0.41	0.57	46	0.02	0.39	0.56	42	0.20	0.72	1.02	45	0.21	0.71	1.00
Austria	17	0.00	0.41	0.47	20	-0.03	0.39	0.45	17	0.15	0.65	0.98	20	0.09	0.59	0.91
Portugal	26	-0.31	0.56	0.74	29	-0.25	0.55	0.73	25	-0.56	1.09	1.78	28	-0.43	1.05	1.71
Slovenia	8	-0.16	0.96	1.14	11	0.01	0.82	1.03	8	0.46	1.31	1.70	11	0.60	1.27	1.61
Slovakia	8	0.16	0.57	0.75	11	0.11	0.62	0.76	8	0.35	1.41	1.69	11	0.36	1.36	1.61
Finland	17	-0.04	0.46	0.50	20	-0.01	0.42	0.47	17	0.12	0.96	1.15	20	0.07	0.86	1.07
Euro area	14	-0.05	0.21	0.26	17	0.01	0.22	0.27	13	-0.11	0.54	0.80	16	-0.02	0.56	0.79
Bulgaria	5	-0.97	1.66	2.15	8	-0.07	1.70	2.31	5	-1.02	2.90	3.38	8	0.16	2.74	3.25
Czech Republic	8	0.00	0.52	0.59	11	0.22	0.60	0.65	8	0.62	0.95	1.25	11	0.46	0.75	1.07
Denmark	39	-0.19	0.53	0.68	42	-0.14	0.53	0.68	38	-0.35	1.03	1.75	41	-0.30	1.01	1.70
Hungary	8	-0.13	0.62	0.65	11	0.05	0.59	0.64	8	-0.35	0.75	0.90	11	-0.01	1.06	1.29
Poland	8	-0.29	0.45	0.50	11	-0.01	0.53	0.66	8	-0.19	1.11	1.24	11	0.15	1.28	1.43
Romania	5	0.09	1.41	1.66	8	0.29	1.19	1.45	5	-0.92	1.92	2.72	8	-0.26	1.52	2.24
Sweden	17	-0.06	0.35	0.43	20	-0.03	0.33	0.42	17	0.43	0.61	0.71	20	0.42	0.59	0.69
United Kingdom	39	0.05	0.75	1.18	42	0.06	0.72	1.14	38	-0.32	1.40	2.15	41	-0.28	1.32	2.08
EU	43	0.00	0.31	0.43	46	0.02	0.30	0.42	42	-0.22	0.81	1.29	45	-0.18	0.80	1.26

Table A1.3:

General government balance

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	41	0.12	0.46	0.65	44	0.15	0.47	0.65	41	0.35	1.14	1.60	44	0.31	1.11	1.55
Germany	43	-0.27	0.82	0.99	46	-0.29	0.80	0.97	42	-0.16	1.10	1.37	45	-0.20	1.08	1.34
Estonia	8	-0.68	1.74	1.94	11	-0.80	1.57	1.81	8	-1.32	2.48	2.77	11	-1.16	2.00	2.41
Ireland	38	0.51	2.15	3.95	41	0.43	2.03	3.81	38	0.77	2.82	4.01	41	0.64	2.69	3.87
Greece	30	0.84	1.79	2.54	33	1.18	2.04	2.93	30	1.41	2.63	3.66	33	1.59	2.70	3.71
Spain	26	0.30	1.06	1.47	29	0.44	1.12	1.60	25	0.64	1.48	2.36	28	0.76	1.52	2.41
France	43	-0.06	0.62	0.84	46	-0.04	0.60	0.81	42	0.10	0.80	1.16	45	0.10	0.78	1.13
Italy	43	0.15	0.88	1.30	46	0.17	0.86	1.27	42	0.42	1.30	1.68	45	0.43	1.26	1.63
Cyprus	8	-0.23	1.76	2.37	11	0.28	1.91	2.41	8	-0.25	2.17	3.14	11	-0.08	1.83	2.73
Latvia	8	-0.70	1.49	1.68	11	-0.57	1.22	1.46	8	-0.78	3.15	3.46	11	-0.77	2.57	3.02
Lithuania	8	0.24	1.22	1.61	11	-0.03	1.10	1.46	8	-0.16	2.01	2.51	11	-0.27	1.66	2.21
Luxembourg	38	-0.75	1.45	1.81	41	-0.74	1.40	1.75	37	-1.33	2.21	2.52	40	-1.34	2.15	2.46
Malta	8	0.04	0.79	1.20	11	-0.01	0.76	1.09	8	0.02	1.04	1.33	11	-0.15	0.92	1.20
Netherlands	43	-0.27	0.97	1.19	46	-0.30	0.95	1.16	42	-0.10	1.32	1.72	45	-0.11	1.28	1.67
Austria	17	-0.26	0.53	0.67	20	-0.30	0.53	0.65	17	-0.36	0.80	0.98	20	-0.37	0.79	0.95
Portugal	26	-0.21	0.88	1.15	29	-0.13	0.88	1.14	25	0.18	1.37	1.97	28	0.26	1.32	1.90
Slovenia	8	-0.22	0.49	0.64	11	0.72	1.29	2.90	8	0.31	1.50	2.07	11	0.86	2.38	3.74
Slovakia	8	0.27	0.95	1.14	11	0.13	0.75	0.98	8	0.58	1.42	2.19	11	0.30	1.16	1.88
Finland	17	-0.45	0.96	1.12	20	-0.26	0.93	1.09	17	-0.43	1.46	2.01	20	-0.21	1.40	1.90
Euro area	14	-0.07	0.57	0.67	17	-0.02	0.51	0.62	13	0.18	1.06	1.51	16	0.17	0.90	1.36
Bulgaria	5	0.70	1.51	1.85	8	0.43	1.21	1.55	5	2.33	2.70	3.67	8	1.40	1.95	2.94
Czech Republic	8	-1.01	1.42	1.69	11	-0.71	1.31	1.57	8	-0.76	1.88	2.30	11	-0.77	1.71	2.10
Denmark	35	-0.21	0.91	1.28	38	-0.28	0.92	1.30	35	-0.07	1.62	2.00	38	-0.19	1.61	1.99
Hungary	8	0.06	1.30	1.62	11	-0.11	1.11	1.42	8	-0.58	2.39	3.59	11	-0.57	1.88	3.07
Poland	8	-0.23	1.08	1.18	11	0.75	1.71	2.88	8	0.04	1.36	1.99	11	0.81	1.79	2.90
Romania	5	0.79	1.72	1.99	8	0.37	1.21	1.60	5	1.52	1.52	2.28	8	0.77	1.12	1.83
Sweden	17	-1.02	1.17	1.36	20	-0.85	1.02	1.25	17	-1.07	1.39	1.63	20	-0.78	1.31	1.54
United Kingdom	39	0.03	0.81	1.09	42	0.01	0.79	1.06	38	0.41	1.47	1.86	41	0.31	1.45	1.83
EU	43	-0.07	0.52	0.64	46	-0.06	0.50	0.62	42	0.15	0.83	1.12	45	0.14	0.78	1.08

Table A1.4:

Unemployment rate

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	43	0.06	0.48	0.61	46	0.05	0.46	0.59	41	0.30	0.83	1.12	44	0.27	0.80	1.08
Germany	43	0.08	0.36	0.52	46	0.08	0.34	0.50	41	0.11	0.74	1.03	44	0.13	0.71	1.00
Estonia	7	0.17	1.20	1.38	10	0.44	1.16	1.31	8	-0.88	1.93	2.83	11	-0.29	1.75	2.51
Ireland	39	0.31	0.61	0.85	42	0.31	0.61	0.84	38	0.34	1.05	1.52	41	0.37	1.05	1.49
Greece	31	-0.08	0.70	0.98	34	-0.23	0.79	1.23	30	-0.42	1.18	1.50	33	-0.68	1.37	1.87
Spain	26	0.12	0.69	0.88	29	0.14	0.70	0.87	25	-0.13	1.38	1.76	28	-0.18	1.46	1.87
France	42	0.05	0.31	0.42	45	0.05	0.30	0.41	41	0.04	0.56	0.72	44	0.06	0.55	0.72
Italy	43	0.05	0.70	1.08	46	0.02	0.69	1.06	41	0.05	0.97	1.47	44	-0.03	0.98	1.47
Cyprus	8	-0.23	0.68	0.79	11	-0.11	1.00	1.32	8	-0.38	1.03	1.15	11	-0.65	1.68	2.08
Latvia	8	0.41	1.04	1.18	11	0.45	0.94	1.14	8	-0.05	2.43	3.24	11	0.14	2.03	2.86
Lithuania	8	0.31	0.91	1.11	11	0.26	0.72	0.96	8	-0.13	1.98	2.76	11	-0.07	1.53	2.36
Luxembourg	37	0.06	0.37	0.50	40	0.05	0.36	0.48	36	0.03	0.48	0.67	39	0.04	0.47	0.66
Malta	8	0.44	0.49	0.64	11	0.37	0.45	0.58	8	0.16	0.61	0.70	11	0.18	0.53	0.62
Netherlands	43	0.24	0.61	1.06	46	0.24	0.59	1.02	41	0.23	1.00	1.43	44	0.20	0.97	1.39
Austria	17	0.09	0.35	0.49	20	0.03	0.35	0.49	17	0.14	0.53	0.76	20	0.09	0.50	0.72
Portugal	26	0.17	0.57	0.71	29	0.24	0.63	0.78	25	0.00	1.04	1.38	28	0.05	1.14	1.53
Slovenia	8	0.25	0.43	0.51	11	0.23	0.37	0.46	8	-0.03	0.68	0.79	11	0.04	0.78	0.93
Slovakia	8	0.43	0.88	1.10	11	0.30	0.77	0.98	8	0.31	1.54	1.74	11	0.14	1.30	1.53
Finland	17	0.15	0.39	0.53	20	0.13	0.36	0.50	17	0.27	0.58	0.84	20	0.21	0.52	0.78
Euro area	14	0.16	0.24	0.29	17	0.13	0.25	0.28	13	0.08	0.42	0.49	16	-0.01	0.48	0.58
Bulgaria	5	-0.38	1.26	1.46	8	-0.16	1.06	1.27	5	-0.68	1.48	1.60	8	-0.36	1.11	1.32
Czech Republic	8	0.33	0.50	0.62	11	0.35	0.48	0.59	8	0.31	0.79	0.99	11	0.34	0.68	0.89
Denmark	39	-0.07	0.52	0.80	42	-0.04	0.51	0.78	38	-0.16	1.03	1.30	41	-0.12	0.99	1.26
Hungary	8	-0.10	0.40	0.46	11	0.13	0.55	0.67	8	-0.50	0.63	0.78	11	-0.05	0.76	1.07
Poland	8	0.76	0.96	1.22	11	0.66	0.86	1.10	8	0.98	1.33	1.67	11	0.81	1.23	1.55
Romania	5	0.64	0.72	0.83	8	0.43	0.58	0.69	5	0.64	0.84	0.99	8	0.54	0.66	0.84
Sweden	17	-0.11	0.58	0.84	20	-0.11	0.54	0.78	17	-0.12	1.04	1.19	20	-0.17	0.95	1.11
United Kingdom	39	0.06	0.27	0.32	42	0.10	0.29	0.34	38	0.09	0.56	0.78	41	0.14	0.58	0.80
EU	43	0.05	0.24	0.33	46	0.05	0.24	0.32	41	0.07	0.52	0.73	44	0.07	0.52	0.72

Table A1.5:

Gross fixed capital formation

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	43	-0.19	2.20	2.83	46	-0.20	2.16	2.77	42	0.63	3.18	4.51	45	0.64	3.18	4.44
Germany	43	0.76	2.26	2.91	46	0.84	2.24	2.90	42	0.90	3.22	3.97	45	1.02	3.19	3.92
Estonia	8	0.94	8.34	9.08	11	0.05	7.73	8.73	8	2.61	11.74	13.95	11	2.14	9.47	12.09
Ireland	39	1.13	3.78	4.90	42	0.89	3.70	4.80	38	1.67	5.98	7.30	41	1.44	5.77	7.12
Greece	31	2.20	4.16	5.71	34	2.71	4.50	6.07	30	2.82	4.80	6.10	33	3.15	4.95	6.44
Spain	26	0.12	2.19	2.69	29	-0.11	2.26	2.75	25	0.50	3.22	4.12	28	0.46	3.35	4.24
France	43	0.32	1.40	1.84	46	0.37	1.39	1.83	42	0.71	1.91	2.49	45	0.78	1.90	2.45
Italy	43	1.15	2.53	3.42	46	1.30	2.58	3.44	42	1.78	3.04	3.97	45	2.03	3.21	4.11
Cyprus	8	1.54	5.21	6.72	11	2.47	6.56	9.06	8	1.60	5.00	6.43	11	4.52	6.99	9.63
Latvia	8	0.90	8.73	9.72	11	1.26	8.11	9.17	8	1.41	11.94	15.02	11	2.42	10.21	13.36
Lithuania	8	2.21	5.36	7.43	11	1.41	5.42	7.13	8	1.88	11.30	14.92	11	2.21	9.69	13.31
Luxembourg	43	-0.46	3.30	4.18	46	-0.40	3.24	4.10	42	-0.66	5.70	7.37	45	-0.59	5.60	7.24
Malta	8	9.63	10.78	14.67	11	7.39	8.86	12.68	8	6.38	10.58	13.91	11	4.02	9.53	12.63
Netherlands	43	-0.14	2.62	3.24	46	-0.06	2.53	3.15	42	-0.39	3.15	3.95	45	-0.27	3.15	3.90
Austria	17	0.21	1.99	2.44	20	0.37	1.88	2.32	17	0.78	2.58	3.31	20	0.82	2.45	3.13
Portugal	26	0.46	3.23	3.92	29	0.49	3.06	3.76	25	1.60	4.04	5.06	28	1.61	3.90	4.89
Slovenia	8	1.61	6.26	7.49	11	0.94	5.64	6.75	8	4.46	7.64	10.69	11	2.87	7.57	9.93
Slovakia	8	0.45	1.78	2.48	11	1.15	2.74	3.57	8	-0.34	7.54	10.76	11	0.83	7.37	9.99
Finland	17	1.58	2.93	3.73	20	1.68	2.83	3.55	17	1.71	4.29	5.81	20	2.14	4.34	5.67
Euro area	14	0.72	1.24	1.67	17	0.84	1.26	1.67	13	1.60	2.38	3.37	16	1.81	2.45	3.32
Bulgaria	5	5.38	10.22	10.88	8	3.75	7.52	8.80	5	9.02	14.66	18.89	8	6.36	9.98	15.02
Czech Republic	8	1.63	3.53	3.71	11	1.18	2.95	3.27	8	3.31	4.86	6.25	11	2.78	4.67	5.75
Denmark	39	0.46	3.64	4.57	42	0.52	3.54	4.45	38	0.89	5.10	6.50	41	1.05	5.01	6.37
Hungary	8	2.69	4.59	5.48	11	0.99	4.58	5.39	8	5.33	5.60	7.00	11	2.89	5.55	6.70
Poland	8	0.40	4.10	4.71	11	0.18	4.10	4.60	8	1.33	5.25	6.04	11	0.37	5.03	5.69
Romania	5	2.24	11.44	12.94	8	2.98	8.80	10.73	5	3.64	13.88	18.40	8	4.11	11.11	15.20
Sweden	17	0.41	3.21	3.84	20	0.32	3.03	3.64	17	1.38	4.38	5.40	20	1.21	3.98	5.04
United Kingdom	39	0.61	2.27	2.78	42	0.55	2.24	2.73	38	0.85	3.35	4.30	41	0.72	3.19	4.17
EU	43	0.61	1.25	1.69	46	0.64	1.24	1.67	42	0.90	2.02	2.88	45	0.97	2.01	2.85

Table A1.6:

Current-account balance

	Current year								Year-ahead							
	1969-2011				1969-2014				1969-2011				1969-2014			
	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE	N obs	ME	MAE	RMSE
Belgium	41	0.03	1.01	1.42	44	0.07	0.99	1.40	41	-0.05	1.35	1.68	44	0.08	1.38	1.70
Germany	41	-0.28	0.64	0.82	44	-0.33	0.67	0.85	41	-0.28	1.02	1.33	44	-0.38	1.08	1.38
Estonia	8	0.05	2.38	2.89	11	-0.01	2.28	2.74	8	-0.15	4.55	6.17	11	0.16	4.01	5.48
Ireland	39	-0.16	1.26	1.79	42	-0.29	1.36	1.89	38	0.10	1.96	2.64	41	-0.02	1.93	2.59
Greece	30	0.93	1.59	2.12	33	0.75	1.53	2.07	30	1.38	1.98	2.48	33	1.07	1.99	2.49
Spain	26	0.17	0.82	1.05	29	0.17	0.83	1.04	25	0.22	1.18	1.54	28	0.13	1.26	1.59
France	41	0.03	0.56	0.68	44	0.02	0.55	0.67	41	0.01	0.75	0.93	44	-0.01	0.74	0.91
Italy	41	0.20	0.74	0.90	44	0.14	0.74	0.91	41	0.50	1.21	1.62	44	0.36	1.23	1.62
Cyprus	8	1.66	3.06	4.22	11	1.25	2.91	3.90	8	2.11	2.94	4.68	11	1.64	2.66	4.17
Latvia	8	0.50	4.08	5.21	11	0.38	3.24	4.48	8	0.04	6.51	8.23	11	0.15	5.02	7.04
Lithuania	8	0.41	2.01	2.39	11	-0.17	1.93	2.24	8	0.07	4.00	5.11	11	-0.56	3.53	4.59
Luxembourg	39	0.41	3.04	5.30	42	0.41	2.90	5.11	32	-0.40	6.23	8.53	35	-0.40	5.81	8.17
Malta	8	-0.25	2.83	3.55	11	-0.69	2.56	3.22	8	0.74	3.01	3.80	11	-0.09	2.81	3.51
Netherlands	41	-0.02	1.06	1.38	44	-0.04	1.05	1.36	41	-0.07	1.50	1.85	44	-0.05	1.45	1.80
Austria	17	-0.08	0.79	1.04	20	-0.05	0.81	1.03	17	-0.31	1.16	1.51	20	-0.24	1.12	1.44
Portugal	26	0.25	1.27	1.83	29	0.18	1.22	1.77	25	0.94	1.74	2.33	28	0.69	1.73	2.30
Slovenia	8	0.09	1.16	1.67	11	-0.20	1.23	1.71	8	0.64	2.06	2.52	11	0.07	2.01	2.40
Slovakia	8	0.19	2.41	2.66	11	0.01	1.97	2.34	8	0.86	1.86	2.36	11	0.64	1.88	2.30
Finland	17	-0.01	1.44	1.67	20	0.06	1.38	1.60	17	0.14	1.62	1.87	20	0.25	1.51	1.78
Euro area	14	0.06	0.51	0.62	17	-0.04	0.51	0.64	13	0.19	0.70	0.81	16	-0.04	0.76	0.90
Bulgaria	5	-1.50	5.10	5.57	8	-1.27	3.97	4.71	5	-2.55	8.23	8.91	8	-1.88	6.12	7.27
Czech Republic	8	-0.25	1.45	1.62	11	-0.30	1.26	1.45	8	0.00	1.70	1.98	11	-0.06	1.32	1.70
Denmark	39	-0.14	0.87	1.14	42	-0.18	0.89	1.18	38	-0.04	1.63	2.17	41	-0.11	1.58	2.12
Hungary	8	-0.16	2.59	2.98	11	-0.26	2.09	2.59	8	-0.55	2.35	2.63	11	-0.51	2.20	2.44
Poland	8	-0.34	0.86	1.23	11	-0.41	0.79	1.11	8	-0.20	1.60	1.94	11	-0.39	1.44	1.77
Romania	5	-1.10	1.82	2.32	8	-1.25	1.70	2.13	5	-2.48	3.32	4.26	8	-2.16	2.68	3.56
Sweden	17	-0.29	0.76	0.94	20	-0.27	0.75	0.92	17	-0.74	1.43	1.74	20	-0.62	1.23	1.61
United Kingdom	39	-0.19	0.79	0.98	42	-0.04	0.86	1.06	38	0.01	1.00	1.46	41	0.15	1.07	1.52
EU	41	-0.04	0.31	0.40	44	-0.05	0.31	0.40	41	0.07	0.50	0.67	44	0.04	0.51	0.66

ANNEX 2

Univariate analysis

Table A2.1:
Tests for unbiasedness ('69-'14)

	GDP		Inflation		General government		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	-0.07	0.26	-0.03	0.00	0.15	0.33	0.05	0.27*	-0.20	0.65	0.07	0.08
Germany	0.01	0.33	0.08	0.04	-0.29**	-0.20	0.08	0.13	0.84**	1.02*	-0.33***	-0.38*
Estonia	0.01	0.97	-0.27	-0.11	-0.80	-1.16	0.44	-0.29	0.05	2.14	-0.01	0.16
Ireland	-0.46	-0.38	0.07	-0.13	0.43	0.64	0.31**	0.37	0.89	1.44	-0.29	-0.02
Greece	0.11	0.38	-0.06	-0.52	1.18**	1.59**	-0.23	-0.69**	2.71***	3.15***	0.75**	1.07***
Spain	-0.15	0.11	-0.24**	-0.34*	0.44	0.76*	0.15	-0.18	-0.11	0.46	0.17	0.13
France	0.05	0.35**	0.06	-0.26	-0.04	0.10	0.05	0.06	0.37	0.78**	0.02	-0.01
Italy	0.45***	0.83***	-0.07	-0.87***	0.17	0.43*	0.02	-0.03	1.3***	2.03***	0.14	0.36
Cyprus	-0.31	0.78	0.34	0.52	0.28	-0.08	-0.11	-0.65	2.47	4.52	1.25	1.64
Latvia	-0.34	0.69	-1.62**	-1.9**	-0.57	-0.77	0.45	0.14	1.26	2.42	0.38	0.15
Lithuania	0.00	0.48	-0.28	-0.26	-0.04	-0.27	0.26	-0.07	1.41	2.22	-0.17	-0.57
Luxembourg	-0.46	0.05	0.02	-0.07	-0.74***	-1.34***	0.05	0.04	-0.40	-0.59	0.41	-0.41
Malta	-0.49	-0.15	0.38	0.44	-0.01	-0.15	0.37**	0.18	7.39**	4.02	-0.69	-0.09
Netherlands	0.00	0.11	0.02	0.21	-0.3*	-0.11	0.24	0.21	-0.06	-0.27	-0.04	-0.05
Austria	0.04	0.35	-0.03	0.09	-0.3**	-0.37*	0.03	0.09	0.37	0.82	-0.05	-0.24
Portugal	0.10	0.41*	-0.25*	-0.43	-0.13	0.26	0.24*	0.05	0.49	1.61*	0.18	0.69
Slovenia	0.09	0.62	0.01	0.60	0.73	0.86	0.23*	0.04	0.94	2.87	-0.20	0.07
Slovakia	-0.50	-0.14	0.11	0.36	0.14	0.30	0.30	0.14	1.15	0.83	0.01	0.64
Finland	0.28	0.52	-0.01	0.08	-0.26	-0.21	0.13	0.21	1.68**	2.14*	0.06	0.25
Euro area	0.14	0.53	0.01	-0.02	-0.02	0.17	0.13*	-0.01	0.84**	1.81**	-0.04	0.00
Bulgaria	0.47	1.29	-0.07	0.16	0.43	1.40	-0.16	-0.36	3.75	6.36	-1.28	-1.88
Czech Republic	-0.10	0.43	0.22	0.46	-0.71	-0.77	0.36**	0.34	1.18	2.79	-0.30	-0.06
Denmark	0.28*	0.45**	-0.14	-0.30	-0.28	-0.19	-0.04	-0.12	0.52	1.06	-0.18	-0.11
Hungary	0.11	0.71	0.05	-0.01	-0.11	-0.58	0.13	-0.06	0.99	2.89	-0.26	-0.51
Poland	-0.50	-0.28	-0.01	0.15	0.76	0.81	0.66**	0.81*	0.18	0.37	-0.41	-0.39
Romania	0.31	1.51	0.29	-0.26	0.37	0.77	0.43*	0.54*	2.98	4.11	-1.25*	-2.16*
Sweden	-0.04	0.34	-0.03	0.42***	-0.85***	-0.78**	-0.11	-0.17	0.32	1.21	-0.27	-0.62*
United Kingdom	0.04	0.30	0.06	-0.28	0.01	0.31	0.1*	0.14	0.55	0.72	-0.04	0.15
EU	0.10	0.38*	0.02	-0.18	-0.06	0.14	-0.19	-0.18	0.64***	0.97**	-0.05	0.04
Overall	-0.02	0.33***	-0.04	-0.14**	-0.02	0.08	0.11***	0.05	0.82***	1.35***	-0.01	0.02

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.2:
Tests for unbiasedness ('00-'14)

	GDP		Inflation		General government		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	0.09	0.39	-0.28**	-0.28	0.04	0.12	0.15	0.34	-0.59	0.49	0.34	0.45
Germany	-0.05	0.30	0.04	0.12	-0.5*	-0.37	0.15	0.23	1.36*	1.98*	-0.72***	-0.97**
Estonia	0.01	0.97	-0.27	-0.11	-0.80	-1.16	0.44	-0.29	0.05	2.14	-0.01	0.16
Ireland	-0.33	0.14	0.04	0.25	1.58	1.78	0.35**	-0.09	1.37	2.77	-0.12	-0.27
Greece	0.32	0.89	-0.16	-0.19	2.12***	2.7***	-0.63	-1.15**	4.18**	4.91**	1.15*	1.91**
Spain	-0.08	0.31	-0.27*	-0.35	0.69	1.07	-0.05	-0.39	-0.11	1.22	0.18	0.12
France	0.26*	0.55**	0.22**	0.00	0.16	0.32	0.12*	0.21*	0.46	0.96*	0.11	0.29
Italy	0.55***	1.11***	-0.01	-0.11	0.17	0.35	0.19	0.01	1.77***	3.25***	0.13	0.24
Cyprus	-0.31	0.78	0.34	0.52	0.28	-0.08	-0.11	-0.65	2.47	4.52	1.25	1.64
Latvia	-0.34	0.69	-1.62**	-1.9**	-0.57	-0.77	0.45	0.14	1.26	2.42	0.38	0.15
Lithuania	0.00	0.48	-0.28	-0.26	-0.04	-0.27	0.26	-0.07	1.41	2.22	-0.17	-0.57
Luxembourg	-0.03	0.29	-0.20	-0.01	-0.96***	-1.6***	0.09	0.13	1.44*	2.14	1.22	0.37
Malta	-0.49	-0.15	0.38	0.44	-0.01	-0.15	0.37**	0.18	7.39**	4.02	-0.69	-0.09
Netherlands	0.35*	0.60	0.08	0.18	-0.20	0.10	0.23***	0.17	0.36	0.93	0.03	0.17
Austria	0.10	0.39	-0.2*	-0.01	-0.42***	-0.40	0.04	-0.01	0.50	1.17	-0.27	-0.49
Portugal	0.18	0.66**	-0.13	0.03	0.20	0.93*	0.04	-0.49	1.59*	3.66***	0.26	0.23
Slovenia	0.09	0.62	0.01	0.60	0.73	0.86	0.23*	0.04	0.94	2.87	-0.20	0.07
Slovakia	-0.50	-0.14	0.11	0.36	0.14	0.30	0.30	0.14	1.15	0.83	0.01	0.64
Finland	0.46	0.86	0.00	-0.09	-0.24	-0.21	0.13	0.08	0.92	1.69	0.32	0.66
Euro area	0.17	0.56	0.01	-0.04	0.04	0.23	0.10	-0.04	1.02**	1.97**	-0.12	-0.14
Bulgaria	0.47	1.29	-0.07	0.16	0.43	1.40	-0.16	-0.36	3.75	6.36	-1.28	-1.88
Czech Republic	-0.10	0.43	0.22	0.46	-0.71	-0.77	0.36**	0.34	1.18	2.79	-0.30	-0.06
Denmark	0.55**	0.91**	0.06	-0.04	-0.8**	-0.72	-0.11	-0.37	0.14	0.60	-0.61*	-0.9**
Hungary	0.11	0.71	0.05	-0.01	-0.11	-0.58	0.13	-0.06	0.99	2.89	-0.26	-0.51
Poland	-0.50	-0.28	-0.01	0.15	0.76	0.81	0.66**	0.81*	0.18	0.37	-0.41	-0.39
Romania	0.31	1.51	0.29	-0.26	0.37	0.77	0.43*	0.54*	2.98	4.11	-1.25*	-2.16*
Sweden	0.06	0.40	-0.09	0.27**	-0.63**	-0.55	-0.03	-0.09	-0.02	1.22	-0.30	-0.95**
United Kingdom	0.23	0.44	-0.05	-0.12	-0.06	0.29	0.17**	0.19	1.02	1.00	0.18	0.46
EU	0.18	0.53	0.01	-0.03	0.01	0.22	0.15**	0.04	1.03**	1.8**	-0.05	0.00
Overall	0.07	0.54***	-0.07	-0.01	0.06	0.16	0.14***	-0.03	1.30***	2.22***	0.01	-0.01

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.3:
Tests for unbiasedness ('00-'07)

	GDP		Inflation		General government		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	0.15	0.24	-0.41**	-0.55**	-0.26*	-0.07	0.06	0.25	-0.31	0.81	0.26	0.20
Germany	0.21	0.18	0.04	0.11	-0.26	-0.45	-0.03	-0.11	2.762**	2.09	-0.763**	-0.987*
Estonia	-1.38	-1.88	-0.38	-0.55	-0.82	-2.06***	1.08**	-0.03	-2.70	-3.88	1.23	4.00
Ireland	-0.70	-1.04	-0.43	-0.31	-0.74	-0.57	0.425*	0.26	0.89	0.63	0.25	0.29
Greece	-0.34**	-0.39**	-0.20	-0.34*	0.74	1.34*	-0.11	-0.28	-0.15	0.29	2.2**	3.05***
Spain	-0.21	-0.21	-0.39**	-0.51***	-0.4*	-0.63**	0.30	0.56	-0.19	0.04	0.725**	0.888*
France	0.39*	0.40	0.18	-0.24***	0.22	0.25	0.10	0.24	0.16	0.43	0.45*	0.725**
Italy	0.42*	0.54	-0.28***	-0.42**	0.06	0.18	0.48***	0.65***	1.438**	1.937**	0.23	0.48
Cyprus	-0.20	-0.18	-0.20	-0.3***	-1.53	-1.80	0.05	-0.28	-0.18	-0.90	1.08	2.025*
Latvia	-2.35**	-3.05***	-3.22**	-2.84***	-1.11*	-1.8**	0.70	1.7**	-1.20	-5.10	3.18	5.475*
Lithuania	-0.85*	-1.48***	-0.45	-0.23	-0.44	-1.24*	1.18**	1.475*	-1.85	-5.83	1.28	2.43
Luxembourg	-0.59	-0.43	-0.34**	-0.5*	-1.17**	-2***	0.06	-0.13	0.76	1.51	2.27	-2.07
Malta	-0.73**	-0.63	-0.01	-0.02	-0.5***	-0.75***	0.53	0.20	2.55	-0.98	0.60	1.53
Netherlands	0.43	0.38	-0.15	-0.16	-0.41	-0.38	0.25*	0.34	0.80	0.65	-0.24	-0.21
Austria	0.18	0.11	-0.17	0.07	-0.30	-0.56**	-0.10	-0.11	1.21	1.11	-0.888**	-1.275**
Portugal	0.51*	0.64	-0.48***	-0.52***	-0.11	0.43	0.00	-0.30	2.30	3.462**	0.53	0.81
Slovenia	-1.08**	-1.45**	-0.30	0.25	-0.53	-0.82	0.33	0.15	-3.75	-1.75	0.95	1.675**
Slovakia	-1.68***	-2.23**	-0.10	0.10	-0.42	-0.55	0.73	1.38	-0.18	-2.15	1.9**	1.35
Finland	-0.03	-0.15	-0.16	-0.04	-0.8*	-1.14**	0.04	0.2*	-0.11	0.13	0.15	-0.01
Euro area	0.21	0.21	-0.09	-0.23**	-0.14	-0.19	0.16**	0.19	1.187*	1.25	0.04	0.11
Bulgaria	0***	0***	:	:	:	:	:	:	:	:	:	:
Czech Republic	-1.38***	-1.75***	0.02	0.23	-1.85**	-1.95**	0.50	0.58	-0.48	0.55	-0.78	-1.33
Denmark	0.21	0.10	0.01	-0.11	-0.62	-0.62	-0.09	-0.09	-1.59	-2.20	0.05	-0.18
Hungary	0.20	-0.05	-0.21	-0.30	0.76	0.95	-0.13	-0.50	1.30	2.23	0.33	0.10
Poland	-0.38	-0.78	-0.43	0.32	-0.90	-0.86	1.3**	2.175**	-1.18	-1.85	-0.20	0.00
Romania	0***	0***	:	:	:	:	:	:	:	:	:	:
Sweden	0.11	0.13	-0.13	0.19	-0.82**	-1.05**	-0.14	-0.08	0.41	1.08	-0.41	-1.425**
United Kingdom	0.15	0.18	0.24	0.26	-0.04	0.35	0.06	0.03	1.28	0.00	-0.13	0.35
EU	0.20	0.20	-0.04	-0.1**	-0.17	-0.10	0.19**	0.16	1.10	0.98	0.00	0.08
Overall	-0.19**	-0.30***	-0.29***	-0.26***	-0.44***	-0.50***	0.23***	0.25***	0.16	-0.06	0.50**	0.61

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.4:
Tests for unbiasedness ('08-'14)

	GDP		Inflation		General government		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	0.01	0.56	-0.13	0.03	0.38	0.33	0.24	0.44	-0.90	0.12	0.42	0.74
Germany	-0.34	0.45	0.04	0.13	-0.78***	-0.28	0.36*	0.61*	-0.25	1.85	-0.67*	-0.94
Estonia	0.81	2.59	-0.22	0.15	-0.78	-0.65	0.02	-0.44	1.62	5.58	-0.71	-2.03
Ireland	0.09	1.48	0.58	0.88	4.24	4.45	0.26	-0.49	1.91	5.23	-0.55	-0.90
Greece	1.08*	2.34**	-0.12	-0.03	3.69**	4.26*	-1.21	-2.16**	9.13***	10.19***	-0.06	0.61
Spain	0.07	0.91	-0.13	-0.17	1.94**	3**	-0.46	-1.47	-0.01	2.58	-0.45	-0.75
France	0.11	0.71	0.27	0.28	0.08	0.40	0.14	0.19	0.79	1.57*	-0.28	-0.21
Italy	0.68**	1.77**	0.31*	0.24	0.30	0.54	-0.13	-0.73*	2.16*	4.75**	0.02	-0.03
Cyprus	-0.38	1.33	0.66	0.99	1.31	0.90	-0.20	-0.86	3.98	7.61*	1.36	1.41
Latvia	0.81	2.83	-0.70	-1.36	-0.26	-0.18	0.30	-0.76	2.67	6.72	-1.22	-2.89
Lithuania	0.48	1.60	-0.18	-0.27	0.20	0.28	-0.26	-0.96	3.28	6.81	-0.99	-2.27
Luxembourg	0.61	1.10	-0.04	0.56	-0.73***	-1.15	0.13	0.43	2.22*	2.86	0.16	1.42
Malta	-0.36	0.13	0.61*	0.69	0.26	0.20	0.29**	0.17	10.16*	6.88	-1.43*	-1.01
Netherlands	0.25	0.86	0.34	0.57	0.05	0.66	0.2*	-0.01	-0.14	1.25	0.33	0.61
Austria	0.02	0.71	-0.23*	-0.09	-0.56***	-0.20	0.20	0.11	-0.32	1.24	0.44	0.41
Portugal	-0.20	0.68	0.26	0.67	0.55	1.51	0.09	-0.70	0.77	3.88**	-0.05	-0.43
Slovenia	0.75	1.80	0.18	0.80	1.44	1.82	0.17	-0.03	3.62	5.51	-0.86	-0.84
Slovakia	0.17	1.05	0.23	0.51	0.45	0.78	0.06	-0.57	1.91	2.53	-1.07	0.23
Finland	1.01	2.01	0.19	-0.16	0.40	0.84	0.24	-0.06	2.1*	3.48	0.51	1.43*
Euro area	0.12	0.95	0.13	0.17	0.25	0.70	0.03	-0.30	0.82	2.79*	-0.31	-0.48
Bulgaria	0.55	1.51	0.43	0.72	0.70	1.36	-0.37	-0.53	5.10	8.37	-2.23	-3.44
Czech Republic	0.63*	1.67	0.33	0.60	-0.06	-0.10	0.27	0.20	2.12**	4.06*	-0.04	0.66
Denmark	0.95**	1.83**	0.12	0.04	-1.00	-0.83	-0.13	-0.70	2.11**	3.79**	-1.36**	-1.73***
Hungary	0.06	1.15	0.19	0.16	-0.61	-1.44	0.27	0.20	0.82	3.26	-0.59	-0.86
Poland	-0.57	0.01	0.24	0.06	1.70	1.76	0.30	0.03	0.95	1.64	-0.53	-0.62
Romania	0.26	1.75	0.39	-0.34	0.53	0.89	0.37	0.46	5.45	7.33	-1.68**	-2.77**
Sweden	0.00	0.70	-0.05	0.35	-0.42	0.02	0.10	-0.11	-0.52	1.38	-0.17	-0.41
United Kingdom	0.31	0.74	-0.38	-0.56	-0.09	0.23	0.29*	0.39	0.73	2.14	0.52	0.59
EU	0.16	0.90	0.06	0.06	0.21	0.60	-1.49	-1.66	0.94	2.74	-0.10	-0.08
Overall	0.29**	1.27***	0.12*	0.20	0.48***	0.72***	0.06	-0.27**	2.28***	4.17	-0.41**	-0.52**

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.5:

Tests for persistency in current-year forecast ('69-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	0.15	0.03	-0.11	0.05	0.08	-0.24	0.09	-0.11	0.11	0.24*	0.15	0.25*	0.27*	0.01	-0.23*	-0.22	0.00	0.09
Germany	0.06	0.12	0.03	0.02	-0.17	-0.18	0.05	-0.15	-0.17	0.18	-0.05	-0.09	0.27*	0.06	-0.10	0.01	-0.06	0.04
Estonia	0.42	-0.41*	-0.67***	-0.24	-0.40	0.29	0.16	-0.39	-0.22	0.47*	-0.37*	-0.58***	0.42	-0.33	-0.59***	-0.02	-0.26	-0.52
Ireland	-0.06	0.09	0.05	-0.20	-0.04	-0.07	0.19	0.16	-0.01	-0.19	0.10	-0.02	0.15	-0.05	-0.36*	0.11	-0.04	-0.18
Greece	0.38**	0.18**	0.05*	0.12	-0.17	0.04	0.17	0.00	0.01	0.33**	0.16*	-0.01	0.20	0.12	0.28	-0.07	-0.14	-0.05
Spain	0.33*	-0.04	-0.13	-0.23	-0.04	0.04	0.17	-0.04	0.13	0.29*	0.15	0.00	0.36**	-0.07	-0.04	0.28	0.12	0.02
France	0.17	0.01	-0.11	-0.09	0.08	-0.05	0.05	-0.17	0.05	-0.17	-0.08	-0.01	0.03	-0.17	0.01	0.01	0.05	0.14
Italy	-0.14	-0.10	0.21	0.18	-0.11	-0.19	-0.21	0.00	-0.08	-0.16	-0.06	0.05	0.00	-0.27	0.11	0.02	-0.15	-0.02
Cyprus	0.01	-0.32	0.24	0.23	-0.13	0.20	-0.16	-0.19	0.41	0.14	-0.39	-0.23	-0.28	-0.15	0.28	-0.40	-0.26	0.34
Latvia	0.36	-0.36	-0.49**	0.41	0.02	-0.18	-0.01	-0.27	-0.28	-0.06	-0.37	-0.06	0.22	-0.30	-0.37	0.08	-0.22	-0.41
Lithuania	0.15	-0.42	-0.35	-0.24	0.36	-0.27	0.18	-0.05	-0.19	0.37	0.08	-0.27	0.01	-0.37	0.23	-0.07	-0.25	-0.17
Luxembourg	0.24*	-0.19	-0.11	0.08	0.06	0.09	-0.24	-0.11	0.03	-0.33**	0.09*	-0.03	0.25*	-0.06	-0.07	-0.38***	0.01**	0.02*
Malta	-0.14	-0.61**	0.14*	-0.15	0.00	0.04	-0.02	-0.28	-0.11	-0.27	-0.38	0.30	-0.09	0.11	-0.07	-0.04	-0.40	0.31
Netherlands	0.15	0.09	-0.02	-0.05	-0.10	-0.05	0.05	0.04	-0.20	-0.19	-0.06	0.06	0.02	0.09	-0.26	0.27*	-0.23**	-0.37***
Austria	0.18	0.02	-0.27	0.12	-0.03	0.22	-0.10	-0.03	0.00	0.20	0.04	0.04	0.13	-0.02	-0.02	-0.08	0.26	0.18
Portugal	0.28	0.22	-0.03	0.24	0.16	0.17	0.06	0.00	0.05	0.38**	0.16*	-0.05	0.07	0.13	-0.07	0.05	-0.07	0.09
Slovenia	0.16	-0.05	-0.01	-0.06	-0.28	-0.05	-0.04	0.07	-0.05	-0.10	-0.09	-0.11	0.52**	-0.16	-0.43**	0.12	-0.25	0.20
Slovakia	0.20	-0.12	-0.08	-0.05	-0.27	-0.51	0.29	-0.25	-0.11	0.13	-0.24	-0.22	-0.13	-0.41	0.26	0.34	0.28	-0.02
Finland	-0.11	-0.19	-0.13	0.04	0.03	-0.03	-0.14	-0.02	-0.10	-0.01	-0.11	-0.23	0.07	-0.16	0.23	-0.27	-0.11	0.14
Euro area	0.02	-0.26	-0.14	-0.07	-0.14	0.06	0.24	-0.45*	-0.29*	0.12	-0.48*	0.00	0.21	-0.42*	-0.15	-0.12	-0.24	0.40
Bulgaria	-0.35	0.11	-0.20	0.16	-0.16	0.00	0.18	-0.51	-0.35	0.24	-0.05	-0.47	0.11	-0.18	-0.50	0.04	-0.35	-0.27
Czech Republic	0.31	-0.05	0.05	0.04	-0.02	-0.02	-0.10	-0.11	0.39	-0.21	-0.40	0.06	-0.09	0.22	0.01	-0.21	-0.18	-0.21
Denmark	0.16	0.04	0.04	0.02	-0.08	-0.13	0.22	0.06	-0.01	-0.21	0.04	-0.11	0.19	0.04	-0.26	0.14	0.07	0.09
Hungary	0.19	-0.57*	-0.15	0.37	-0.40	-0.69***	0.18	-0.27	0.10	0.27	-0.20	-0.21	0.02	-0.09	-0.31	-0.17	-0.58*	0.15
Poland	-0.22	-0.18	0.11	0.21	-0.03	-0.10	0.00	0.10	-0.12	0.13	0.03	0.08	-0.38	-0.07	0.04	-0.25	-0.35	-0.10
Romania	-0.06	-0.07	0.01	-0.54*	0.13	0.10	-0.07	-0.30	0.14	0.11	0.03	-0.17	0.18	-0.64**	-0.22*	-0.22	-0.45	-0.04
Sweden	-0.04	-0.34	-0.25	-0.19	0.14	-0.01	0.23	-0.06	-0.12	0.32	-0.02	-0.25	0.02	-0.05	-0.33	-0.33	0.17	-0.23
United Kingdom	-0.16	-0.10	0.06	0.05	0.22	0.10	0.22	-0.07	-0.01	-0.10	0.02	-0.22	0.09	-0.22	-0.24	0.20	0.00	-0.11
EU	-0.07	-0.03	-0.06	0.10	0.09	-0.22	0.09	-0.21	-0.16	0.19	-0.02	-0.04	0.17	-0.24	-0.15	-0.13	-0.12	-0.10

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.6:
Tests for persistency in current-year forecast ('00-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.22	-0.11	0.09	-0.09	-0.09	0.14	-0.08	-0.14	0.15	0.09	-0.20	-0.09	0.27	0.15	0.03	-0.53**	0.1*	0.02
Germany	0.29	-0.10	-0.07	-0.26	-0.25	0.23	0.12	-0.02	-0.12	-0.02	-0.35	0.01	0.47**	0.17*	0.20	-0.42*	-0.21	0.29
Estonia	0.42	-0.41*	-0.67***	-0.24	-0.40	0.29	0.16	-0.39	-0.22	0.47*	-0.37*	-0.58***	0.42	-0.33	-0.59***	-0.02	-0.26	-0.52
Ireland	-0.48**	0.22*	-0.10	0.15	-0.13	-0.25	0.16	0.11	-0.08	-0.33	-0.05	-0.10	0.16	0.00	-0.47	0.11	-0.10	-0.04
Greece	0.62***	0.19**	-0.02**	-0.02	-0.13	-0.35	0.14	-0.37	-0.18	0.29	0.03	-0.08	0.23	0.03	0.27	-0.13	-0.05	-0.21
Spain	0.23	-0.26	-0.26	-0.22	0.02	-0.25	0.20	-0.22	0.19	0.34	0.02	0.03	0.31	-0.24	-0.16	0.30	0.05	0.10
France	-0.21	0.06	-0.17	0.13	-0.30	-0.26	0.21	-0.38	-0.33	-0.13	-0.04	0.12	-0.08	-0.14	-0.07	-0.04	0.32	0.10
Italy	-0.23	-0.44*	0.13	0.31	0.19	0.18	-0.12	-0.54**	0.28**	0.12	-0.07	-0.01	-0.11	-0.29	0.10	0.00	-0.04	0.11
Cyprus	0.01	-0.32	0.24	0.23	-0.13	0.20	-0.16	-0.19	0.41	0.14	-0.39	-0.23	-0.28	-0.15	0.28	-0.40	-0.26	0.34
Latvia	0.36	-0.36	-0.49**	0.41	0.02	-0.18	-0.01	-0.27	-0.28	-0.06	-0.37	-0.06	0.22	-0.30	-0.37	0.08	-0.22	-0.41
Lithuania	0.15	-0.42	-0.35	-0.24	0.36	-0.27	0.18	-0.05	-0.19	0.37	0.08	-0.27	0.01	-0.37	0.23	-0.07	-0.25	-0.17
Luxembourg	0.00	-0.52*	0.18	-0.06	-0.03	0.11	-0.08	-0.26	0.03	-0.33	-0.01	-0.13	-0.44*	-0.07	0.22	-0.41*	0.09	-0.08
Malta	-0.14	-0.61**	0.14*	-0.15	0.00	0.04	-0.02	-0.28	-0.11	-0.27	-0.38	0.30	-0.09	0.11	-0.07	-0.04	-0.40	0.31
Netherlands	0.24	0.16	-0.11	0.14	-0.26	-0.01	0.25	-0.12	-0.46	0.09	-0.17	0.01	0.04	0.06	-0.15	0.34	-0.41*	-0.66***
Austria	0.16	0.13	-0.14	-0.20	-0.26	0.31	-0.02	0.14	-0.19	0.24	0.06	0.04	0.13	0.03	0.15	-0.15	0.22	0.32
Portugal	0.10	0.17	0.15	0.15	-0.19	0.27	-0.18	-0.36	0.03	0.29	-0.08	-0.27	-0.12	0.14	0.13	0.18	-0.28	-0.08
Slovenia	0.16	-0.05	-0.01	-0.06	-0.28	-0.05	-0.04	0.07	-0.05	-0.10	-0.09	-0.11	0.52**	-0.16	-0.43**	0.12	-0.25	0.20
Slovakia	0.20	-0.12	-0.08	-0.05	-0.27	-0.51	0.29	-0.25	-0.11	0.13	-0.24	-0.22	-0.13	-0.41	0.26	0.34	0.28	-0.02
Finland	-0.21	-0.21	-0.10	0.09	0.11	-0.20	-0.10	-0.05	-0.12	0.20	-0.10	-0.08	-0.18	-0.26	0.25	-0.4*	-0.21	0.07
Euro area	0.00	-0.20	-0.08	-0.10	-0.10	0.05	0.06	-0.51*	-0.20	0.02	-0.61**	-0.04*	0.20	-0.24	0.03	-0.28	-0.16	0.48*
Bulgaria	-0.35	0.11	-0.20	0.16	-0.16	0.00	0.18	-0.51	-0.35	0.24	-0.05	-0.47	0.11	-0.18	-0.50	0.04	-0.35	-0.27
Czech Republic	0.31	-0.05	0.05	0.04	-0.02	-0.02	-0.10	-0.11	0.39	-0.21	-0.40	0.06	-0.09	0.22	0.01	-0.21	-0.18	-0.21
Denmark	0.01	-0.30	-0.24	0.32	-0.10	-0.29	0.11	-0.39	0.00	0.22	-0.04	-0.19	0.22	-0.21	-0.40	0.08	0.03	-0.09
Hungary	0.19	-0.57*	-0.15	0.37	-0.40	-0.69***	0.18	-0.27	0.10	0.27	-0.20	-0.21	0.02	-0.09	-0.31	-0.17	-0.58*	0.15
Poland	-0.22	-0.18	0.11	0.21	-0.03	-0.10	0.00	0.10	-0.12	0.13	0.03	0.08	-0.38	-0.07	0.04	-0.25	-0.35	-0.10
Romania	-0.06	-0.07	0.01	-0.54*	0.13	0.10	-0.07	-0.30	0.14	0.11	0.03	-0.17	0.18	-0.64**	-0.22*	-0.22	-0.45	-0.04
Sweden	-0.03	-0.25	-0.27	-0.21	0.10	-0.01	0.05	-0.26	-0.19	0.06	-0.01	-0.15	-0.14	0.23	-0.27	-0.38*	0.26	-0.21
United Kingdom	0.03	-0.32	0.19	0.13	0.19	-0.08	0.05	-0.26	0.00	0.28	0.03	0.03	-0.04	-0.18	0.01	0.49**	0.18*	-0.16
EU	-0.13	-0.31	0.02	-0.01	-0.27	-0.08	0.03	-0.49*	-0.20	0.02	-0.65**	0.01**	0.23	-0.30	0.02	-0.22	-0.14	0.01

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.7:

Tests for persistency in current-year forecast ('00-'07)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.23	-0.01	-0.14	0.11	-0.56	-0.04	-0.31	0.01	-0.25	-0.09	-0.30	0.01	0.31	0.21	-0.15	-0.23	-0.02	-0.22
Germany	0.28	0.13	-0.23	-0.08	-0.52	0.15	-0.02	-0.14	-0.20	-0.32	-0.23	-0.04	0.23	-0.01	0.00	-0.37	-0.16	0.09
Estonia	-0.12	-0.48	0.10	-0.37	-0.02	-0.11	-0.52	0.11	-0.09	0.16	-0.22	-0.44	-0.33	-0.21	0.05	-0.62*	0.13	-0.01
Ireland	-0.73***	0.65***	-0.53***	-0.24	-0.01	-0.15	-0.11	-0.16	-0.31	-0.11	-0.31	0.16	0.18	-0.38	-0.27	0.21	0.34	-0.21
Greece	0.16	-0.14	0.19	-0.31	-0.09	0.03	0.31	-0.30	-0.54*	-0.27	-0.17	-0.23	-0.38	-0.31	0.45*	0.21	0.09	-0.07
Spain	0.04	-0.14	0.16	-0.52*	0.21	-0.08	-0.20	0.07	0.01	-0.17	-0.44	0.40	0.64**	0.06*	-0.33*	0.03	-0.37	-0.29
France	-0.38	0.36	-0.43*	0.28	-0.35	-0.34	0.35	-0.20	-0.31	-0.10	0.05	-0.20	-0.05	-0.13	-0.22	-0.34	0.22	-0.19
Italy	-0.40	0.06	-0.07	-0.08	-0.08	0.03	-0.01	-0.56	0.14	-0.45	0.26	-0.16	-0.37	0.15	-0.49	-0.48*	-0.25	0.53**
Cyprus	-0.17	-0.47	0.13	-0.54	-0.02	0.06	-0.06	-0.17	-0.27	0.31	-0.46	-0.34	-0.41	-0.24	0.15	-0.24	-0.46	0.20
Latvia	-0.25	-0.26	0.02	-0.21	-0.29	0.00	-0.01	-0.34	-0.16	-0.52	-0.05	0.07	-0.11	0.05	-0.44	-0.55	-0.02	0.07
Lithuania	-0.08	0.00	-0.42	-0.47	0.16	-0.18	-0.06	-0.49	0.05	-0.23	-0.48	0.22	-0.21	-0.42	0.12	-0.6*	0.09	0.01
Luxembourg	-0.03	-0.48	-0.05	0.13	-0.33	-0.17	0.11	-0.13	-0.21	-0.75***	0.54***	-0.43***	-0.42	-0.20	0.47	-0.43	0.07	-0.09
Malta	0.04	-0.46	-0.07	0.01	-0.42	-0.10	0.26	-0.39	-0.37	-0.26	-0.46	0.23	0.31	-0.46	-0.35*	0.01	-0.46	-0.04
Netherlands	0.34	0.20	-0.24	-0.15	-0.32	0.13	0.51*	-0.07	-0.51*	0.25	0.01	-0.23	0.46	0.25	-0.28	0.38	-0.36	-0.44*
Austria	0.03	0.20	-0.17	-0.11	-0.56	0.4*	0.10	-0.19	-0.42	-0.39	-0.24	0.25	0.03	-0.17	0.15	-0.56*	-0.01	0.23
Portugal	-0.01	0.19	-0.28	0.40	-0.15	-0.33	-0.10	-0.40	0.12	-0.46	0.01	0.32	-0.06	-0.04	0.06	0.00	-0.44	-0.12
Slovenia	-0.18	-0.48	0.17	0.13	-0.41	-0.22	0.03	-0.05	-0.48	-0.05	-0.50	0.05	0.28	-0.48	-0.29	0.21	-0.39	-0.32
Slovakia	-0.12	-0.32	-0.06	-0.32	-0.23	0.05	-0.40	-0.17	0.07	0.02	-0.40	-0.12	-0.62*	0.22	-0.09	-0.37	-0.30	0.17
Finland	-0.20	0.09	-0.16	-0.14	-0.05	-0.23	-0.28	0.26	-0.35	0.13	-0.15	-0.24	-0.19	-0.02	0.08	-0.48*	0.07	-0.14
Euro area	0.02	0.27	-0.35	-0.16	0.07	-0.04	0.12	-0.24	-0.19	-0.21	-0.30	-0.15	0.37	0.04	-0.17	-0.32	-0.10	-0.06
Bulgaria	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Czech Republic	-0.78**	0.35**	-0.07*	-0.19	-0.35	0.04	-0.20	-0.43	0.13	0.15	-0.16	-0.49*	-0.66*	0.34*	-0.18	-0.23	-0.25	-0.02
Denmark	-0.22	-0.04	-0.38	0.21	-0.20	-0.42	0.26	-0.23	-0.17	-0.34	-0.27	0.15	0.10	-0.30	-0.54	-0.12	-0.15	0.36
Hungary	0.29	-0.39	-0.41*	0.00	-0.17	-0.33	-0.25	-0.47	0.22	-0.02	-0.44	-0.04	-0.17	-0.40	0.07	-0.18	-0.49	0.17
Poland	-0.59*	0.09	0.00	-0.57*	0.04	0.03	-0.53	0.00	0.03	-0.16	-0.32	-0.03	-0.19	-0.27	-0.04	0.27	-0.49	-0.28
Romania	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Sweden	-0.20	0.21	-0.47	-0.15	0.18	-0.39	-0.03	-0.45	-0.23	0.03	-0.06	-0.31	0.56*	0.10	-0.32	-0.46	0.35	-0.30
United Kingdom	-0.26	-0.31	0.06	-0.30	0.53*	-0.27	0.02	-0.18	-0.13	0.49*	-0.05	-0.15	0.27	0.05	0.11	-0.04	-0.02	-0.21
EU	-0.14	0.30	-0.34	-0.21	0.07	0.04	0.09	-0.29	-0.25	0.07	-0.35	-0.17	0.46	0.05	-0.14	-0.27	-0.20	-0.05

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.8:
Tests for persistency in current-year forecast ('08-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.18	-0.49	0.33	-0.42	0.28	-0.10	-0.31	-0.31	0.30	0.46	-0.13	-0.36	-0.09	-0.31	0.21	-0.51*	0.07	-0.07
Germany	0.08	-0.43	-0.13	-0.31	-0.17	0.16	0.06	-0.25	-0.46	0.13	-0.08	-0.41	0.17	-0.25	-0.15	-0.27	-0.13	0.20
Estonia	0.31	-0.32	-0.39	-0.39	-0.11	0.10	0.01	-0.20	-0.16	0.40	-0.12	-0.50	0.45	-0.36	-0.5**	0.10	-0.19	-0.42
Ireland	-0.38	0.05	0.02	0.00	-0.35	-0.26	-0.03	-0.06	-0.17	-0.56*	0.07	-0.24	0.01	0.25	-0.27	0.00	-0.31	-0.08
Greece	0.33	-0.40	-0.51*	0.02	-0.13	-0.38	-0.20	-0.45	-0.10	0.17	-0.28	-0.30	-0.28	0.06	-0.10	-0.15	-0.16	-0.47
Spain	0.32	-0.03	-0.05	-0.14	-0.10	-0.41	-0.03	-0.69**	0.22*	0.30	-0.14	0.02	0.23	-0.25	0.03	0.22	-0.22	0.22
France	-0.35	-0.11	-0.10	-0.09	-0.08	-0.26	0.02	-0.56	-0.12	-0.41	-0.21	0.19	-0.07	-0.15	0.02	-0.49	0.19	-0.13
Italy	0.02	-0.53	0.00	-0.42	-0.25	0.21	-0.24	-0.47	0.22	0.00	-0.32	-0.43	-0.04	-0.37	0.17	0.24	-0.02	-0.20
Cyprus	0.02	-0.29	0.20	0.01	-0.10	-0.04	-0.62**	-0.02	0.4*	0.09	-0.38	-0.23	-0.39	-0.19	0.26	-0.42	-0.16	0.31
Latvia	0.36	-0.21	-0.32	0.51*	-0.16	-0.5*	-0.24	-0.04	-0.12	-0.05	-0.27	0.15	0.19	-0.55	-0.25	-0.09	-0.20	-0.07
Lithuania	0.25	-0.20	-0.26	0.38	-0.04	-0.36	0.09	-0.10	0.05	-0.17	0.21	-0.10	0.09	-0.19	0.23	-0.18	-0.46	0.02
Luxembourg	-0.04	-0.44	0.29	-0.10	0.03	0.07	-0.29	-0.13	-0.15	-0.08	-0.25	-0.06	-0.49	0.51*	-0.39**	-0.55*	0.15	-0.15
Malta	-0.14	-0.50	0.23	-0.43	0.16	0.01	0.02	-0.26	-0.02	-0.34	-0.07	-0.22	-0.21	0.14	-0.04	-0.57*	0.14	0.15
Netherlands	-0.54*	-0.03	0.26	-0.02	-0.25	-0.12	-0.18	0.13	0.02	-0.34	-0.37	0.47*	-0.34	-0.16	-0.03	0.02	-0.06	-0.11
Austria	0.29	-0.03	-0.43	-0.39	-0.06	0.23	-0.7**	0.48**	-0.4***	0.46	0.06	-0.13	0.00	0.14	-0.28	-0.24	-0.25	0.30
Portugal	-0.24	-0.09	-0.10	-0.33	-0.46	0.41*	-0.32	-0.21	0.25	0.45	-0.13	-0.39	-0.44	-0.12	-0.17	0.40	-0.18	-0.43
Slovenia	-0.01	0.09	-0.07	-0.64**	0.3*	-0.19	-0.17	0.02	-0.15	-0.26	-0.17	0.12	0.41	-0.24	-0.48*	-0.43	-0.24	0.42
Slovakia	-0.31	0.02	-0.08	0.00	-0.43	-0.36	0.35	-0.26	-0.25	-0.51*	0.01	0.17	-0.25	-0.58*	0.33*	-0.23	0.04	-0.23
Finland	-0.28	-0.22	-0.14	0.12	-0.22	-0.28	-0.12	-0.41	0.04	0.20	-0.23	-0.14	-0.26	-0.18	-0.18	-0.36	-0.47	0.44*
Euro area	-0.02	-0.53	0.06	-0.30	-0.03	-0.20	0.05	-0.54	0.06	-0.09	-0.54	-0.21	-0.04	-0.6*	0.05	-0.5*	-0.22	0.5*
Bulgaria	-0.41	0.27	-0.25	-0.22	-0.09	0.03	0.40	-0.22	-0.46	0.14	-0.25	-0.32	-0.17	-0.03	-0.53	-0.35	-0.07	-0.24
Czech Republic	-0.04	-0.64*	0.16	-0.06	0.16	-0.10	-0.48	-0.17	0.37	-0.36	-0.06	0.13	0.42	0.11	-0.17	-0.26	-0.39	-0.03
Denmark	0.02	-0.59	0.19	0.46	0.01	-0.25	0.00	-0.58	0.14	0.52*	-0.03	-0.38	0.01	-0.39	0.00	-0.39	0.18	-0.21
Hungary	0.01	-0.7**	0.12*	0.27	-0.55*	-0.47**	-0.08	-0.35	-0.13	0.29	-0.11	-0.12	0.09	-0.19	-0.21	-0.33	-0.29	0.01
Poland	-0.10	-0.15	-0.30	0.42	-0.10	-0.42	-0.03	0.03	-0.22	-0.13	-0.24	-0.33	-0.40	0.10	-0.27	-0.5*	-0.13	0.10
Romania	-0.04	-0.12	-0.03	-0.67**	0.25*	0.04	0.05	-0.14	0.03	0.13	-0.08	-0.34	-0.12	-0.58	0.04	0.14	-0.36	-0.32
Sweden	-0.12	-0.34	0.02	-0.28	-0.08	0.25	0.17	-0.37	-0.09	-0.19	-0.22	0.16	-0.61**	0.29*	-0.26	-0.17	-0.37	-0.03
United Kingdom	0.19	-0.15	0.16	0.17	-0.41	-0.27	-0.01	-0.35	0.11	-0.20	-0.05	0.17	-0.16	-0.06	-0.16	0.54*	0.11	-0.21
EU	-0.10	-0.54	0.25	-0.02	-0.16	-0.25	0.09	-0.48	-0.02	-0.08	-0.58	-0.13	-0.06	-0.69**	0.11*	-0.30	-0.07	0.09

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.9:

Tests for persistency in year-ahead forecast ('69-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	0.11	-0.07	0.06	0.22	-0.08	-0.13	0.08	-0.06	0.04	0.4***	0.08**	0.2**	0.11	0.08	-0.14	0.44***	-0.06***	-0.11**
Germany	-0.08	-0.21	-0.09	0.31**	0.19**	-0.12*	0.02	-0.34*	-0.12*	0.51***	0.26***	0.06***	0.23	-0.12	-0.11	0.16	-0.13	-0.10
Estonia	0.44*	-0.30	-0.57**	-0.14	-0.42	-0.13	0.21	-0.5*	-0.43**	0.24	-0.17	-0.13	0.39	-0.25	-0.61**	0.33	-0.46*	-0.54**
Ireland	0.34**	0.09*	0.12*	0.32**	-0.13*	-0.22*	0.48***	0.1***	-0.17***	0.56***	0.37***	0.25***	0.23	0.03	-0.15	-0.11	0.06	0.00
Greece	0.45***	0.14**	0.21**	0.22	0.15	-0.01	0.26	-0.01	0.02	0.51***	0.06***	-0.06**	0.43***	0.11**	0.24**	0.33**	-0.05	0.22
Spain	0.26	-0.16	0.06	-0.01	-0.24	-0.21	0.3*	-0.05	0.12	0.44***	0.05**	0.11*	0.26	-0.20	-0.18	0.33*	0.05	-0.04
France	0.03	-0.10	-0.10	0.13	0.01	0.08	0.18	-0.11	-0.13	0.14	-0.04	-0.08	0.21	-0.24*	-0.3**	0.24*	0.06	0.13
Italy	0.08	-0.34**	0.13*	0.21	0.13	-0.18	0.09	-0.18	-0.07	0.48***	0.11***	-0.12***	0.10	-0.25	0.09	0.21	-0.18	-0.19
Cyprus	-0.22	-0.19	0.06	0.10	0.02	0.05	0.04	-0.31	0.00	0.10	-0.42	-0.08	0.08	0.08	0.26	0.00	-0.10	-0.17
Latvia	0.33	-0.31	-0.40	0.03	-0.06	0.08	0.32	-0.42	-0.47**	0.13	-0.20	-0.20	0.40	-0.45*	-0.54***	0.29	-0.35	-0.39
Lithuania	0.01	-0.36	-0.14	0.00	-0.09	0.01	0.13	-0.24	-0.15	0.30	-0.27	-0.37	0.06	-0.54*	0.06	0.12	-0.65**	-0.15*
Luxembourg	0.10	-0.17	-0.11	0.49***	0.11***	-0.15***	0.11	-0.20	0.12	0.18	-0.17	-0.02	0.12	0.22	-0.24	0.07	-0.47***	0.04**
Malta	-0.05	-0.41	-0.19	-0.34	0.27	-0.21	0.12	-0.25	-0.13	-0.6**	0.15*	0.07	-0.09	-0.04	-0.04	0.22	-0.19	-0.09
Netherlands	-0.01	0.09	-0.10	0.17	0.05	-0.10	0.23	-0.03	-0.25	0.25*	-0.19*	-0.11	0.20	0.00	-0.21	0.34**	-0.18**	-0.35***
Austria	-0.10	-0.24	-0.37	-0.11	-0.39	0.16	-0.14	-0.27	-0.03	-0.08	-0.12	-0.07	0.06	-0.56**	-0.13**	0.21	-0.22	0.30
Portugal	0.09	0.04	-0.08	0.35**	-0.02	0.09	0.16	-0.17	-0.08	0.4**	0.2**	0*	0.28	0.04	0.01	0.37**	-0.08	-0.25*
Slovenia	0.07	-0.23	0.07	-0.01	-0.35	-0.32	-0.37	0.06	-0.20	-0.31	-0.12	-0.10	0.23	-0.13	-0.19	0.00	0.02	0.25
Slovakia	-0.03	-0.21	-0.19	-0.22	-0.15	-0.42	0.19	-0.28	-0.05	0.43	-0.21	-0.33	-0.26	-0.44	0.29	-0.11	-0.08	0.35
Finland	-0.05	-0.19	-0.05	0.01	-0.06	-0.25	-0.05	-0.23	-0.05	-0.10	-0.21	-0.08	0.00	-0.36	-0.01	0.12	-0.10	-0.03
Euro area	-0.13	-0.34	-0.12	-0.21	-0.22	-0.18	0.10	-0.38	-0.28	0.09	-0.38	0.20	0.08	-0.45	-0.10	0.51**	-0.09*	-0.23*
Bulgaria	-0.34	-0.16	0.12	0.06	-0.40	0.02	0.22	-0.16	-0.26	0.40	-0.21	-0.6**	-0.11	-0.16	-0.19	0.17	-0.44	-0.34
Czech Republic	0.14	-0.17	-0.12	-0.07	0.00	-0.49	-0.02	-0.27	0.28	-0.11	-0.41	0.01	-0.16	-0.10	0.03	0.15	0.08	-0.05
Denmark	0.20	-0.04	-0.07	-0.31**	0.02	0.20	0.41***	0.05**	-0.15**	0.41***	0.05**	-0.15**	0.20	-0.01	-0.17	0.14	-0.24	0.03
Hungary	-0.05	-0.07	0.07	-0.17	-0.02	-0.07	0.07	-0.18	0.00	0.27	-0.01	0.14	0.46*	-0.04	-0.20	-0.10	-0.57*	-0.09
Poland	-0.27	-0.54*	0.18*	0.14	-0.43	-0.20	0.11	-0.17	-0.21	0.45*	0.07	0.01	0.24	-0.53*	-0.22	-0.26	-0.64**	0.37**
Romania	-0.01	-0.29	0.04	-0.43	0.19	0.04	0.23	-0.06	-0.20	-0.56*	0.3*	-0.15	0.03	-0.6*	-0.14	-0.06	-0.47	-0.07
Sweden	-0.09	-0.30	-0.26	0.05	0.04	0.00	0.19	-0.21	-0.12	0.21	-0.26	0.00	-0.14	-0.17	-0.17	0.11	0.09	-0.03
United Kingdom	0.18	-0.06	-0.18	0.38***	-0.06**	-0.1*	0.17	-0.15	-0.19	0.20	-0.24	-0.32**	0.02	-0.24	-0.32*	0.10	0.04	-0.12
EU	-0.04	-0.26	-0.04	0.31**	-0.09*	-0.19*	0.08	-0.29	-0.11	0.49***	0.11***	0.09***	0.17	-0.33**	-0.2**	0.29**	-0.09	-0.34**

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.10:
Tests for persistency in year-ahead forecast ('00-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.35	-0.26	-0.04	-0.19	-0.43	0.19	-0.15	-0.22	-0.16	0.24	-0.37	-0.05	0.08	-0.28	0.22	0.17	-0.40	-0.14
Germany	-0.15	-0.28	-0.24	-0.36	-0.05	-0.12	0.11	-0.34	-0.43*	0.24	0.01	0.04	0.20	-0.15	-0.01	-0.03	-0.37	-0.27
Estonia	0.44*	-0.30	-0.57**	-0.14	-0.42	-0.13	0.21	-0.5*	-0.43**	0.24	-0.17	-0.13	0.39	-0.25	-0.61**	0.33	-0.46*	-0.54**
Ireland	0.06	-0.03	-0.07	0.06	-0.26	-0.09	0.5**	0.14*	-0.27*	0.10	0.07	0.06	0.58***	0.15**	-0.33**	0.27	0.45*	-0.09
Greece	0.63***	0.28***	0.06**	-0.27	-0.05	-0.12	-0.02	-0.29	-0.38	0.57**	0.18**	-0.05*	0.41*	0.05	0.24	0.37	-0.21	0.11
Spain	0.12	-0.34	0.12	-0.10	-0.22	-0.30	0.27	-0.14	0.17	0.32	-0.12	0.23	0.20	-0.31	0.04	0.31	-0.02	0.07
France	-0.19	-0.13	-0.25	-0.11	-0.26	-0.14	0.01	-0.24	-0.46	0.06	-0.18	-0.01	0.10	-0.45	-0.17	0.48**	0.27*	0.08
Italy	-0.11	-0.40	0.06	0.02	-0.26	-0.22	-0.17	-0.6**	0.17**	0.35	0.05	0.23	-0.26	-0.14	0.08	0.30	-0.04	-0.05
Cyprus	-0.22	-0.19	0.06	0.10	0.02	0.05	0.04	-0.31	0.00	0.10	-0.42	-0.08	0.08	0.08	0.26	0.00	-0.10	-0.17
Latvia	0.33	-0.31	-0.40	0.03	-0.06	0.08	0.32	-0.42	-0.47**	0.13	-0.20	-0.20	0.40	-0.45*	-0.54***	0.29	-0.35	-0.39
Lithuania	0.01	-0.36	-0.14	0.00	-0.09	0.01	0.13	-0.24	-0.15	0.30	-0.27	-0.37	0.06	-0.54*	0.06	0.12	-0.65**	-0.15*
Luxembourg	-0.01	-0.27	-0.06	0.16	-0.06	0.23	-0.20	-0.42	0.24	0.10	-0.27	0.05	-0.08	-0.38	-0.15	0.10	-0.35	-0.01
Malta	-0.05	-0.41	-0.19	-0.34	0.27	-0.21	0.12	-0.25	-0.13	-0.6**	0.15*	0.07	-0.09	-0.04	-0.04	0.22	-0.19	-0.09
Netherlands	-0.17	-0.14	-0.14	0.01	-0.11	-0.25	0.03	-0.11	-0.36	0.13	-0.01	-0.31	-0.06	-0.23	-0.07	0.36	-0.34*	-0.49**
Austria	-0.13	-0.21	-0.38	-0.16	-0.39	0.15	-0.10	-0.19	-0.10	-0.14	-0.07	-0.01	0.01	-0.66***	-0.07**	0.13	-0.33	0.35
Portugal	-0.22	-0.17	-0.09	-0.06	-0.24	0.17	-0.01	-0.43	-0.06	0.23	-0.11	-0.19	-0.09	-0.16	-0.03	0.42*	0.04	-0.04
Slovenia	0.07	-0.23	0.07	-0.01	-0.35	-0.32	-0.37	0.06	-0.20	-0.31	-0.12	-0.10	0.23	-0.13	-0.19	0.00	0.02	0.25
Slovakia	-0.03	-0.21	-0.19	-0.22	-0.15	-0.42	0.19	-0.28	-0.05	0.43	-0.21	-0.33	-0.26	-0.44	0.29	-0.11	-0.08	0.35
Finland	-0.16	-0.25	-0.05	-0.04	-0.05	-0.34	-0.06	-0.26	-0.09	-0.4*	-0.11	0.09	-0.02	-0.43	0.02	-0.04	-0.34	-0.18
Euro area	-0.15	-0.32	-0.12	-0.19	-0.21	-0.16	0.05	-0.37	-0.27	0.03	-0.46	0.19	0.05	-0.40	-0.06	0.48**	-0.04	-0.14
Bulgaria	-0.34	-0.16	0.12	0.06	-0.40	0.02	0.22	-0.16	-0.26	0.40	-0.21	-0.6**	-0.11	-0.16	-0.19	0.17	-0.44	-0.34
Czech Republic	0.14	-0.17	-0.12	-0.07	0.00	-0.49	-0.02	-0.27	0.28	-0.11	-0.41	0.01	-0.16	-0.10	0.03	0.15	0.08	-0.05
Denmark	0.13	-0.05	-0.23	-0.43*	0.23	-0.22	0.05	-0.24	-0.06	0.48**	-0.02	-0.36*	0.31	-0.22	-0.37	0.47**	0.22*	-0.14
Hungary	-0.05	-0.07	0.07	-0.17	-0.02	-0.07	0.07	-0.18	0.00	0.27	-0.01	0.14	0.46*	-0.04	-0.20	-0.10	-0.57*	-0.09
Poland	-0.27	-0.54*	0.18*	0.14	-0.43	-0.20	0.11	-0.17	-0.21	0.45*	0.07	0.01	0.24	-0.53*	-0.22	-0.26	-0.64**	0.37**
Romania	-0.01	-0.29	0.04	-0.43	0.19	0.04	0.23	-0.06	-0.20	-0.56*	0.3*	-0.15	0.03	-0.6*	-0.14	-0.06	-0.47	-0.07
Sweden	-0.10	-0.27	-0.26	-0.13	-0.02	-0.18	0.15	-0.35	-0.27	0.06	-0.40	0.13	-0.14	-0.05	-0.17	-0.08	0.04	-0.10
United Kingdom	-0.08	-0.14	0.02	0.29	-0.04	-0.01	0.04	-0.14	-0.25	0.10	0.35	-0.02	-0.23	-0.16	-0.06	0.35	-0.07	-0.24
EU	-0.15	-0.29	-0.12	-0.24	-0.23	-0.15	0.03	-0.35	-0.31	-0.01	-0.44	0.00	0.02	-0.35	-0.09	0.25	-0.14	0.02

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.11:

Tests for persistency in year-ahead forecast ('00-'07)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.39	0.07	-0.20	-0.22	-0.49	0.11	-0.38	-0.11	-0.02	0.16	-0.34	-0.02	0.28	0.03	0.01	0.37	0.00	-0.31
Germany	0.13	0.22	-0.26	0.24	-0.44	-0.27	0.13	-0.04	-0.27	0.02	-0.45	-0.22	0.51*	0.06	-0.10	0.06	-0.61*	-0.29*
Estonia	-0.12	-0.34	-0.04	0.14	-0.22	-0.42	-0.49	0.01	-0.02	-0.30	-0.39	0.18	-0.39	-0.22	0.11	0.21	-0.50	-0.22
Ireland	-0.73***	0.42***	-0.15**	0.13	-0.09	-0.25	0.23	-0.15	-0.29	-0.19	-0.17	-0.13	0.45	-0.14	-0.37	0.65**	0.16*	-0.22
Greece	-0.05	-0.13	0.03	-0.31	-0.07	0.20	0.36	-0.34	-0.52*	0.03	-0.39	-0.21	-0.33	-0.32	0.42	0.37	-0.14	0.08
Spain	0.18	0.05	-0.19	-0.42	0.32	0.05	0.26	-0.10	0.06	-0.06	-0.57	0.23	0.55*	0.18	-0.30	0.46	-0.27	-0.53**
France	-0.62**	0.53**	-0.47***	-0.01	-0.28	-0.18	0.23	0.15	-0.48	0.16	0.04	-0.22	0.32	-0.02	-0.20	0.36	-0.09	-0.19
Italy	-0.20	0.09	-0.28	0.14	0.06	-0.16	-0.05	-0.35	0.09	-0.24	0.16	-0.20	-0.47	0.36	-0.47**	-0.26	-0.54*	0.36*
Cyprus	-0.26	-0.45	0.21	-0.49	0.00	-0.01	0.11	-0.18	-0.42	0.27	-0.41	-0.37	-0.38	-0.29	0.17	-0.32	-0.33	0.15
Latvia	-0.32	-0.16	-0.02	-0.23	-0.50	0.22	-0.20	-0.30	0.00	-0.81**	0.42**	-0.12**	-0.13	-0.13	-0.24	-0.19	-0.31	0.00
Lithuania	0.18	-0.42	-0.26	-0.32	0.18	-0.36	0.16	-0.42	-0.24	-0.22	-0.48	0.20	0.10	-0.48	-0.12	0.01	-0.48	-0.03
Luxembourg	-0.15	-0.21	-0.17	-0.15	-0.31	-0.19	-0.02	-0.38	0.20	0.52*	-0.11	-0.45*	-0.18	-0.06	0.48	-0.15	-0.35	NA
Malta	0.13	-0.42	-0.22	0.13	-0.17	-0.46	-0.63*	0.24	-0.11	-0.67*	0.34*	-0.17	-0.09	-0.34	-0.07	0.19	-0.49	-0.20
Netherlands	0.12	0.24	-0.37	0.07	-0.46	0.02	0.40	-0.31	-0.59**	0.02	0.21	-0.36	0.40	0.11	-0.41	0.59**	0.02	-0.31
Austria	-0.22	0.39	-0.32	-0.18	-0.55	0.20	0.15	0.05	-0.30	-0.10	-0.45	-0.03	-0.15	-0.56*	0.37*	-0.09	-0.65*	0.11
Portugal	-0.22	0.20	-0.26	0.13	-0.16	-0.37	0.00	-0.33	0.12	-0.42	-0.02	0.09	-0.02	-0.08	0.04	0.26	-0.18	-0.40
Slovenia	0.15	-0.50	-0.15	0.24	-0.32	-0.42	-0.02	0.02	-0.49	-0.12	-0.34	-0.03	0.10	-0.49	-0.10	-0.25	-0.50	0.24
Slovakia	0.30	-0.47	-0.32	-0.47	-0.11	0.08	-0.48	-0.11	0.09	0.11	-0.38	-0.23	-0.66*	0.17	0.00	-0.42	-0.22	0.14
Finland	-0.25	0.22	-0.24	0.23	0.10	-0.55	0.09	0.12	-0.53	0.00	-0.12	-0.02	0.18	-0.03	0.20	0.04	-0.33	-0.30
Euro area	-0.16	0.33	-0.36	0.21	0.11	-0.16	0.19	-0.06	-0.27	0.07	-0.38	-0.20	0.47	0.11	-0.19	0.13	-0.50	-0.35
Bulgaria	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Czech Republic	-0.04	-0.42	-0.04	0.21	-0.28	-0.43	-0.21	-0.49	0.20	0.02	-0.09	-0.43	-0.63*	0.15	-0.02	-0.25	-0.23	-0.03
Denmark	-0.30	0.15	-0.37	-0.63**	0.2*	0.10	0.26	-0.30	-0.16	-0.02	-0.59*	-0.14	0.26	-0.22	-0.50	0.57**	0.25*	0.03
Hungary	0.16	-0.22	-0.44	-0.75**	0.42**	-0.17*	-0.15	-0.34	-0.01	-0.06	-0.50	0.06	-0.27	-0.32	0.08	-0.23	-0.48	0.20
Poland	-0.26	-0.29	0.04	-0.24	-0.37	0.11	0.25	-0.50	-0.25	-0.24	-0.25	-0.01	0.21	-0.50	-0.22	-0.30	-0.39	0.19
Romania	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Sweden	-0.39	0.38	-0.5**	-0.01	0.04	-0.14	0.40	-0.45*	-0.55**	0.29	-0.20	-0.26	0.53*	0.16	-0.20	-0.28	-0.26	-0.13
United Kingdom	-0.20	0.08	-0.13	0.53*	0.02	-0.24	0.05	-0.17	-0.34	0.21	-0.28	0.19	0.02	-0.07	-0.08	0.30	-0.05	-0.21
EU	-0.15	0.35	-0.34	-0.62**	0.07	0.17	0.17	-0.09	-0.36	0.35	-0.30	-0.55*	0.44	0.14	-0.16	0.25	-0.34	-0.27

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.12:
Tests for persistency in year-ahead forecast ('08-'14)

	GDP			Inflation			General government balance			Unemployment rate			Investment			Current-account balance		
	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3	lag 1	lag 2	lag 3
Belgium	-0.26	-0.32	0.11	-0.36	-0.27	0.00	-0.10	-0.14	-0.13	0.30	-0.53*	-0.41*	-0.34	-0.43	0.28	0.16	-0.48	-0.34
Germany	-0.25	-0.19	-0.08	-0.39	-0.06	-0.10	0.12	-0.33	-0.18	-0.13	-0.26	-0.15	-0.47	-0.25	0.24	-0.09	0.08	-0.28
Estonia	0.35	-0.31	-0.27	-0.42	-0.10	-0.09	0.20	-0.33	-0.34	0.26	-0.22	-0.10	0.40	-0.24	-0.36	0.31	-0.16	-0.42
Ireland	0.27	-0.21	-0.03	-0.11	-0.24	0.00	0.39	0.01	-0.34	0.03	0.03	0.04	0.49	0.17	-0.12	-0.50	0.31	-0.09
Greece	0.30	-0.14	-0.18	-0.28	-0.04	-0.15	-0.23	-0.11	-0.23	0.32	-0.22	-0.32	0.25	-0.20	0.04	0.11	-0.33	-0.07
Spain	-0.03	-0.43	0.33	-0.09	-0.23	-0.42	-0.07	-0.32	0.27	0.04	-0.43	0.30	0.07	-0.39	0.24	-0.32	-0.33	0.23
France	0.14	-0.27	-0.02	-0.27	-0.26	-0.15	-0.04	-0.24	-0.21	-0.13	-0.13	0.03	0.01	-0.42	-0.06	-0.15	-0.08	-0.10
Italy	-0.23	-0.37	0.19	-0.12	-0.45	-0.17	-0.28	-0.30	0.05	-0.10	-0.6*	0.00	-0.41	-0.23	0.23	0.52*	0.06	-0.37
Cyprus	-0.46	-0.15	-0.02	-0.21	-0.09	-0.03	-0.49	0.02	0.15	-0.04	-0.43	-0.07	-0.26	-0.08	0.17	-0.15	0.02	-0.17
Latvia	0.32	-0.18	-0.24	-0.15	-0.05	0.04	0.36	-0.38	-0.36	0.06	-0.14	-0.02	0.33	-0.48	-0.35	0.21	-0.16	-0.19
Lithuania	-0.01	-0.23	-0.09	-0.04	-0.06	-0.07	0.01	-0.27	0.04	0.13	-0.22	-0.09	0.03	-0.38	0.18	0.00	-0.54	-0.05
Luxembourg	0.19	-0.22	0.15	-0.13	-0.25	0.07	-0.48	-0.03	0.26	-0.16	-0.50	0.10	0.03	-0.13	-0.40	-0.25	-0.01	0.21
Malta	-0.19	-0.11	0.15	-0.62**	0.32*	-0.08	0.25	-0.16	-0.05	-0.66**	0.26*	-0.24*	-0.16	-0.04	-0.02	0.09	0.10	-0.19
Netherlands	-0.41	-0.19	0.16	-0.15	-0.21	-0.20	-0.32	0.00	0.11	-0.13	-0.50	-0.18	-0.37	-0.38	0.31	0.24	-0.36	-0.35
Austria	-0.13	-0.25	-0.17	-0.18	-0.27	-0.01	-0.17	-0.13	-0.06	-0.36	0.18	-0.14	0.17	-0.50	-0.28	-0.30	-0.58*	0.44**
Portugal	-0.06	-0.11	-0.05	-0.34	-0.30	0.27	-0.19	-0.25	0.21	0.25	-0.17	-0.19	-0.23	0.10	-0.19	0.23	-0.05	-0.22
Slovenia	-0.12	-0.11	0.18	-0.46	-0.06	-0.16	-0.58*	0.14	-0.27	-0.40	0.09	-0.32	0.05	-0.01	-0.08	-0.51*	-0.01	0.16
Slovakia	-0.27	0.00	-0.12	-0.17	-0.43	-0.19	0.13	-0.15	-0.15	-0.17	-0.42	0.39	-0.31	-0.46	0.30	-0.15	-0.24	0.18
Finland	-0.29	-0.20	0.04	-0.42	-0.15	0.11	-0.39	-0.19	0.05	-0.48	0.02	-0.03	-0.16	-0.28	-0.14	-0.38	-0.17	0.21
Euro area	-0.18	-0.27	0.10	-0.29	-0.21	-0.17	-0.04	-0.20	-0.03	-0.20	-0.62*	0.26*	-0.26	-0.39	0.21	0.53*	-0.09	-0.43
Bulgaria	-0.39	0.00	0.07	-0.26	-0.24	0.03	0.23	-0.20	-0.27	0.23	-0.22	-0.53	-0.33	0.15	-0.23	-0.16	-0.21	-0.27
Czech Republic	-0.21	-0.19	0.04	-0.27	0.07	-0.41	-0.19	-0.14	0.23	-0.45	-0.02	0.11	-0.01	-0.08	-0.02	-0.09	-0.36	-0.02
Denmark	-0.17	-0.20	0.03	-0.37	0.24	-0.34	-0.06	-0.29	0.16	0.5*	0.04	-0.36	-0.17	-0.37	0.03	-0.15	0.04	-0.23
Hungary	-0.14	-0.13	0.21	0.06	-0.25	-0.01	-0.12	-0.34	-0.17	0.27	0.00	0.00	0.59*	0.01	-0.35	-0.22	-0.37	-0.20
Poland	-0.25	-0.37	0.11	0.21	-0.37	-0.22	-0.01	-0.21	-0.31	0.02	-0.27	-0.02	0.37	-0.09	0.10	-0.26	-0.39	0.00
Romania	-0.05	-0.15	0.05	-0.35	0.16	0.05	0.29	0.08	-0.23	-0.78***	0.55***	-0.35***	-0.23	-0.27	-0.13	-0.05	-0.05	-0.20
Sweden	-0.06	-0.33	-0.07	-0.15	-0.28	-0.13	-0.07	-0.28	-0.17	-0.18	-0.41	-0.06	-0.46	0.09	-0.16	-0.13	-0.11	-0.06
United Kingdom	-0.07	0.02	0.08	0.02	-0.30	-0.14	0.03	-0.08	-0.16	-0.07	0.20	-0.15	-0.29	0.08	-0.01	0.43	0.07	-0.21
EU	-0.18	-0.21	0.08	-0.26	-0.21	-0.15	-0.02	-0.19	-0.08	-0.20	-0.35	0.24	-0.21	-0.24	0.17	0.13	-0.16	0.04

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.13:

Diebold-Mariano tests ('69-'14)

	GDP		Inflation		General government balance		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	3.68***	4.08***	2.95***	2.87***	2.47***	4.54***	3.08***	2.77***	3.5***	2.91***	1.96**	1.67**
Germany	2.64***	3.12***	4.17***	3.77***	2.25***	3.22***	1.76**	2.11**	2.66***	3.26***	2.04**	2.41***
Estonia	1.75*	2.36**	1.41*	1.83**	0.53	0.71	1.23	2.17**	2.14**	2.39**	1.27	1.00
Ireland	3.67***	1.92**	3.46***	2.65***	1.00	1.69**	3.09***	2.76***	3.36***	3.11***	2.19**	2.09**
Greece	2.24**	2.1**	3.21***	2.47***	0.58	1.8**	2.01**	1.18	1.23	1.57*	0.80	0.86
Spain	2.63***	2.72***	2.13**	2.29**	1.33*	1.18	2.56***	2.45***	3.33***	2.57***	2.3***	3.12***
France	2.54***	3.06***	2.23**	2.22**	2.04**	3.33***	4.02***	3.29***	3.69***	4.44***	2.18**	2.23**
Italy	2.85***	4.35***	2.51***	2.18**	2.47***	1.93**	2.3***	0.78	3.27***	3.39***	3.14***	2.51***
Cyprus	1.5*	2.44**	1.53*	1.69*	0.94	1.39*	0.93	1.28	-0.40	-0.05	1.57*	1.12
Latvia	1.84**	2.14**	1.39*	1.19	1.79**	2.13**	1.21	1.51*	1.85**	2.61**	1.29	1.31
Lithuania	1.64*	2.53**	3***	4.78***	1.62*	2.32**	1.68*	1.78*	2.28**	2.47**	1.08	1.27
Luxembourg	2.14**	3.22***	3.67***	2.35***	0.67	1.25	0.22	0.10	2.47***	2.01**	1.99**	1.54*
Malta	1.77*	35801.12***	1.95**	-1.08	0.91	0.79	0.70	2.71***	0.48	1104576.72***	0.39	1.68*
Netherlands	2.49***	3.81***	3.78***	3.35***	1.32*	2.38***	1.76**	1.47*	3.62***	3.2***	1.67**	2.57***
Austria	1.85**	1.89**	2.02**	1.57*	2.23**	2.13**	-0.31	0.46	2.39***	3.29***	-0.72	0.24
Portugal	3.47***	3.75***	2.93***	1.82**	1.89**	1.63*	2.37***	2.22**	3.16***	2.71***	1.89**	1.4*
Slovenia	1.65*	2.45**	1.4*	1.31	1.56*	-0.32	2.83***	1.78*	1.13	1.49*	1.71*	1.34
Slovakia	1.64*	2.21**	3.19***	1.10	1.43*	1.82**	3.24***	1.92**	2.31**	1.9**	0.07	1.21
Finland	1.86**	1.81**	2.08**	2.79***	1.89**	2.41***	2.21**	1.45*	2.09**	3.19***	1.10	0.87
Euro area	1.91**	2.27**	1.64*	1.61*	1.55*	1.81**	2.39**	2.58***	2.03**	3.1***	0.69	2.01**
Bulgaria	1.29	1.35	1.41*	2.01**	1.25	0.01	1.29	1.49*	0.93	1.33	1.16	1.02
Czech Republic	1.9**	3.5***	1.44*	31096.27***	0.93	1.52*	1.56*	2.72***	1.45*	167513.17***	1.20	0.39
Denmark	3.16***	3.13***	2.01**	1.81**	2.16**	2.73***	2.87***	2.47***	2.62***	3.05***	0.97	2.14**
Hungary	1.94**	2.33**	2.46**	2.1**	1.7*	1.98**	1.63*	1.46*	-0.79	0.71	0.80	1.04
Poland	3.38***	37960.21***	1.91**	2.32**	-0.66	-0.24	1.88**	1.20	2.67***	4.36***	3.14***	1.13
Romania	1.31	1.38	2.53**	1.6*	1.44*	4.43***	-0.65	-0.07	1.20	1.48*	0.72	1.23
Sweden	1.52*	1.57*	2.3**	3.17***	1.77**	1.68*	1.75**	1.99**	2.08**	3.93***	1.71**	-0.76
United Kingdom	3.12***	3.47***	2.65***	2.32***	2.47***	2.89***	2.96***	2.63***	3.28***	3.42***	1.55*	2.72***
EU	2.82***	3.45***	3.48***	3.08***	2.38***	2.92***	4.16***	3.24***	3.24***	3.63***	2.82***	4.61***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.14:

Diebold-Mariano tests ('00-'14)

	GDP		Inflation		General government balance		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	2.08**	2.97***	1.71*	1.5*	1.15	1.78**	2.86***	0.35	2.63***	2.84***	0.57	1.68*
Germany	1.66*	1.98**	1.81**	0.86	1.65*	3.13***	0.43	1.26	1.81**	2.82***	0.33	0.53
Estonia	1.75*	2.36**	1.41*	1.83**	0.53	0.71	1.23	2.17**	2.14**	2.39**	1.27	1.00
Ireland	3.05***	1.84**	1.44*	1.77**	0.96	1.89**	1.36*	1.20	2.23**	2.34**	0.54	1.78**
Greece	1.47*	1.49*	2.25**	0.73	0.15	0.15	2.14**	1.29	0.36	1.05	0.20	0.41
Spain	2.23**	1.94**	1.64*	2.02**	1.20	1.01	1.68*	1.39*	2.29**	1.63*	1.72**	3.16***
France	2.04**	2.13**	1.36*	1.27	1.33*	2.19**	1.74**	1.88**	2.51***	3.39***	-0.16	0.91
Italy	1.81**	1.88**	1.76**	1.36*	1.85**	3.01***	1.79**	1.81**	1.54*	1.44*	2.36**	0.93
Cyprus	1.5*	2.44**	1.53*	1.69*	0.94	1.39*	0.93	1.28	-0.40	-0.05	1.57*	1.12
Latvia	1.84**	2.14**	1.39*	1.19	1.79**	2.13**	1.21	1.51*	1.85**	2.61**	1.29	1.31
Lithuania	1.64*	2.53**	3***	4.78***	1.62*	2.32**	1.68*	1.78*	2.28**	2.47**	1.08	1.27
Luxembourg	2.25**	2.37**	1.65*	1.84**	1.79**	1.36*	-0.02	-0.03	2.76***	3.21***	1.58*	-1.78
Malta	1.77*	35801.12***	1.95**	-1.08	0.91	0.79	0.70	2.71***	0.48	1104576.72***	0.39	1.68*
Netherlands	1.9**	4.19***	2.67***	0.62	1.09	2.27**	3.16***	2.72***	2.09**	2.7***	1.12	2.7***
Austria	1.77**	2.09**	1.79**	1.21	1.65*	1.49*	-0.48	0.18	2.44***	5.08***	-0.13	0.33
Portugal	3.04***	3.24***	2.15**	1.71*	1.8**	1.56*	1.99**	1.52*	2.67***	1.95**	1.69*	1.19
Slovenia	1.65*	2.45**	1.4*	1.31	1.56*	-0.32	2.83***	1.78*	1.13	1.49*	1.71*	1.34
Slovakia	1.64*	2.21**	3.19***	1.10	1.43*	1.82**	3.24***	1.92**	2.31**	1.9**	0.07	1.21
Finland	1.78**	2.01**	2.19**	2.6***	1.22	1.38*	1.32*	1.94**	2.07**	3.86***	0.93	0.60
Euro area	1.88**	2.39**	1.63*	1.44*	1.48*	1.84**	1.9**	2.11**	2.08**	3.12***	0.54	2.06**
Bulgaria	1.29	1.35	1.41*	2.01**	1.25	0.01	1.29	1.49*	0.93	1.33	1.16	1.02
Czech Republic	1.9**	3.5***	1.44*	31096.27***	0.93	1.52*	1.56*	2.72***	1.45*	167513.17***	1.20	0.39
Denmark	1.53*	1.76**	2.14**	1.71*	0.88	1.67*	1.49*	1.42*	2.45***	1.74**	-1.03	-0.41
Hungary	1.94**	2.33**	2.46**	2.1**	1.7*	1.98**	1.63*	1.46*	-0.79	0.71	0.80	1.04
Poland	3.38***	37960.21***	1.91**	2.32**	-0.66	-0.24	1.88**	1.20	2.67***	4.36***	3.14***	1.13
Romania	1.31	1.38	2.53**	1.6*	1.44*	4.43***	-0.65	-0.07	1.20	1.48*	0.72	1.23
Sweden	1.5*	1.56*	1.47*	3.41***	0.92	1.65*	1.21	2.1**	1.7*	2.99***	1.15	-0.73
United Kingdom	1.68*	2.03**	1.27	1.77**	1.71*	2.14**	1.41*	1.23	1.9**	1.73**	-0.25	-0.08
EU	1.82**	2.3**	1.71*	1.67*	1.52*	1.91**	2.17**	2.23**	2.02**	2.7***	1.23	2.07**

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.15:
Diebold-Mariano tests ('00-'07)

	GDP		Inflation		General government balance		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	2.39**	1.21	-0.68	0.19	-2.12	2.11**	1.49*	0.76	1.57*	0.95	0.20	-0.25
Germany	2.06**	1.39	3.08***	3.73***	1.23	1.18	0.00	1.62*	0.28	115791.05***	0.77	3.59***
Estonia	0.58	0.00	1.01	0.00	-1.48	0.00	0.38	0.00	0.13	0.00	-0.16	0.00
Ireland	1.72*	1.76*	2.43**	0.95	0.07	0.15	-0.65	496.9***	1.23	1.82*	0.66	0.98
Greece	-3.06	0.33	1.64*	-0.01	1.77*	7.68***	-0.38	0.92	1.99**	3.94***	-2.42	-1.72
Spain	1.07	1.33	0.33	-1.77	-0.53	-0.57	2.63**	2.47**	1.93**	4***	1.9**	1.38
France	1.47*	1.44*	-1.34	-0.13	1.25	1.65*	2.09**	2.53**	1.76*	1.64*	0.32	1.28
Italy	1.69*	0.65	-0.03	-0.39	1.4*	2.34**	1.41*	3.02***	1.20	0.39	1.69*	0.13
Cyprus	0.00	0.00	-1.75	0.00	2.09*	0.00	-12.76	0.00	1.24	0.00	-1.90	0.00
Latvia	-1.31	0.00	-0.56	0.00	-1.78	0.00	1.87*	0.00	0.72	0.00	0.83	0.00
Lithuania	-4.90	0.00	1.76	0.00	1.38	0.00	3.27**	0.00	-3.93	0.00	1.03	0.00
Luxembourg	1.98**	0.95	1.23	1.88*	1.82*	1.31	0.77	0.94	2.35**	298477.81***	0.86	0.00
Malta	-0.48	0.00	-0.12	0.00	1.47	0.00	-0.65	0.00	-0.12	0.00	0.76	0.00
Netherlands	1.66*	3.67***	2.17**	1.5*	0.61	1.57*	2.09**	2.42**	1.51*	3.26***	0.08	0.55
Austria	1.76*	3925.54***	-0.11	0.30	0.77	1.42	-0.20	0.15	0.98	2.05**	0.78	1.96**
Portugal	1.72*	1.06	2.21**	1.16	1.42*	2.89**	1.44*	1.57*	0.87	2.99**	0.12	0.43
Slovenia	-0.35	0.00	1.44	0.00	-2.40	0.00	0.77	0.00	-0.77	0.00	0.06	0.00
Slovakia	0.18	0.00	2.12*	0.00	0.10	0.00	3.02**	0.00	1.50	0.00	0.96	0.00
Finland	1.81*	1.03	1.41*	1.79*	0.82	1.20	1.99**	1.12	1.47*	2.08**	-0.05	-0.24
Euro area	2.37**	1.51*	0.62	0.35	1.55*	1.28	2.54**	1.73*	1.69*	5.55***	-1.96	1.47*
Bulgaria	:	:	:	:	:	:	:	:	:	:	:	:
Czech Republic	-1.41	0.00	1.89*	0.00	-1.96	0.00	1.21	0.00	1.68	0.00	3.85**	0.00
Denmark	2.34**	0.89	1.5*	1206.17***	-0.72	17656.06***	1.7*	1.38	1.35	2.56**	0.34	0.55
Hungary	0.87	0.00	3.16**	0.00	1.00	0.00	0.82	0.00	0.71	0.00	-1.25	0.00
Poland	1.74	0.00	1.11	0.00	11.3***	0.00	2.01*	0.00	0.86	0.00	0.64	0.00
Romania	:	:	:	:	:	:	:	:	:	:	:	:
Sweden	3.52***	0.88	1.31	1.54*	0.75	0.88	0.64	2.4**	0.65	1.07	0.96	0.08
United Kingdom	3.6***	12.3***	0.05	4137.86***	1.64*	0.96	1.23	1.87*	0.68	1.08	0.13	-0.18
EU	2.3**	2.05**	1.29	0.91	1.76*	1.10	2.55**	2.23**	1.52*	9.32***	0.25	2546.63***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.16:
Diebold-Mariano tests ('08-'14)

	GDP		Inflation		General government balance		Unemployment rate		Investment		Current-account balance	
	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead	current year	year ahead
Belgium	1.77*	1.76*	1.61*	3.72***	1.20	0.99	2.26**	-0.16	2.82**	220569.11***	-0.70	14389.24***
Germany	1.64*	1.82*	1.65*	4174.78***	1.04	3.52***	-0.02	0.06	2.06**	2.84**	-0.88	-7.92
Estonia	1.5*	1.57*	1.22	1.14	-2.66	-0.57	1.23	1.92*	2.24**	2.31**	1.04	1.07
Ireland	2.12**	1.67*	1.36	1.09	0.89	1246070.86** *	1.34	1.03	1.44*	1.68*	0.42	1.56*
Greece	1.59*	1.30	2.69**	0.92	0.12	0.47	2.94**	2.21**	-0.37	0.33	0.80	0.77
Spain	2.23**	34559.97***	1.71*	15279.95***	0.92	0.50	1.57*	1.32	2.12**	3.7***	1.64*	9.1***
France	1.71*	1.56*	1.36	1.71*	1.19	1.52*	0.96	0.73	2.03**	2.19**	-0.82	-0.18
Italy	1.68*	1.82*	1.83*	5.5***	1.01	1.65*	1.65*	1.47	1.44*	1.14	2.05**	1.02
Cyprus	1.56*	4.4***	1.46*	33594.71***	0.64	0.98	0.95	1.8*	-0.43	-0.41	1.30	0.93
Latvia	1.56*	1.25	1.28	1.01	1.89*	1.38	1.17	1.38	1.76*	3.09**	1.08	0.99
Lithuania	1.67*	1.35	1.98**	1.15	1.58*	3.48***	1.58*	1.25	2.32**	1.57*	1.02	0.92
Luxembourg	1.25	1.94*	1.47*	1.35	0.80	-0.46	-0.73	-0.60	2.25**	4.8***	1.16	-0.79
Malta	1.75*	2.8**	1.7*	-0.81	0.47	0.76	0.63	1.14	0.61	1541224.14***	-0.82	2.8**
Netherlands	1.82*	2.31**	1.79*	1.21	1.00	1.12	2.4**	1.67*	2.39**	3.26**	1.91*	1.69*
Austria	1.74*	1.85*	1.72*	2.1**	1.7*	1.08	-0.83	-0.02	2.46**	429152.94***	-1.26	-0.72
Portugal	3.31***	53915.71***	2.28**	51905.78***	1.62*	1.13	1.92*	1.47	3.9***	0.83	1.99**	1.83*
Slovenia	1.71*	1.96*	1.29	0.69	1.66*	-0.60	3.42***	1.18	1.11	1.20	1.84*	4.23***
Slovakia	1.58*	1.41	2.07**	4.49***	1.5*	1.83*	1.76*	0.82	1.98**	3.42***	-1.18	1.58*
Finland	1.59*	1.59*	1.69*	1.89*	1.08	0.89	0.75	3325.54***	1.89*	7.35***	0.42	0.81
Euro area	1.79*	1.96*	1.65*	6.99***	1.25	1.62*	1.75*	2.43**	2.06**	4.17***	0.63	6.28***
Bulgaria	1.30	0.99	1.28	1.25	1.22	1.41	1.05	1.30	0.95	1.25	1.21	0.80
Czech Republic	1.97**	3.07**	1.04	2.19**	1.46*	1.44	0.97	0.83	1.46*	2.7**	-0.46	0.17
Denmark	1.30	1.08	1.44*	1.55*	0.93	1.51*	1.21	0.85	1.62*	0.88	-1.10	-0.18
Hungary	2.08**	3.59***	1.23	0.96	1.49*	0.89	1.59*	1.14	-0.49	0.67	1.00	1.08
Poland	2.23**	2.33**	1.38	1.40	-0.73	-0.26	0.21	0.56	2**	4.21***	2.91**	3.09**
Romania	1.32	1.07	1.97**	1.25	1.06	2.24**	-0.89	-0.06	1.17	1.15	0.99	0.97
Sweden	1.42	1.39	-0.23	0.57	0.37	-0.19	1.01	0.67	1.75*	1.91*	0.57	1.00
United Kingdom	1.61*	2.03*	1.37	3.95***	1.17	1.62*	1.31	0.96	1.81*	269274.63***	-1.92	-0.55
EU	1.74*	1.85*	1.74*	13477.9***	1.22	1.58*	1.47*	1.02	1.95**	2.43**	1.24	2.15**

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.17:
Tests for directional accuracy

		GDP							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase
Current-year	actual decrease	320	51	55	15	73	11	154	27
	actual increase	52	274	21	44	5	78	26	123
	Accuracy (%)	0.85***		0.73***		0.90***		0.84***	
Year-ahead	actual decrease	229	130	32	35	57	28	108	71
	actual increase	52	262	18	49	5	77	24	126
	Accuracy (%)	0.73***		0.60***		0.80***		0.71***	

		Inflation							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	342	45	61	9	100	18	160	27
	actual increase	58	247	23	49	6	50	29	122
	Accuracy (%)	0.85***		0.77***		0.86***		0.83***	
Year-ahead	actual decrease	287	77	41	19	93	20	132	40
	actual increase	91	200	23	49	12	45	41	113
	Accuracy (%)	0.74***		0.68***		0.81***		0.75***	

		General government balance							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	241	66	59	13	56	14	133	30
	actual increase	97	275	29	39	22	82	49	124
	Accuracy (%)	0.76***		0.70***		0.79***		0.76***	
Year-ahead	actual decrease	155	136	39	27	48	22	93	64
	actual increase	102	266	29	42	32	70	60	113
	Accuracy (%)	0.64***		0.59**		0.68***		0.62***	

		Unemployment rate							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase	projected decrease	projected increase
Current-year	actual decrease	243	53	67	15	39	11	123	26
	actual increase	50	279	8	36	14	99	25	143
	Accuracy (%)	0.84***		0.82***		0.85***		0.84***	
Year-ahead	actual decrease	220	68	69	15	36	14	121	31
	actual increase	85	235	18	30	16	88	42	121
	Accuracy (%)	0.75***		0.75***		0.80***		0.77***	

		Investment							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	279	86	49	27	61	18	134	48
	actual increase	45	290	12	58	3	91	17	149
	Accuracy (%)	0.81***		0.73***		0.88***		0.81***	
Year-ahead	actual decrease	221	118	46	18	52	23	120	46
	actual increase	97	248	25	52	15	84	41	136
	Accuracy (%)	0.69***		0.70***		0.78***		0.75***	

		Current account balance							
		1969 - 2014		2000 - 2007		2008 - 2014		2000 - 2014	
		Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection	Negative projection	Positive projection
Current-year	actual decrease	222	87	48	23	35	22	96	51
	actual increase	101	233	19	41	37	72	59	118
	Accuracy (%)	0.71***		0.70***		0.64***		0.66***	
Year-ahead	actual decrease	164	128	43	29	20	35	74	72
	actual increase	118	234	28	34	30	85	63	124
	Accuracy (%)	0.62***		0.57**		0.62*		0.59***	

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.18:
Forecast encompassing tests

		GDP				Inflation				General government balance			
		'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14
Current-year	**α = 0**	-0.06	0.45	-0.07	-0.16*	0.08	1.28***	-0.23	-0.16*	-0.08	0.14	-1.36***	0.03
	β = 0	-0.14***	-0.57***	-0.16***	-0.19***	-0.01	-0.20***	-0.07**	-0.05*	0.04	-0.28**	-0.09	-0.12
	δ = 0	1.18***	1.49***	1.18***	1.23***	0.99***	0.78***	1.11***	1.14***	0.93***	1.04***	0.84***	0.98***
	Serial corr.	0.17***	0.05	0.01	0.10*	-0.03	-0.21**	0.03	-0.06	0.09**	0.06	-0.02	0.07
Year-ahead	**α = 0**	-0.69***	2.14***	-0.06	-1.31***	-0.17*	0.19	0.87*	0.02	-0.62***	0.01	-1.29**	-0.78***
	β = 0	-0.13***	0.03	-0.08**	-0.13***	-0.04	-0.08	-0.06	0.07	-0.03	-0.33**	-0.22**	-0.03
	γ = 0	-0.53***	-0.24	-0.30***	-0.72***	-0.08	0.28*	-0.12	-0.40***	-0.21**	-0.21	0.26	-0.28*
	δ = 0	1.74***	0.59***	1.03***	2.03***	1.20***	0.83***	0.71***	1.30***	1.08***	1.02***	0.60***	1.11***
	Serial corr.	0.13***	-0.17*	0.06	0.12**	0.07	-0.23***	0.47***	0.05	0.21***	-0.19*	-0.13	0.12**

		Unemployment rate				Investment				Current-account balance			
		'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14	'69-'14	'00 -'07	'08-'14	'00-'14
Current-year	**α = 0**	0.21**	0.43	0.99***	0.15	-1.19***	-0.38	-1.99***	-1.78***	0.03	-1.00***	0.22	-0.25*
	β = 0	-0.11***	0.14	-0.05	-0.11***	-0.03	-0.22***	-0.07	-0.05	-0.18***	-0.54*	-0.47***	-0.52***
	δ = 0	1.07***	0.76***	0.94***	1.08***	1.16***	1.18***	1.16***	1.20***	1.12***	0.98***	1.16***	1.36***
	Serial corr.	0.03	-0.27***	0.12	0.16***	0.06	-0.01	-0.10	-0.01	-0.15***	-0.27***	-0.05	-0.16***
Year-ahead	**α = 0**	1.10***	2.57***	3.05***	1.41***	-2.15***	1.83	-2.12***	-3.40***	0.05	-0.96***	0.30*	-0.42**
	β = 0	-0.08*	-0.32***	0.07	0.07	-1.05***	-0.28**	-0.16***	-0.18***	-0.30***	0.18	-0.10	-0.25**
	γ = 0	-0.26***	0.33**	-0.37**	-0.65***	-0.23***	0.75**	-0.04	-0.25**	0.44***	-0.12	0.11	-0.07
	δ = 0	1.20***	0.60***	1.00***	1.43***	1.49***	0.75**	0.80***	1.58***	0.67***	0.57***	0.60***	1.01***
	Serial corr.	0.24***	-0.06	0.01	0.08	0.07*	-0.05	-0.07	0.01	0.17	0.10	0.08	0.14***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

Table A2.19:
Forecast efficiency tests

		GDP				Inflation				General government balance			
		'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14
Current-year	**α = 0**	-0.17**	0.26	-0.32**	-0.27***	0.09*	0.71	-0.38***	-0.20**	-0.08	0.33***	-1.20***	0.05
	β = 1	1.09***	0.98	1.05***	1.11***	0.99	0.83***	1.11***	1.11***	0.97	0.9	0.80***	1.05
	F(α=0, β=1)	8.78***	2.98**	3.42**	8.57***	1.43	19.70***	5.89***	7.67***	1.10	13.62***	8.60***	0.8
	Serial corr.	0.12***	-0.24***	0.09	0.08	0.04	-0.28***	-0.15**	0.02	0.11	-0.02	-0.07	0.07
Year-ahead	**α = 0**	-0.58	2.00***	-1.17***	-0.84**	-0.15	0.73***	-0.03	0.03	-0.49	0.19	-2.37***	-0.41**
	β = 1	1.11***	0.47***	0.8	0.71***	1.07***	0.81*	0.92	0.99	0.87***	0.73***	0.51***	0.89**
	F(α=0, β=1)	8.54***	12.20***	19.92***	15.13***	9.04***	9.88***	1.32	0.01	11.3***	16.22***	26.12***	2.83*
	Serial corr.	0.13***	-0.14*	-0.01	0.01	0.11***	0.05	-0.21***	-0.06	0.27***	0.15*	0.01	0.18***

		Unemployment rate				Investment				Current-account balance			
		'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14	'69-'14	'00 -'07	'08 -'14	'00-'14
Current-year	**α = 0**	0.16*	0.12	0.71***	0.03	-1.18***	0.44	-2.17***	-1.63***	0.02	-1.14***	0.23	-0.15
	β = 1	0.97***	0.95	0.92***	0.98	1.15***	0.87	1.14**	1.18***	0.95***	0.51***	0.82***	0.87***
	F(α=0, β=1)	13.37***	12.60***	7.38***	6.68***	22.90***	0.68	15.52***	19.66***	3.78**	26.43***	10.66***	6.34***
	Serial corr.	0.08**	-0.12	0.19**	0.21***	0.07*	-0.02	-0.11	0.01	-0.12***	-0.19**	-0.27***	-0.11**
Year-ahead	**α = 0**	0.86***	0.86**	2.32***	0.78***	-2.08***	2.28**	-4.34***	-3.17***	-0.01	-1.17***	0.12	-0.20
	β = 1	0.89***	0.85***	0.78***	0.91***	1.24***	0.52***	1.14	1.34***	0.86***	0.63***	0.64***	0.84***
	F(α=0, β=1)	24.78***	12.77***	21.16***	6.58***	22.12***	3.57**	20.56***	22.00***	13.01***	17.38***	22.62***	5.94***
	Serial corr.	0.39***	0.06	0.13*	0.31***	0.09**	0.05	-0.03	0.05	0.22***	0.31***	0.00	0.26***

Significance levels: (*) 0.10, (**) 0.05, (***) 0.01

ANNEX 3

Comparing GDP forecast errors with those of other international institutions

Table A3.1:

Comparison of Commission and other forecasts - current year

	Full sample									
		No of obs.		ME		MAE		RMSE		
	Sample	COM	OECD	COM	OECD	COM	OECD	COM	OECD	
Belgium	75/14	40	40	0.02	0.05	0.62	0.65	0.78	0.78	
Denmark	75/14	40	40	0.24	-0.05	0.67	0.67	0.85	0.83	
Germany	71/14	44	44	0.04	0.02	0.74	0.71	1.04	0.89	
Ireland	75/14	40	40	-0.53	-0.39	1.55	1.38	1.92	1.72	
Greece	81/14	34	34	0.10	0.03	0.76	0.75	1.02	1.03	
Spain	86/14	29	29	-0.16	-0.15	0.51	0.46	0.70	0.66	
France	71/14	44	44	0.10	0.14	0.52	0.57	0.68	0.81	
Italy	71/14	44	44	0.38	0.12	0.80	0.68	1.09	0.94	
Luxembourg	81/14	34	34	-0.63	-0.31	1.38	1.24	1.92	1.59	
Netherlands	75/14	40	40	0.03	-0.08	0.65	0.69	0.85	0.82	
Austria	95/14	20	20	0.04	-0.02	0.52	0.48	0.68	0.62	
Portugal	86/14	29	29	0.10	-0.01	0.70	0.72	0.87	0.94	
Finland	95/14	20	20	0.28	0.20	1.21	1.10	1.50	1.43	
Sweden	95/14	20	20	-0.04	-0.02	0.85	0.83	1.24	1.22	
United Kingdom	73/14	42	42	0.04	0.13	0.68	0.59	0.87	0.80	

	Adjusted sample													
		No of obs.			ME			MAE			RMSE			
	Sample	COM	CONS	IMF	COM	CONS	IMF	COM	CONS	IMF	COM	CONS	IMF	
Belgium	91/14	24	24	24	0.07	0.13	0.01	0.57	0.68	0.61	0.71	0.83	0.76	
Denmark	91/14	24	24	24	0.35	0.32	0.21	0.76	0.81	0.87	0.96	1.09	1.04	
Germany	90/14	24	25	25	-0.18	-0.18	-0.16	0.59	0.58	0.64	0.83	0.84	0.91	
Ireland	91/14	24	24	24	-0.74	-1.06	-0.54	1.65	1.97	1.35	2.03	2.48	1.70	
Greece	94/14	21	21	21	0.14	-0.09	0.18	0.67	0.81	0.82	1.00	1.09	1.23	
Spain	91/14	24	24	24	-0.03	-0.02	-0.02	0.44	0.49	0.47	0.56	0.66	0.61	
France	90/14	24	25	25	0.15	0.17	0.14	0.51	0.49	0.44	0.60	0.60	0.57	
Italy	90/14	24	25	25	0.49	0.49	0.42	0.65	0.70	0.70	0.74	0.82	0.82	
Luxembourg	94/14	22	0	22	-0.26	0.00	-0.49	1.31	:	1.23	1.67	:	1.51	
Netherlands	91/14	24	24	24	0.06	0.05	0.02	0.63	0.58	0.58	0.82	0.78	0.76	
Austria	95/14	20	20	20	0.04	0.05	0.06	0.52	0.66	0.56	0.68	0.79	0.68	
Portugal	91/14	24	24	24	0.25	0.39	0.28	0.70	0.81	0.73	0.87	1.07	0.94	
Finland	95/14	20	20	20	0.28	0.08	0.07	1.21	1.43	1.24	1.50	1.83	1.50	
Sweden	95/14	20	20	20	-0.04	0.01	-0.15	0.85	0.92	0.85	1.24	1.23	1.29	
United Kingdom	90/14	24	25	25	0.11	0.14	0.16	0.55	0.59	0.55	0.69	0.75	0.69	
EU	99/14	16	:	16	0.16	:	0.01	0.42	:	0.42	0.53	:	0.48	
Euro area	99/14	16	12	16	0.15	0.03	0.09	0.38	0.41	0.38	0.48	0.48	0.43	

Table A3.2:

Comparison of Commission and other forecasts - year ahead

	Full sample											
		No of obs.		ME		MAE		RMSE	
	Sample	COM	OECD	COM	OECD	COM	OECD	COM	OECD
Belgium	76/14	39	39	0.16	0.15	0.95	0.95	1.23	1.25
Denmark	76/14	39	39	0.36	0.11	1.04	0.96	1.45	1.30
Germany	71/14	44	44	0.36	0.20	1.26	1.18	1.71	1.61
Ireland	76/14	39	39	-0.60	-0.70	2.19	2.22	2.72	2.69
Greece	82/14	33	33	0.38	0.28	1.23	1.39	1.78	1.99
Spain	87/14	28	28	0.11	0.05	0.93	0.97	1.27	1.26
France	71/14	44	44	0.41	0.28	0.80	0.79	1.13	1.16
Italy	71/14	44	44	0.79	0.45	1.32	1.39	1.82	1.85
Luxembourg	82/14	33	33	-0.27	-0.29	2.00	1.94	2.49	2.48
Netherlands	76/14	39	39	0.12	0.07	1.09	1.09	1.37	1.37
Austria	95/14	20	20	0.35	0.16	0.95	0.82	1.37	1.16
Portugal	87/14	28	28	0.41	0.46	0.94	1.09	1.20	1.37
Finland	95/14	20	20	0.51	0.35	1.82	1.79	2.66	2.59
Sweden	95/14	20	20	0.34	0.16	1.26	1.28	1.84	1.82
United Kingdom	74/14	41	41	0.30	0.09	1.09	1.07	1.43	1.49

	Adjusted sample													
		No of obs.			ME			MAE			RMSE		
	Sample	COM	CONS	IMF	COM	CONS	IMF	COM	CONS	IMF	COM	CONS	IMF
Belgium	91/14	24	24	24	0.37	0.47	0.44	1.00	1.24	1.14	1.26	1.55	1.47
Denmark	91/14	24	24	24	0.61	0.52	0.41	1.05	1.12	1.21	1.53	1.65	1.66
Germany	91/14	24	25	25	0.23	0.27	0.50	1.10	1.19	1.40	1.50	1.59	1.83
Ireland	91/14	24	24	24	-0.89	-1.00	-0.67	2.38	2.65	2.40	3.06	3.48	2.98
Greece	94/14	21	21	21	0.49	0.48	0.49	1.23	1.38	1.23	1.85	2.04	1.96
Spain	91/14	24	24	24	0.30	0.37	0.43	0.88	0.98	0.97	1.25	1.36	1.35
France	91/14	24	25	25	0.50	0.52	0.69	0.81	0.89	0.97	1.06	1.20	1.33
Italy	91/14	24	25	25	0.99	0.93	1.10	1.21	1.24	1.34	1.60	1.58	1.66
Luxembourg	94/14	21	:	21	-0.24	:	-0.07	2.09	:	2.12	2.60	:	2.56
Netherlands	91/14	24	24	24	0.22	0.37	0.53	1.06	1.16	1.18	1.41	1.52	1.60
Austria	95/14	20	20	20	0.35	0.38	0.40	0.95	1.18	1.26	1.37	1.61	1.55
Portugal	91/14	24	24	24	0.62	0.84	0.92	0.91	1.28	1.25	1.20	1.65	1.67
Finland	95/14	20	20	20	0.51	0.32	0.64	1.82	2.00	2.03	2.66	2.82	2.80
Sweden	95/14	20	20	20	0.34	0.37	0.40	1.26	1.27	1.49	1.84	1.98	2.19
United Kingdom	91/14	24	25	25	0.43	0.49	0.57	0.96	1.02	1.11	1.34	1.46	1.55
EU	99/14	15	:	16	0.51	:	0.55	0.90	:	1.10	1.37	:	1.53
Euro area	99/14	16	11	16	0.53	0.48	0.59	1.00	1.05	1.20	1.43	1.59	1.55

Table A3.3:

Comparison of Commission and other forecasts - current year, 2000-14

		No of obs.				ME				MAE			
	Sample	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD
Belgium	00/14	15	15	15	15	0.09	0.10	-0.13	0.03	0.59	0.61	0.50	0.57
Denmark	00/14	15	15	15	15	0.56	0.52	0.32	0.38	0.85	0.94	0.94	0.78
Germany	00/14	15	15	15	15	-0.07	0.02	-0.23	0.04	0.53	0.54	0.61	0.61
Ireland	00/14	15	15	15	15	-0.29	-0.22	-0.36	-0.14	1.61	1.62	1.50	1.56
Greece	00/14	15	15	15	15	0.32	0.08	0.40	0.14	0.80	0.92	0.99	0.82
Spain	00/14	15	15	15	15	-0.09	-0.10	-0.12	-0.14	0.37	0.39	0.36	0.30
France	00/14	15	15	15	15	0.24	0.19	0.19	0.29	0.55	0.43	0.43	0.47
Italy	00/14	15	15	15	15	0.52	0.55	0.43	0.31	0.70	0.75	0.62	0.55
Luxembourg	00/14	15	:	15	15	-0.04	:	-0.50	-0.20	1.43	:	1.46	1.35
Netherlands	00/14	15	15	15	15	0.35	0.35	0.20	0.17	0.60	0.59	0.55	0.69
Austria	00/14	15	15	15	15	0.10	0.09	0.10	0.01	0.52	0.66	0.59	0.48
Portugal	00/14	15	15	15	15	0.17	0.28	0.08	0.08	0.73	0.73	0.66	0.73
Finland	00/14	15	15	15	15	0.46	0.42	0.29	0.43	1.36	1.51	1.33	1.24
Sweden	00/14	15	15	15	15	0.06	0.14	-0.13	0.09	0.97	0.99	0.88	0.94
United Kingdom	00/14	15	15	15	15	0.22	0.21	0.26	0.15	0.49	0.51	0.50	0.38
EU	00/14	15	:	15	:	0.16	:	0.05	:	0.42	:	0.41	:
Euro area	00/14	15	12	15	:	0.17	0.03	0.11	:	0.41	0.41	0.38	:

		No of obs.				ME				MAE			
	Sample	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD
Estonia	04/14	11	:	11	4	0.01	:	0.01	:	2.52	:	2.89	:
Cyprus	04/14	11	:	11	:	-0.31	:	0.46	:	1.17	:	1.49	:
Malta	04/14	11	:	11	:	-0.49	:	-0.48	:	0.93	:	1.09	:
Slovenia	04/14	11	:	11	3	0.09	:	0.17	-1.06	1.38	:	1.44	1.28
Slovakia	04/14	11	:	11	11	-0.50	:	-0.25	-0.50	1.03	:	1.02	0.83
Bulgaria	04/14	8	:	11	:	0.47	:	0.23	:	0.67	:	0.62	:
Czech Republic	04/14	11	:	11	11	-0.10	:	-0.16	-0.21	1.03	:	0.94	0.76
Latvia	04/14	11	:	11	:	-0.34	:	-0.12	:	3.02	:	3.02	:
Lithuania	04/14	11	:	11	:	0.00	:	-0.01	:	1.41	:	1.65	:
Hungary	04/14	11	:	11	11	0.11	:	0.33	0.08	0.91	:	1.30	0.83
Poland	04/14	11	:	11	11	-0.50	:	-0.58	-0.36	0.93	:	0.76	0.89
Romania	07/14	8	:	11	:	0.31	:	-0.26	:	1.34	:	1.75	:

Table A3.4:

Comparison of Commission and other forecasts - year-ahead, 2000-14

		No of obs.				ME				MAE			
	Sample	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD
Belgium	00/14	15	15	15	15	0.39	0.41	0.32	0.27	1.05	1.27	1.15	0.95
Denmark	00/14	15	15	15	15	0.91	0.81	0.69	0.71	1.29	1.36	1.39	1.14
Germany	00/14	15	15	15	15	0.30	0.43	0.37	0.19	1.20	1.32	1.43	1.12
Ireland	00/14	15	15	15	15	0.14	0.34	0.33	-0.03	2.26	2.21	2.21	1.99
Greece	00/14	15	15	15	15	0.88	0.82	0.83	0.82	1.50	1.71	1.55	2.00
Spain	00/14	15	15	15	15	0.31	0.29	0.35	0.22	0.90	0.93	1.01	0.96
France	00/14	15	15	15	15	0.55	0.57	0.72	0.41	0.73	0.81	0.88	0.61
Italy	00/14	15	15	15	15	1.11	1.04	1.17	0.94	1.38	1.40	1.48	1.25
Luxembourg	00/14	15	:	15	15	0.29	:	0.38	0.31	2.26	:	2.48	2.11
Netherlands	00/14	15	15	15	15	0.60	0.70	0.86	0.59	1.27	1.33	1.45	1.21
Austria	00/14	15	15	15	15	0.39	0.46	0.47	0.18	1.06	1.34	1.34	0.88
Portugal	00/14	15	15	15	15	0.66	0.82	0.96	0.73	0.98	1.37	1.19	1.25
Finland	00/14	15	15	15	15	0.86	0.81	1.00	0.77	2.01	2.22	2.25	2.00
Sweden	00/14	15	15	15	15	0.39	0.48	0.45	0.30	1.45	1.45	1.80	1.41
United Kingdom	00/14	15	15	15	15	0.44	0.48	0.44	0.14	0.91	0.94	1.04	0.90
EU	00/14	15	:	15	:	0.55	:	0.58	:	0.90	:	1.17	:
Euro area	00/14	15	11	15	:	0.56	0.48	0.60	:	1.01	1.05	1.26	:

		No of obs.				ME				MAE			
	Sample	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD	COM	CONS	IMF	OECD
Estonia	04/14	11	:	11	2	0.97	:	0.48	0.01	4.18	:	4.62	1.64
Cyprus	04/14	11	:	11	:	0.78	:	1.04	:	1.44	:	1.51	:
Malta	04/14	11	:	11	:	-0.15	:	-0.06	:	1.55	:	1.67	:
Slovenia	04/14	11	:	11	:	0.62	:	0.81	:	2.45	:	2.64	:
Slovakia	04/14	11	:	11	14	-0.14	:	0.50	-0.30	2.12	:	2.31	1.72
Bulgaria	04/14	8	:	8	:	1.29	:	1.16	:	1.73	:	1.93	:
Czech Republic	04/14	11	:	11	11	0.43	:	0.38	0.33	2.09	:	2.26	1.98
Latvia	04/14	11	:	11	:	0.69	:	0.56	:	4.54	:	4.61	:
Lithuania	04/14	11	:	11	:	0.48	:	0.59	:	3.18	:	2.95	:
Hungary	04/14	11	:	11	11	0.71	:	0.96	0.23	1.85	:	2.08	1.94
Poland	04/14	11	:	11	11	-0.28	:	-0.27	-0.72	1.21	:	1.32	1.29
Romania	07/14	8	:	8	:	1.51	:	1.53	:	2.39	:	2.60	: