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AN EVALUATION OF THE OECD CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCE FORECASTS[1]

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ABSTRACT:

Forecasts of the cyclically-adjusted primary government balance are, potentially, informative as to the stance of future fiscal policies. This is sustained by the fiscal surveillance procedure for Eurozone members since the reformed Stability and Growth Pact of 2005. However, the quality of these forecasts has never been analyzed. We evaluate the properties of the December forecasts of the cyclically-adjusted primary government balance by the OECD for 19 countries.

The forecasts for the current year, nowcasts, are reasonably accurate; the quality of the one-year-ahead and the two-year-ahead forecasts deteriorates however sharply when the forecast horizon increases. Despite their poor quality, forecasts are mostly unbiased and efficient and thus rational. Simple alternative forecasts for the cyclically-adjusted primary government balance do not systematically outperform the forecasts by the OECD.

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INTRODUCTION

Public finance analysts have searched over many decades intensively for indicators of the stance of fiscal policy. Many gauges have been proposed. Implicitly, such measures refer to some deficit goal. For example, the full employment budget accepts deficits as long as these reflect the state of the business cycle. However, no single fiscal indicator emerged internationally so every country used its own indicator of fiscal policy for a long time. Since the underlying data and calculations were not always publicly available, comparing fiscal positions of different countries was quite hazardous.

The growing international cooperation and integration and the world wide experience with large and lasting deficits in the seventies and eighties, implying an unsustainable path for public debt, necessitated a common and widely accepted indicator for the stance of fiscal policy. The most obvious and readily available indicator, the financial balance of the government, is defective due to one-off operations (for example, mobile telephone licenses, tax amnesties, accounting consolidations of other government entities) and, most importantly, the position of the economy on the business cycle.

Over the past two decades some consensus has emerged in favour of the cyclically-adjusted government balance as the principal fiscal policy indicator. This balance is assumed not only to reflect the structural stance of fiscal policy, but also to report on policy actions (the fiscal impulse equals the change in the balance) and on the medium run sustainability of the public finances. The policy relevancy of the cyclically-adjusted government balance is illustrated by the fact that this balance plays a prominent role in the revised Growth and Stability Pact of 2005 and that forecasts are made by different international organisations.

Analysing the quality of forecasts for the cyclically-adjusted government balances should help us to improve our understanding of the functioning of the economic system. Forecast errors contain, potentially, information to correct the methodology used in deriving the cyclical adjustments. Ultimately this will improve the understanding and effectiveness of fiscal policy. In addition, a growing literature exists on the comparative experiences of countries with fiscal policies. An international evaluation of forecasts for the cyclically-adjusted government balances is part of this subject. Especially after the current worldwide economic and financial crisis this indicator can be a very useful guide in the unavoidable fiscal consolidations.

Notwithstanding the wide acceptance of the concept of the cyclically-adjusted government balance, no general accepted methodology exists to correct government balances for cyclical and one-off effects. As a result, the data produced by national and international institutions differ widely. Choosing between the different series is not straightforward; all published series can be criticized. The adjustments indeed require knowledge of the cyclical position of the economy, frequently approximated

by the output gap[2], and of the reaction of government balances to deviations of the economy from the cyclically neutral position. Additionally, one has to decide on a discretionary basis which exceptional fiscal operations have to be excluded. A study of the cyclically-adjusted government balance forecasts can be helpful in deriving a general accepted methodology.

We focus on the December forecasts of the cyclically-adjusted primary government balance that the OECD publishes in Economic Outlook for 19 of its member countries since December 1993. The primary balance is chosen since interest payments can be considered exogenous as to current fiscal policy. The forecast for the current year, "nowcasts", for next year and for two-year ahead are analyzed. The main reason for choosing OECD forecasts is the availability of forecasts over a longer period of time and their regular publication frequency. Furthermore, the OECD methodology is probably the one that is most widely accepted and applied to a large group of countries. The experience of the OECD with international data and forecasts leads us to expect that the approach will be applied in a flexible way so as to take country-specific aspects into account.

We start in section 1 with a review of the methodologies used to derive cyclically-adjusted primary government balances and with a summary of forecast analyzes of budget balances. In section 2 the data are discussed as well as the choice of the evaluation benchmark. In a next section we report the evaluation statistics of the cyclically-adjusted primary government balance forecasts. All in all, the quality of the forecasts is rather poor. We investigate therefore in section 4 whether some simple alternative forecasts perform better. A final section concludes.

1. CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCE

Many national and international organisations calculate cyclically-adjusted government balances. Methodologies differ[3], however, to correct the government balance for transitory effects. The most well-known and widely used series for a group of countries are those produced by the OECD and the European Commission. Both institutions apply an aggregate approach[4]. It consists in excluding non-

[2] We refer to Orphanides and van Norden (2002) for a general discussion of problems related to the derivation of the output gap.

[3] Articles and references can be found in the conference volumes of the Bank of Italy [(1998) and (2006)].

[4] For the OECD we refer especially to Muller and Price (1984), Giorno et al. (1995), Van den Noord (2000), Girouard and André (2005) and Joumard et al. (2008). The methodology of the European Commission is detailed in Larch and Turrini (2009).

recurrent budgetary operations[5] and in linking an aggregate measure for the output gap[6] to several components of the government budget. In contrast to this aggregated approach, the European Central Bank uses different macro-economic variables to correct important components of government revenues and expenditures directly for cyclicality[7]. In this way, the peculiarities of each economic cycle can be captured, minimising what is known in the literature as the 'composition-effect'. Since cycles differ with regard to their effect on the components of aggregate demand and thus on tax bases, it is an empirical matter as to the impact of this disaggregation. Unfortunately, no series are available.

We will focus on the cyclically-adjusted primary government balances; cyclically-adjusted total government balances can be derived by subtracting interest payments. The rationalisation for the independence between the primary balance and interest payments is that it is assumed that the former is essentially determined by cyclical effects and policy choices whereas the latter depends largely on past interest rates as well as debt management policies. The implication is that changes in interest payments are assumed to affect the total government balance equally.
The correct segregation of a particular budgetary variable is, however, speculative due to second round effects. For example, interest payments are taxed and these taxes are part of the primary balance. The correct procedure requires the computation of a primary government balance that excludes taxes on government debt interest payments. This approach is practically difficult to implement due to the lack of information about taxes on interest payments. However, one should be aware that neglecting the interaction between interest payments and the primary government balance leads to inflated tax revenues and therefore to an overestimation of the primary balance.

Concluding that cyclically-adjusted primary government balances are no longer related to the economic cycle is, however, hasty[8]. At least three effects could explain a persistent relationship. Firstly, a policy argument, namely a systematic

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[5] See Koen and van den Noord (2005) and Joumard et al. (2008) for a general discussion of these one-off operations and for the OECD's treatment of these items.
Since December 2008, Economic Outlook number 84, the OECD also publishes tables entitled 'General Government underlying balances' and 'General Government underlying primary balances'. The difference with the cyclically-adjusted balances is that another approach is taken with regard to the one-off operations. Instead of only considering the revenues from mobile telephone licenses, one-offs are defined as the deviation from trend in net capital transfers. One-offs are thus derived by some top-down procedure, not by a traditional bottom-up method that consists in aggregating specific capital operations. Up to 2006 the European Commission also corrected only for UMTS license. Later on a distinction is introduced between the cyclically and the structural primary balance. The former being the primary balance corrected for cyclical effects, the latter excludes also "one-off and other temporary measures estimated by the Commission services".

[6] The output gap is defined as the deviation of actual output from potential output. The OECD calculates potential output by using a production function; in the Autumn 2002 the European Commission switched from a Hodrick-Prescott filter to a production function approach.

[7] The methodology is explained in Bouthevillain et al. (2001) and Kremer et al. (2006). Obviously, disaggregation is only useful when the cyclicality of the components of the government budget differs. See Lane (2003) for an analysis of the cyclical behaviour of spending categories in the OECD countries.

[8] Alberola et al. (2003) study a panel of 14 EU countries, sample period 1969-1998, and find that the cyclically-adjusted primary balance is correlated with the GDP-gap, an indicator of the cycle.

anti- or pro-cyclical policy will lead to a respectively positive or negative correlation. A second explanation derives from the cyclicality of interest rates. As a result, taxes on interest payments on the government debt that are, as observed, not filtered out in the cyclically-adjusted primary government balances could be correlated with the economic cycle. Thirdly, a methodological argument, by using elasticities estimated over a longer sample period there can be an over/underfiltering as cycles may differ in their impact on the components of aggregate demand.

To illustrate the cyclicality in cyclically-adjusted primary government balances we estimated the relationship between this variable and the output gap for the 19 OECD countries of our sample[9]. The results (not reported) show that 10 coefficients of the output gap differ significantly from zero; 5 of these coefficients are positive, these for Australia, Finland, Japan, Sweden and the United Kingdom, implying that a larger negative gap, i.e. a deeper recession, is associated with a smaller cyclically-adjusted primary balance. In the other regressions with significant slope coefficients, the regressions for Austria, Greece, Ireland, Italy, and Spain, the cyclically-adjusted primary balance reacts negatively to the output gap.

Traditionally, forecast evaluation studies have concentrated on real variables. Somewhat understandably since budgetary forecasts were viewed to depend heavily on the forecasts for real variables. We summarize now the fiscal forecast studies[10]. Artis and Marcellino (2001) evaluate the budgetary forecasts published by the IMF, the OECD and the European Commission over the period mid seventies-mid nineties. The current year and one-year-ahead IMF-forecasts for the G7-countries are mostly efficient and unbiased but are outperformed by a naive model that extrapolates the last outcome. Similarly, the current year and the one-year-ahead budget forecasts by the OECD and the European Commission for France, Germany, Italy and the United Kingdom are most of the time unbiased and efficient. No organization systematically outperforms the other two institutions[11].

Strauch, Hallerberg and von Hagen (2004) analyze the budgetary forecasts of the Eurozone members as reported in the Convergence and Stability Programs over the period 1991-2002. The forecasts horizon varies up to three years. The results show an optimistic bias in some countries and the importance of fiscal governance, i.e., the budgetary decision process. Countries with a contractual budgetary process are more cautionary compared to countries where the minister of finance is responsible for the budget.

Brück and Stephan (2006) conclude that budget deficit forecasts by the European Commission showed the appearance of a political cycle after the introduction of the Stability and Growth Pact. More precisely, budget deficit forecasts became less pessimistic as elections approached. This effect was more pronounced for left-wing governments and for coalition governments.

[9] The data are those available in June 2007 and the sample is 1989-2006.
[10] We refer to Leal et al. (2007) for a summary and discussion of fiscal forecasting in general.
[11] Keereman (1999, p. 45-46) concludes similarly.

As part of a larger evaluation analysis of the forecasts produced by the European Commission for the member countries (6 macro-economic variables; sample early seventies till late nineties), Keereman (1999) concludes that the forecasts of the government deficit are, in general, acceptable although the superiority of these forecasts relative to naive ones is smaller than for the other variables.

2. DATA

2.1. OECD ECONOMIC OUTLOOK

The OECD started to publish regularly outcomes and forecasts of the total cyclically-adjusted government balance for 19 countries in the Economic Outlook issue of December 1993[12]. Note that forecasts for the cyclically-adjusted government balance are, as other OECD forecasts, conditional on announced measures and stated policy intentions (OECD (2008)). The OECD tries to limit the ensuing credibility problem by imposing that announced policies should be incorporated in 'well-defined programmes'. The term 'well-defined' is, however, not specified. In addition, the uncertainty related to the implementation of these programmes is not eliminated[13]. By lack of knowledge about how to incorporate the conditionality of forecasts, we, as in all forecast evaluation studies of international organisations, neglect this aspect.

Forecasts lead unavoidably to forecast errors. These errors have different sources. Firstly, they reflect unannounced policy changes and announced ones that are postponed or, in the extreme case, not implemented at all. One should, however, not exaggerate the importance of this effect since forecasts that incorporate potential policy changes, can imply similar errors although with an opposite sign. Essentially it concerns the forecasts of policy actions: forecasting them explicitly or neglecting them, i.e. forecasting by assuming no policy change, can lead to errors. The net impact of the conditionality of forecasts on the forecast errors is thus not straightforward. Secondly, forecast errors in the output gap will, considering a given unadjusted deficit, be reflected in the forecast errors of the cyclically-adjusted government balance. Thirdly, errors can originate from the fact that one-off operations have most likely not been forecasted whereas realizations are partially corrected (see Joumard et al. (2008)). Fourthly, methodological changes between the forecast and realisation point of time will also be reflected in the forecast error. Finally, forecast errors in the cyclically-adjusted government balance can also have an origin in revisions in historical income data. Indeed, forecasts are based on preliminary data for the recent past. Changes in these data can affect the cyclical

[12] These are the countries covered in the first table published by the OECD in the December 1993 Economic Outlook issue (table A.26). In later issues more countries were added but the sample is too short to allow for a sensible analysis.

[13] One could probably increase the accuracy of the forecasts by adjusting them for 'required' or 'unavoidable' policy changes. Such adjustments would, however, be highly subjective, implying other forecasts than those of the OECD. This would be the subject of another study (what is the best forecast of the cyclically-adjusted primary balance?). This happens quite likely in some organisations. Furthermore, it would be difficult if not impossible to construct a time series since such adjustments should be performed ex ante. Finally, there is the practical problem about how to perform such adjustments for 19 different countries.

attribution of taxes and expenditures and so induce errors. I.e., forecasts could have been different if the revised data would have been used[14].

From December 1993 on Economic Outlook reports bi-annual historical data for the cyclically-adjusted government balance as well as forecasts. In the first two publications the cyclically-adjusted government balance was expressed as a percentage of trend GDP; starting December 1994 the cyclically-adjusted government balance is expressed as a percentage of potential GDP.

Initially, only data for the total cyclically-adjusted government balance were published. From June 2002 on, also series for the primary government balance, as a percentage of potential GDP, are available[15]. The data for the cyclically-adjusted primary government balance are published as a percentage of potential GDP. Since cyclically-adjusted government balances are corrected for deviations from potential GDP, it seems appropriate to express ratios relative to this variable. The cyclically-adjusted primary government balance data for the period up to 2002 have to be derived from the total cyclically-adjusted government balance and interest payments. Since our data are expressed as a percentage of potential GDP, the interest payments should be divided by potential GDP as well. However, no data on potential GDP are available; consequently we use interest payments relative to nominal GDP. We acknowledge that this leads to a small error but since the same error is made on forecasts as well as on outcomes, the impact on our forecast evaluations should be small, if not negligible.

2.2. WHICH BENCHMARK FOR THE FORECASTS ?

The June issue of the Economic Outlook contains historical series and forecasts for the current and the next year. We therefore find in this issue the first outcome for the cyclically-adjusted government balance in the previous year. In the December issue the oldest historical value is replaced by an additional forecast. This issue therefore contains three forecasts. The initial releases are revised in every next issue. It raises the question which realisation vintage has to be used to evaluate the accuracy of the forecasts. Essentially two possibilities exist.

Firstly, one can opt for the first vintage or first releases of the outcome series. In our case the three forecasts for year (t) should thus be confronted to the actual data as published in the June issues of Economic Outlook in (t+1). The main argument for pursuing this procedure is that users will quite likely use these data for a first evaluation of the reliability of the forecasts for year t. Furthermore, the data will be homogenous as to their information content.

A second possibility is derived from the argument that the June (t+1) data are preliminary and so will be revised implying that an evaluation based on these data could be erroneous. A dependable forecast evaluation thus requires ‘final’ data.

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[14] Vuchelen and De Wit (2008) show that the revisions in the cyclically-adjusted primary government balances as a percentage of potential GDP are stochastic so do not allow for any a priori correction.

[15] The publication of the cyclically-adjusted primary balance was ended from the December 2008 issue on when the OECD started the publication of the underlying balance statistics (see footnote 5).

Since the revision period can be quite long, evaluations will be difficult and be delayed for many years. Evaluations would loose, we believe, much of their interest. Pragmatically, one can use the most recent data vintage as the outcome series, in our case the series published in June 2008. Note that the series will be heterogeneous as to the information content: outcomes for recent years will have been revised less frequently compared to outcomes for more distant years.

The differences between the two 'actual' series reflect of course data revisions. These revisions not only capture, as is customary with macro-economic data, adjustments due to the availability of additional information but also modifications in the methodology. These changes affect both the nominal cyclically-adjusted primary government balances, the numerator, as well as potential GDP, the denominator.

In order to illustrate the differences between the two possibilities for the outcome series, the June (t+1) series and the June 2008 series, we report some summary statistics for both series in table 1. We note that for all reported statistics, mean, standard deviations, minimum and maximum values, both series differ decisively. For example, the average cyclically-adjusted primary government balances differ by more than one percent of potential GDP for 6 countries (Austria, Canada, Greece, Norway, Portugal and Sweden). These differences affect of course the forecast errors. To illustrate this we report in table 2 the mean forecast errors for the current year, the one-year-ahead and two-year-ahead forecasts. These errors are defined as the realisation less the forecast. In the column 'outcome June (t+1)' the forecast error is calculated by using the June (t+1) data as reference; in the column 'outcome June 2008' the outcome data are those published in June 2008.

The general picture is that forecast errors are much smaller as the first realisation is used as benchmark. Except for 8 out of 57 cases, all 'first outcome' errors are smaller than those obtained with the 'June 2008 outcomes'. Especially the errors for Norway, Greece and Portugal rise when the June 2008 outcomes are chosen. Note also that for 15 countries all mean forecast errors implied by the choice of the 'June 2008' data vintage as outcome, are negative; the exceptions are Australia, Finland, Ireland and the United States. To further illustrate the differences between the two definitions for 'outcomes', we note that the average, over all countries, of current forecast errors equals 0.05 percent of potential GDP when the first outcome is chosen and -0.82 percent when the June 2008 outcomes are used. The averages for the one-year-ahead forecasts are -0.05 percent and -0.87 percent; for the two-year-ahead forecasts the average errors amount to respectively -0.07 percent and -0.98 percent.

All these statistics do indicate that the choice of the outcome-vintage is important. As a result of previous research we tend to believe that these differences can to a large degree be explained by changes in the methodology used to derive the cyclically-adjusted primary government balance. Since one cannot expect forecasters to predict changes in the methodology, we retain the June (t+1) vintage as the appropriate vintage of the outcome data. In this way we minimize the differences in methodology between forecasts and outcomes but, likely, do not

exclude them completely. Obviously, this problem is more acute when the forecast horizon increases.

TABLE 1. SUMMARY STATISTICS FOR JUNE (T+1) AND JUNE 2008 ACTUAL SERIES FOR THE CYCLICALLY-ADJUSTED PRIMARY BALANCES, 1993-2007 (a)

	Outcome June (t+1)				Outcome June 2008			
	Mean	Sta. dev.	Min.	Max.	Mean	Sta. dev.	Min.	Max.
Australia	1.20	1.65	-2.30	3.00	1.95	1.48	-1.04	3.85
Austria	1.29	1.22	-2.50	2.60	0.29	1.26	-2.15	1.69
Belgium	5.74	1.14	3.40	6.90	4.95	1.14	2.33	6.80
Canada	3.97	2.09	1.40	7.60	2.67	2.19	-1.49	5.87
Denmark	3.26	1.29	0.50	5.10	2.86	1.41	0.97	6.16
Finland	2.37	3.04	-3.08	7.80	2.40	2.80	-3.37	7.26
France	0.39	0.83	-0.60	1.60	-0.60	1.16	-3.25	0.84
Germany	0.89	0.98	-0.30	2.70	0.30	0.99	-1.34	2.23
Greece	3.55	2.92	-1.30	7.70	1.50	2.29	-3.01	4.28
Ireland	1.53	1.55	-2.10	3.40	2.26	1.90	-1.51	4.47
Italy	3.66	1.86	0.40	6.20	2.88	1.65	0.47	6.33
Japan	-3.12	2.10	-5.90	2.17	-4.03	1.61	-5.92	-0.71
Netherlands	2.51	0.90	0.60	4.20	1.86	1.36	-0.79	3.31
Norway	-5.52	4.39	-14.90	0.40	-10.24	3.24	-14.32	-5.21
Portugal	1.15	0.93	-1.60	2.70	-0.48	1.31	-2.97	1.40
Spain	2.09	1.31	-1.21	3.20	1.42	1.42	-2.03	3.17
Sweden	1.35	4.50	-9.60	7.50	0.08	3.29	-7.26	3.78
United Kingdom	0.01	2.15	-3.13	3.80	-0.29	2.59	-4.53	3.65
United States	0.32	2.17	-2.50	4.30	0.42	2.18	-2.59	3.49

Note (a): The outcomes or actuals in the column (t+1) are from the issue of Economic Outlook published in June (t+1); the outcomes in the column June 2008 are all as produced by the OECD in June 2008. All data as a percentage of potential GDP.

TABLE 2. MEAN FORECAST ERRORS FOR CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCES, 1993-2007 (a)

	Outcome June (t+1)			Outcome June 2008		
	Current year forecasts	One-year-ahead forecasts	Two-year-ahead forecasts	Current year forecasts	One-year-ahead forecasts	Two-year-ahead forecasts
Australia	-0.12	0.03	0.29	0.63	0.75	0.91
Austria	0.01	0.02	-0.04	-0.99	-0.81	-0.74
Belgium	0.13	0.30	0.51	-0.66	-0.57	-0.33
Canada	0.28	0.29	0.35	-1.02	-0.87	-0.76
Denmark	-0.02	0.28	0.39	-0.03	-0.18	-0.17
Finland	0.06	0.02	-0.04	0.10	0.08	0.02
France	-0.05	-0.33	-0.42	-1.04	-0.14	-1.09
Germany	0.11	-0.17	-0.58	-0.48	-0.80	-1.23
Greece	-0.01	-0.38	-0.67	-2.06	-2.49	-2.99
Ireland	-0.10	-0.15	-0.35	0.62	0.48	0.11
Italy	0.14	-0.23	-0.14	-0.64	-0.95	-0.89
Japan	0.02	-0.58	-0.81	-0.89	-1.28	-1.52
Netherlands	0.36	0.28	0.23	-0.30	-0.44	-0.49
Norway	-0.40	-1.04	-0.82	-5.11	-6.05	-6.20
Portugal	-0.22	-0.61	-0.65	-1.85	-2.23	-2.30
Spain	0.10	0.15	0.27	-0.57	-0.52	-0.36
Sweden	0.35	1.22	1.32	-0.91	-0.31	-0.26
United Kingdom	-0.13	-0.32	-0.31	-0.43	-0.54	-0.44
United States	0.03	0.19	0.05	0.13	0.26	0.07

Note (a): All forecasts are from the December issues of Economic Outlook. The current year forecasts are those for year t published in the December issue of Economic Outlook of year t. The one-year-ahead forecasts are those published in December of (t-1) for year t; the two-year-ahead forecasts are those published in December of year (t-2) for year t. The outcomes or actuals in the column (t+1) are from the issue of Economic Outlook published in June (t+1); the outcomes in the column June 2008 are all as produced by the OECD in June 2008.
All data as a percentage of potential GDP.

2.3. SUMMARY STATISTICS

Table 3 presents some basic information on the cyclically-adjusted primary government balance in the 19 OECD countries. We consider the outcomes (June (t+1) vintage), the current year, the one-year-ahead and the two-year-ahead forecasts. Four sample statistics are reported; the mean, the standard deviation, the minimum and the maximum values. We note that all statistics differ widely between the countries. The average cyclically-adjusted primary government balance is positive for most countries; the exceptions are Japan and Norway. The positive averages can be explained by the pursued fiscal consolidations in order to reduce the level of public debt that had risen sharply in the seventies and eighties. The prolonged Japanese economic crisis and Norwegian natural resource revenues (these are excluded in the calculation of the cyclically-adjusted primary budget balance; Norway could thus bear a large deficit without increasing its debt level) may explain these two exceptions. The minimum value is as low as -15.40 percent of potential GDP for the current year forecasts for Norway; the maximum value as high as 9.31 percent for the two-year-ahead forecasts for Finland.

The summary statistics for the three forecast errors as implied by the June (t+1) vintage (this choice is explained in section 2.2.) as outcomes, are reported in table 4. The current year forecasts, published in December, have a mean forecast error

that does not differ significantly from zero. The largest average error equals -0.4 percent (Norway). The small mean errors hide, however, important inaccuracies as is apparent from the columns 'Minimum' and 'Maximum'. Note that the results for Norway should be interpreted with care due to the peculiarities (gas and oil) of this country; furthermore, all data for Norway are heavily revised. If we use as yardstick for outliers that they should deviate more than two times the standard deviation from the mean error, we need to conclude that the current year forecast errors of only 6 countries (Denmark, France, Greece, Ireland, Japan and the United Kingdom) do not contain outliers. This is surprising since the forecasts for the current year are published in December when, we may suppose, a lot of information relevant for the current year cyclically-adjusted primary government balance is already available.

As we will explore later in more detail, the quality of the forecasts deteriorates as the forecast horizon increases, but table 4 shows that the mean error still does not differ significantly from zero for most countries. This unbiasedness is an important property of the forecasts. However, one can question its usefulness since the standard deviations of the errors also increase indicating that the uncertainty of the forecasts is quite large. This is evident in an analysis of the size of the extreme errors, the maximum and minimum errors. Only two large errors of the one-year-ahead forecasts are smaller than one percent (the maximum errors for France and Portugal); some are indeed quite large; for example, Finland (-9.61 percent) and Norway (-7.60 percent)).

Concerning the two-year-ahead forecast errors we note that there is no very marked tendency for the mean errors to increase. Since the standard deviations do increase in general, these mean errors do not differ significantly from 0 for all except 2 countries. However, extreme errors are larger: many exceed 5 percent. Considering the policy relevancy of the cyclically-adjusted primary government balance, this is disturbing. In the next paragraph we will investigate the quality and rationality of the forecasts for the cyclically-adjusted primary government balance (efficiency and unbiasedness).

TABLE 3. SUMMARY STATISTICS FOR OUTCOME AND CURRENT YEAR, ONE-YEAR -AEAD AND TWO-YEAR-AHEAD, FORECASTS FOR THE CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCES, 1993-2007 (a)

	Outcome				Current year forecasts				One-year-ahead forecasts				Two-year-ahead forecasts			
	Mean	Sta. dev.	Min.	Max.	Mean	Sta. dev.	Min.	Max.	Mean	Sta. dev.	Min	Max.	Mean	Sta. dev.	Min.	Max.
Australia	1.20	1.65	-2.30	3.00	1.32	1.71	-2.59	3.90	1.42	1.54	-2.28	3.30	1.45	1.27	-1.54	2.60
Austria	1.29	1.22	-2.50	2.60	1.28	1.07	-1.60	3.20	1.19	1.11	-1.10	3.00	1.34	1.15	-0.60	3.30
Belgium	5.74	1.14	3.40	6.90	5.62	1.10	3.50	6.80	5.60	1.08	3.80	6.90	5.41	1.09	3.50	6.70
Canada	3.97	2.09	1.40	7.60	3.69	2.14	0.40	7.20	3.84	2.06	0.90	7.40	3.99	1.92	1.50	7.30
Denmark	3.26	1.29	0.50	5.10	3.28	1.13	0.80	4.90	3.11	1.08	0.96	4.60	3.22	1.31	1.00	4.90
Finland	2.37	3.04	-3.08	7.80	2.30	2.37	-3.10	5.10	2.74	2.63	-2.50	8.21	3.12	2.66	-0.40	9.31
France	0.39	0.83	-0.60	1.60	0.44	0.71	-0.60	1.70	0.73	0.56	-0.10	1.50	0.90	0.56	0.00	1.40
Germany	0.89	0.98	-0.30	2.70	0.78	0.95	-0.75	2.30	1.12	0.69	-0.10	2.50	1.53	0.77	0.60	3.04
Greece	3.55	2.92	-1.30	7.70	3.56	3.09	-0.99	7.50	4.12	2.41	0.60	7.50	4.42	2.01	0.60	7.40
Ireland	1.53	1.55	-2.10	3.40	1.63	2.03	-1.70	4.40	1.67	2.16	-1.50	5.20	1.87	2.42	-1.70	6.30
Italy	3.66	1.86	0.40	6.20	3.52	2.01	-0.10	6.20	3.82	1.87	0.40	6.10	3.79	1.94	-0.10	5.80
Japan	-3.12	2.10	-5.90	2.17	-3.14	2.06	-5.90	1.14	-2.92	2.31	-5.60	1.47	-2.77	2.48	-5.60	1.78
Netherlands	2.51	0.90	0.60	4.20	2.15	0.76	0.60	3.40	2.28	0.57	1.30	3.40	2.33	0.57	1.55	3.60
Norway	-5.52	4.39	-14.90	0.40	-5.12	4.15	-15.40	1.00	-4.30	3.14	-8.30	1.50	-4.43	3.08	-8.30	1.70
Portugal	1.15	0.93	-1.60	2.70	1.37	1.06	-1.40	3.16	1.73	0.84	0.30	3.83	1.77	1.08	0.00	4.05
Spain	2.09	1.31	-1.21	3.20	1.99	1.23	-1.16	3.20	2.18	0.73	0.66	3.40	2.21	0.59	1.30	3.50
Sweden	1.35	4.50	-9.60	7.50	0.99	4.38	-9.30	5.70	0.91	3.54	-7.33	4.50	1.34	3.12	-5.81	4.20
United Kingdom	0.01	2.15	-3.13	3.80	0.14	2.11	-2.40	4.50	0.55	1.75	-1.90	3.90	0.74	1.68	-1.90	3.50
United States	0.32	2.17	-2.50	4.30	0.29	2.17	-2.80	4.30	0.26	2.13	-3.40	4.60	0.47	2.11	-3.20	4.70

Note (a): All forecasts are from the December issues of Economic Outlook. The current year forecasts are those for year t published in the December issue of Economic Outlook of year t. The one-year-ahead forecasts are those published in December of (t-1) for year t; the two-year-ahead forecasts are those published in December of year (t-2) for year t. The outcomes or actuals in the column (t+1) are from the issue of Economic Outlook published in June (t+1).

TABLE 4. SUMMARY STATISTICS FOR CURRENT YEAR, ONE YEAR AND TWO-YEAR-AHEAD FORECAST ERRORS FOR THE CYCLICALLY-ADJUSTED PRIMARY GOVERNMENTAL BALANCES, 1993-2007 (a)

	Current year forecast errors				One-year-ahead forecast errors				Two-year-ahead forecast errors			
	Mean	Sta. dev.	Min.	Max.	Mean	Sta. dev.	Min.	Max.	Mean	Sta. dev.	Min.	Max.
Australia	-0.12	0.61	-1.30	0.80	0.03	0.94	-2.00	1.60	0.29	0.74	-1.10	1.64
Austria	0.01	0.64	-1.40	1.40	0.02	0.99	-1.80	1.60	-0.04	1.67	-4.57	2.30
Belgium	0.13	0.32	-0.30	0.70	0.30	0.64	-1.00	1.40	0.51*	0.79	-0.50	2.20
Canada	0.28*	0.54	-0.60	1.20	0.29	1.05	-1.70	1.90	0.35	1.64	-1.90	3.40
Denmark	-0.02	0.84	-1.30	1.50	0.28	1.26	-1.10	2.70	0.39	1.42	-1.50	2.80
Finland	0.06	1.92	-6.00	2.70	0.02	3.01	-9.61	2.80	-0.04	4.02	-11.61	4.70
France	-0.05	0.30	-0.50	0.50	-0.33	0.70	-1.49	0.60	-0.42	0.86	-2.00	0.50
Germany	0.11	0.47	-1.10	0.85	-0.17	0.99	-2.30	1.40	-0.58	1.42	-3.34	1.40
Greece	-0.01	1.04	-1.70	1.96	-0.38	2.06	-4.20	2.77	-0.67	2.80	-5.70	2.66
Ireland	-0.10	1.34	-2.50	2.10	-0.15	2.45	-5.30	3.30	-0.35	3.24	-8.40	2.80
Italy	0.14	0.54	-0.50	1.30	-0.23	1.16	-1.70	1.80	-0.14	1.48	-2.00	3.10
Japan	0.02	0.97	-1.90	1.70	-0.58	1.87	-3.97	2.70	-0.81	2.39	-4.80	3.00
Netherlands	0.36	0.71	-0.80	1.50	0.28	1.20	-2.80	1.70	0.23	1.20	-2.20	2.00
Norway	-0.40	2.92	-9.70	3.30	-1.04	3.84	-7.60	5.50	-0.82	4.31	-6.60	6.30
Portugal	-0.22	0.55	-1.65	0.50	-0.61*	1.03	-2.70	0.40	-0.65	1.13	-3.30	0.80
Spain	0.10	0.47	-0.60	1.20	0.15	0.73	-1.30	1.70	0.27	0.97	-1.69	1.90
Sweden	0.35	1.05	-1.80	1.90	1.22*	1.73	-2.70	3.70	1.32*	2.28	-3.10	4.20
United Kingdom	-0.13	0.46	-0.90	0.70	-0.32	1.04	-2.10	1.10	-0.31	1.60	-2.70	2.10
United States	0.03	0.18	-0.30	0.30	0.19	1.37	-2.60	1.80	0.05	2.50	-5.70	2.60

Note (a): All forecasts are from the December issues of Economic Outlook. The current year forecasts are those for year t published in the December issue of Economic Outlook of year t. The one-year-ahead forecasts are those published in December of (t-1) for year t; the two-year-ahead forecasts are those published in December of year (t-2) for year t. The outcomes or actuals in the column (t+1) are from the issue of Economic Outlook published in June (t+1). An '*' indicates that the null hypothesis is rejected at the 5 percent significance level.
As a percentage of potential GDP.

3. EVALUATION OF THE FORECASTS FOR THE CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCE

3.1. TEST PROCEDURE

One of the traditional econometric evaluation techniques of forecasts consists in estimating the following regression:

$$A_t = \alpha + \beta F^{t-j}_t + u_t \qquad (1)$$

Where the dependent variable A_t is the observed cyclically-adjusted primary government balance for (t) as published in the June (t+1) issue of Economic Outlook. On the right hand side of the regressions, F^{t-j}_t (j = 0, 1 or 2) is the forecasted cyclically-adjusted primary government balance for (t) as published in the December issue of Economic Outlook in (t-j) and u_t the disturbance. The forecast horizons (j) equal 0, 1 and 2 years.

Rationality of forecasts implies that they are unbiased, efficient and consistent. The condition $\alpha = 0$ and $\beta = 1$ is a sufficient condition[16] for unbiasedness. This test requires the absence of autocorrelation in the estimated regression. A necessary condition is that the forecast errors do not differ significantly from zero. This can be verified by testing whether μ differs significantly from zero in the following regression:

$$(A_t - F^{t-j}_t) = \mu + u_t \qquad j = 0, 1 \text{ and } 2 \qquad (2)$$

Forecasts are weakly efficient if they contain all the available information implying forecasts errors to be uncorrelated; econometrically this also requires that $\beta = 1$ in regression [1]. Revisions of consistent forecasts cannot be predicted. Observe that the above properties of forecasts do not automatically imply 'good' forecasts in the sense of small forecast errors.

The unbiasedness and efficiency tests can be carried out easily. The results are reported in the tables 5, 6 and 7 for respectively the nowcasts, the one-year-ahead and the two-year-ahead forecasts.

The estimation of regression (1) creates an autocorrelation problem for the one and the two-year-ahead forecasts due to an overlap of the forecasting horizon. The two-year-ahead forecast error will depend on the accuracy of the one-year-ahead forecast. The order of the autocorrelation will be equal to the time span between the last outcome and the forecast horizon, minus one (Box and Jenkins (1970) and Brown and Maital (1981)). In our application the order equals one for the one-year-ahead forecasts and two for the two-year-ahead forecasts. Since only the variances of the coefficients are affected by this problem, the procedure involves calculating a modified variance-covariance matrix as:

[16] See Holden and Peel (1990).

$s^2 (X'X)^{-1} X'\Omega X (X'X)^{-1}$ (3)

where s^2 is the variance of the least squares residuals, X the matrix of independent variables and Ω a matrix with one on the diagonal and the first and, eventually, the second order autocorrelation coefficients next to this diagonal.

3.2. RESULTS

In table 5 we report the estimation results of expression (1) for the current year forecasts for the cyclically-adjusted primary government balance. Recall that they are published in the December issue of Economic Outlook. All tests consider a 5 percent level of significance.

The regressions look very acceptable as the coefficients of determination are statistically significant for all countries. Nevertheless these for Denmark, Finland, Ireland, the Netherlands and Norway are quite low. Do note that the forecasts were published in December, so produced in October and November when already a lot of information about the current year is available. One better label therefore these data as 'nowcasts' instead of 'forecasts'.

No intercept differs significantly from zero and all slopes differ significantly from zero but this is not a crucial test here. More importantly for the slopes is whether they equal one. This efficiency property is tested in the column 'F(1)'. We see that the null hypothesis has to be accepted for all countries except for Ireland. This suggests unbiasedness, but in addition to the condition $\beta = 1$, the intercept α has to be zero simultaneously. This is tested with the F(2) test; the results indeed confirm that current year forecasts are unbiased except these for Ireland. Recall that this test is sufficient for unbiasedness. The results of the necessary condition for unbiasedness are reported in column 't(μ)'; for all forecasts this hypothesis is accepted. This confirms, except for Ireland, the sufficiency test.

Additional tests for efficiency consist in analyzing the autocorrelation property of the forecast errors. The Q(2) is the Box-Pierce autocorrelation statistic of the forecast errors with two lags. This test is distributed as chi-square in large samples. As we have only 15 observations, this is not the case in our application; we should thus be careful in interpreting the results. We find some indication for autocorrelation in the forecast errors for Belgium. Another test for autocorrelation in the forecast errors (not reported) is the significance of autoregressive coefficients in a second order autoregressive model. The results, again to be used with some caution, point towards autocorrelation in the errors for France, Italy, Greece and Portugal.

All in all, the current year forecasts for the cyclically-adjusted primary government balance seem to be unbiased except for Ireland and efficient for most of the countries.

TABLE 5. ESTIMATION RESULTS FOR EXPRESSION $A_t = \alpha + \beta F^t_t + u_t$, 1993-2007 (a)

	constant	F^t_t	R^2	DW	F(1)	F(2)	t(μ)	Q(2)
Australia	0.02 (1.04)	0.90 (9.43)	0.87	2.09	1.18	0.86	-0.73	1.73
Austria	0.04 (0.16)	0.97 (5.86)	0.73	2.69	0.02	0.01	0.07	2.37
Belgium	0.13 (0.27)	1.00 (12.52)	0.92	2.61	0.00	1.08	1.53	6.22*
Canada	0.48 (1.66)	0.95 (13.94)	0.94	2.01	0.60	2.33	2.05	0.42
Denmark	0.39 (0.56)	0.87 (4.32)	0.59	1.26	0.39	0.20	-0.10	1.33
Finland	0.08 (0.11)	0.99 (4.43)	0.60	1.03	0.00	0.01	0.13	0.38
France	-0.10 (-1.04)	1.09 (9.69)	0.88	1.50	0.69	0.59	-0.71	5.29
Germany	0.18 (1.10)	0.91 (6.71)	0.78	1.62	0.44	0.61	0.90	0.75
Greece	0.38 (0.93)	0.89 (10.06)	0.89	1.39	1.53	0.77	-0.03	2.33
Ireland	0.59 (1.66)	0.57 (4.11)	0.57	1.39	9.27*	4.70*	-0.30	3.16
Italy	0.53 (1.95)	0.89 (13.16)	0.93	0.97	1.51	1.28	1.01	0.02
Japan	-0.27 (-0.57)	0.91 (7.05)	0.79	1.61	0.52	0.27	0.09	1.55
Netherlands	0.86 (1.49)	0.77 (3.06)	0.42	1.39	0.83	2.31	1.96	3.29
Norway	-1.37 (-1.12)	0.81 (4.32)	0.59	2.18	1.00	0.64	-0.53	1.67
Portugal	0.12 (0.58)	0.75 (5.99)	0.73	1.81	4.12	3.58	-1.58	2.50
Spain	0.11 (0.46)	1.00 (9.30)	0.87	1.62	0.00	0.33	0.85	1.74
Sweden	0.35 (1.22)	1.00 (14.98)	0.95	2.65	000	0.78	1.30	3.80
United Kingdom	-0.13 (-1.04)	1.00 (16.51)	0.95	1.47	0.00	0.55	-1.09	1.72
United States	0.03 (0.61)	1.01 (42.63)	0.99	1.86	0.14	0.30	0.70	0.29

Note (a): The current year forecasts are those for year t published in the December issue of Economic Outlook of year t. The outcomes are from the issues of Economic Outlook published in June (t+1). The t-values of the coefficients are in brackets; R^2 is the coefficient of determination; DW the Durbin-Watson autocorrelation coefficient; F(1) tests $\beta = 1$ and F(2) $\alpha = 0$ and $\beta = 1$. t(μ) is the t-value of the intercept in regression (2) and Q(2) is the Box-Pierce autocorrelation statistic of the forecast errors with two lags. An '*' indicates that the null hypothesis is rejected at the 5 percent significance level.
All data as a percentage of potential GDP.

Table 6 reports the regression results for the one-year-ahead forecasts for the cyclically-adjusted primary government balance. Obviously the quality of the regressions deteriorates considerably compared to the current year forecast regressions. Eleven out of the nineteen coefficients of determination are below 0.5; six are even below 0.2. No coefficient of determination exceeds 0.8. Three intercepts differ significantly from zero and eight slope coefficients do not differ significantly from zero. The slope for the Netherlands is even negative, although not significantly.

Notwithstanding the previous general results, most forecasts are efficient (test results reported in column F(1)). The inefficient forecasts are those for Finland, Ireland, Japan and the Netherlands. More importantly is the combined unbiasedness test of the intercept and the slope (reported in F(2)). All forecasts are unbiased except these for Ireland, Japan, the Netherlands, Portugal and Sweden. Noteworthy is that both lists contain only 'smaller' countries, except for Japan. One highly speculative explanation could be that more research effort is devoted to the larger countries, for example in the prediction of the output gap. The fact that Japan appears to be the exception is probably due to the important economic and financial difficulties this country experienced over the past two decades. The German forecasts are unbiased and efficient but qualitatively poor indicating that the these properties are no guarantee for quality.

Except for Portugal and Sweden, the t-values of the intercept of regression [2], column t(μ), sustain the hypothesis of unbiasedness; efficiency is uphold by the Q(2) statistics. However, some autoregressive coefficients are significant for Germany, the United Kingdom, Denmark and Norway.

We conclude that the forecasts for the one-year-ahead cyclically-adjusted primary government balance did deteriorate compared to the current year forecasts but many forecasts are still unbiased and efficient and thus rational. Forecasts cannot be adjusted so as to increase the performance since no systematic pattern could be discovered in the forecast errors.

TABLE 6. ESTIMATION RESULTS FOR EXPRESSION $A_t = A + B\ F^{t-1}{}_t + u_t$, 1993-2006 (a)

	constant	$F^{t-1}{}_t$	R^2	DW	F(1)	F(2)	t(μ)	Q(2)
Australia	0.43 (1.72)	0.72 (5.47)	0.63	2.07	3.12	1.57	0.13	0.73
Austria	0.36 (0.86)	0.72 (2.82)	0.41	1.53	1.34	0.67	0.09	3.29
Belgium	1.65 (1.91)	0.76 (5.00)	0.66	1.79	2.38	2.85	1.73	3.16
Canada	0.78 (1.04)	0.87 (5.06)	0.76	1.19	0.80	0.94	1.05	4.56
Denmark	1.95 (1.66)	0.46 (1.28)	0.17	1.07	3.30	2.06	0.84	4.79
Finland	1.70 (1.30)	0.39 (1.35)	0.14	0.44	4.85*	2.42	0.02	1.47
France	-0.26 (-0.72)	0.91 (2.33)	0.35	1.37	0.07	1.47	-1.76	2.12
Germany	0.38 (0.62)	0.51 (1.14)	0.12	0.98	1.61	1.02	-0.64	2.36
Greece	0.12 (0.08)	0.88 (2.77)	0.52	0.76	0.25	0.35	-0.70	5.32
Ireland	1.29 (1.74)	0.14 (0.52)	0.03	1.12	16.61*	8.36*	-0.23	2.70
Italy	0.43 (0.58)	0.83 (4.78)	0.66	1.82	0.98	0.77	-0.74	0.08
Japan	-2.33 (-3.07)	0.40 (1.96)	0.35	0.86	14.64*	8.68*	-1.15	2.24
Netherlands	3.48 (2.97)	-0.41 (-0.81)	0.06	0.34	9.58*	5.42*	0.87	2.58
Norway	-2.00 (-0.79)	0.78 (1.69)	0.29	0.89	0.42	0.70	-1.01	3.82
Portugal	0.41 (0.72)	0.41 (1.35)	0.13	2.04	3.69	4.85*	-2.23*	3.44
Spain	0.37 (0.54)	0.90 (3.01)	0.45	1.50	0.13	0.32	0.75	0.01
Sweden	1.35 (2.36)	0.86 (5.53)	0.77	1.50	1.12	4.05*	2.63*	3.15
United Kingdom	-0.32 (-0.76)	1.00 (4.36)	0.74	0.93	0.00	0.60	-1.14	4.13
United States	0.23 (0.45)	0.83 (3.52)	0.64	1.01	0.94	0.60	0.51	3.05

Note (a): The one-year-ahead forecasts are those for year t published in the December issue of Economic Outlook of year t-1. The outcomes are from the issues of Economic Outlook published in June (t+1). The t-values of the coefficients are in brackets; R^2 is the coefficient of determination; DW the Durbin-Watson autocorrelation coefficient; F(1) tests $\beta = 1$ and F(2) $\alpha = 0$ and $\beta = 1$. t(μ) is the t-value of the intercept in regression (2) and Q(2) is the Box-Pierce autocorrelation statistic of the forecast errors with two lags. An '*' indicates that the null hypothesis is rejected at the 5 percent significance level.
All data as a percentage of potential GDP.

Table 7 reports the regression results for the two-year-ahead forecasts for the cyclically-adjusted primary government balance. Due to the length of the forecast horizon and the results for the one-year-ahead forecasts, one cannot be very optimistic about the quality of the two-year-ahead forecasts. This is confirmed since thirteen of the nineteen coefficients of determination are not statistically different from zero. Eight intercepts differ significantly from and only four slope coefficients differ significantly from zero (these for Australia, Belgium, Italy and Sweden). Four slope coefficient are even negative, however, none significantly.
For nine countries the hypothesis of efficiency, slope equal to one, is discarded (Australia, Austria, Denmark, Finland, Germany, Ireland, Japan, the Netherlands and Spain). The sufficiency condition for unbiasedness, test results reported in column F(2), is rejected for eight countries (Australia, Austria, Belgium, Denmark,

Finland, Germany, Ireland and Japan). The necessary condition for unbiasedness, results reported in column t(μ), is accepted for all countries except for Belgium. The Q(2) statistic rejects weak efficiency for only two countries, i.e., Denmark and Greece. However, autoregressive coefficients are significant in all forecast error regressions except those for Japan, Australia, Finland, Norway, Portugal and Spain. All this sustains previous conclusions that the quality deteriorates as the forecast horizon increases. The two-year-ahead forecasts have a low quality but are mostly unbiased.

Summarizing, we conclude that the one and two-year-ahead forecasts for the cyclically-adjusted primary government balance do not seem to be very helpful for understanding the development of public finances in the countries under study. Knowing that frequently forecasts are unbiased and efficient is not of great help if their quality is rather poor. However, note that changes in the cyclically-adjusted primary government balance also reflect policy adjustments. The weak forecasts could thus also mean that policy changes cannot be forecasted.

TABLE 7. ESTIMATION RESULTS FOR EXPRESSION $A_t = A + B\ F^{t-2}_t + u_t$, 1993-2005 (a)

	constant	F^{t-2}_t	R^2	DW	F(1)	F(2)	t(μ)	Q(2)
Australia	0.88 (5.52)	0.59 (6.01)	0.67	2.00	10.34*	6.92*	1.40	0.39
Austria	1.28 (1.77)	0.02 (0.05)	0.09	0.70	9.21*	4.61*	-0.08	1.09
Belgium	2.16 (1.81)	0.70 (3.21)	0.53	1.25	2.36	4.26*	2.35*	1.11
Canada	1.66 (1.07)	0.67 (1.91)	0.42	0.58	1.89	1.27	0.78	0.40
Denmark	3.09 (4.29)	0.16 (0.66)	0.05	1.08	16.17*	9.22*	1.00	8.56*
Finland	3.62 (2.52)	-0.18 (-0.61)	0.03	0.46	16.88*	8.44*	-0.04	2.29
France	0.05 (0.08)	0.48 (0.91)	0.10	1.12	1.49	2.41	-1.79	4.35
Germany	1.43 (1.55)	-0.31 (-0.57)	0.05	0.74	10.88*	7.41*	-1.47	2.75
Greece	0.69 (0.24)	0.69 (1.16)	0.21	0.27	0.56	0.64	0.35	11.9*
Ireland	1.80 (2.19)	-0.15 (-0.58)	0.05	0.91	33.36*	17.01*	-0.39	5.21
Italy	0.91 (0.69)	0.72 (2.37)	0.51	0.75	1.66	0.89	-0.33	3.21
Japan	-2.93 (-3.16)	0.23 (0.94)	0.13	0.69	17.24*	10.36*	-1.22	3.51
Netherlands	3.25 (2.81)	-0.30 (-0.62)	0.03	1.43	6.69*	3.69	0.69	4.13
Norway	-2.26 (-0.79)	0.67 (1.28)	0.19	0.75	0.61	0.53	-0.69	2.27
Portugal	0.47 (0.93)	0.37 (1.42)	0.14	1.96	0.47	0.69	-2.08	1.92
Spain	2.29 (2.63)	0.09 (0.24)	0.00	0.96	4.88*	0.10	1.00	0.52
Sweden	1.74 (2.15)	0.68 (2.79)	0.52	1.26	2.56	3.73	2.08	2.61
United Kingdom	-0.13 (-0.19)	0.75 (1.92)	0.40	0.72	0.82	0.66	-071	0.37
United States	0.34 (0.37)	0.38 (0.83)	0.12	0.60	4.21	2.11	0.07	5.30

Note (a): The two-year-ahead forecasts are those for year t published in the December issue of Economic Outlook of year t-2. The outcomes or actuals are from the issue of Economic Outlook published in June (t+1). The t-values of the coefficients are in brackets; R^2 is the coefficient of determination; DW the Durbin-Watson autocorrelation coefficient; F(1) tests $\beta = 1$ and F(2) $\alpha = 0$ and $\beta = 1$. t(μ) is the t-value of the intercept in regression [2] and Q(2) is the Box-Pierce autocorrelation statistic of the forecast errors with two lags. An '*' indicates that the null hypothesis is rejected at the 5 percent significance level.
All data as a percentage of potential GDP.

4. ARE THERE SIMPLE ALTERNATIVE FORECASTS ?

The previous analysis of the forecasts by the OECD for the current, the one-year-ahead and the two-year-ahead cyclically-adjusted primary government balances illustrates the poor quality of these forecasts. Current year forecasts are acceptable but, as expected, forecasts for the cyclically-adjusted primary government balance deteriorate sharply as the forecast horizon lengthens.

Practically, users are interested in future values for the cyclically-adjusted primary government balances. Deriving the conclusion that one better neglect these forecasts is most of the time not an option. We therefore evaluate the forecasting performance of some easily available alternative forecasts. The alternative forecasts can be labelled naive since they simply use the last outcome and forecasts for previous periods but all data are published simultaneously. More precisely, the alternative for the current year forecasts for the cyclically-adjusted primary government balances (F^t_t) is the last outcome (A_{t-1}); for the one-year-ahead forecast we consider the forecast by the OECD (F^{t-1}_t), the last outcome when the forecasts were published (A_{t-2}) and the current year forecast published at the same time as the last outcome (F^{t-1}_{t-1}); for the two-year-ahead we consider the forecast by the OECD (F^{t-2}_t), the last outcome (A_{t-3}), the current year forecast (F^{t-2}_{t-2}) and the one-year-ahead (F^{t-2}_{t-1}) all published together. The forecast evaluation measure is the root mean square error. The results are reported in table 8.

TABLE 8. ROOT MEAN SQUARE ERROR FOR OECD CYCLICALLY-ADJUSTED PRIMARY GOVERNMENT BALANCE FORECASTS AND NAIVE ALTERNATIVES (a)

	Current year		One-year-ahead			Two-year-ahead			
	F^t_t	A_{t-1}	F^{t-1}_t	A_{t-2}	F^{t-1}_{t-1}	F^{t-2}_t	A_{t-3}	F^{t-2}_{t-2}	F^{t-2}_{t-1}
Australia	0.60	1.04	0.92	1.24	1.10	0.77	1.47	1.34	1.12
Austria	0.62	1.07	0.96	1.55	1.24	1.60	1.69	1.71	1.56
Belgium	0.33	0.76	0.69	1.34	0.80	0.92	1.53	1.07	0.88
Canada	0.59	1.07	1.05	1.92	1.34	1.61	2.74	2.23	1.85
Denmark	0.81	1.38	1.24	1.50	1.29	1.42	1.46	1.25	1.23
Finland	1.85	1.99	2.90	2.64	2.23	3.86	3.74	3.09	3.66
France	0.29	0.75	0.93	0.66	0.79	1.11	1.36	1.03	0.91
Germany	0.47	0.97	1.49	0.82	1.11	1.33	1.50	1.38	1.31
Greece	1.01	1.64	2.02	2.86	2.34	2.77	3.65	3.31	2.83
Ireland	1.30	1.60	2.36	2.10	2.24	3.13	2.33	2.67	2.83
Italy	0.54	1.21	1.14	1.65	1.50	1.43	2.14	1.86	1.55
Japan	0.94	1.89	2.43	1.18	1.85	1.71	2.09	2.19	2.38
Netherlands	0.78	0.99	1.18	1.61	1.33	1.17	1.62	1.41	1.26
Norway	2.85	3.10	3.84	4.48	4.07	4.22	5.26	4.77	4.46
Portugal	0.58	1.69	1.16	2.04	1.24	1.26	1.77	1.32	1.16
Spain	0.47	0.82	0.72	1.28	0.97	0.97	1.52	1.21	0.89
Sweden	1.08	2.58	2.06	3.91	2.65	2.56	5.36	3.99	3.22
United Kingdom	0.46	1.26	1.05	2.72	1.35	1.57	3.10	2.31	1.80
United States	0.18	1.09	1.34	2.18	1.48	2.41	3.02	2.55	2.41

Note (a): All data from OECD; all forecasts are from the December issues of Economic Outlook. The current year forecasts for the cyclically-adjusted primary government balance (F^{t-j}_{t-i}, i,j = 0,1,2) are those published in the December issue of Economic Outlook of year (t-j) for year (t-i); the outcomes or actuals (A_{t-k}, k = 1,2,3) are from the issues of Economic Outlook published in December (t-k+1).
All data as a percentage of potential GDP.

The current year forecasts (F^{t}_{t}), produced in the fall, is most of the time acceptable and much better than the extrapolation of the last outcome (A_{t-1}). The overall quality of the one-year-ahead forecasts (F^{t-1}_{t}) for the cyclically-adjusted primary government balances is much worse compared to the current year forecast. However, only for 5 countries do alternative forecasts imply a lower root mean square error. In 4 of these cases the last available outcome at the publication time of the forecasts, (A_{t-2}), produces better forecasts (France, Germany, Ireland and Japan). Only for Finland is the lagged current year forecast (F^{t-1}_{t-1}) a better forecast than the one-year-ahead one.

For the two year horizon the forecasts by the OECD (F^{t-2}_{t}) do imply the smallest root mean square error for 10 countries: Australia, Canada, Greece, Italy, Japan, the Netherlands, Norway, Sweden, the United Kingdom and the United States. For 8 countries the extrapolation of the one-year-ahead forecasts (F^{t-2}_{t-1}) leads to a lower statistics. It concerns the countries Austria, Belgium, Denmark, France, Germany, Portugal and Spain. Do note, however, that the differences with the statistics for the two-year-ahead forecasts are small. Two other alternative forecasts produce better results for two countries: the last outcome (A_{t-3}) for Ireland and the current year forecast (F^{t-2}_{t-2}) for Finland.

CONCLUSION

The overall conclusion of our research on the quality of the OECD forecasts for the cyclically-adjusted primary government balances is that the current year forecasts are acceptable, whereas ; the one- and two-year-ahead forecasts score rather poorly. The quality deteriorates rapidly when the forecasting horizon increases. However, the forecasts seem in general to be unbiased and efficient, implying that forecast errors cannot be predicted. As the forecasts are thus mostly rational, their weak performance cannot be improved by filtering out systematic patterns in the errors. Simple alternative forecasts do not dominate the forecasts in a systematic way. So, by lack of superior alternative forecasts, we are more or less forced to stick to the forecasts produced by the OECD. Note that the weak forecast performance of the one- and the two-year-ahead forecasts is concentrated on a few countries, i.e., Finland, Greece, Ireland, Norway and Sweden. Combined with the fact that for these countries the one-year-ahead forecast is frequently a valid alternative for the two-year-ahead forecasts, this indicates that the time profile of some of the forecasts can be improved.

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