

**Ex Ante vs Ex Post Government Budget Deficits,  
The EU-15 Experience at the Turn of the Century**

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# **EX ANTE vs EX POST GOVERNMENT BUDGET DEFICITS, THE EU-15 EXPERIENCE AT THE TURN OF THE CENTURY**

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## **Abstract**

In this paper, we have searched for regularities in the projection processes of the government budget balance of the EU-15 member states, during the 1999-2003 period. According to the projections of their government's budget balance and the criteria employed in the text, these countries have been classified into countries with pessimistic, optimistic, accurate and inaccurate forecasts. We have experimented with two versions of a general model consisting of two parts: one technical, relying on the potential impact of past forecast and forecast errors on the formation of the budget deficit for the current target year; the other behavioral, intended to capture the impact of ideological differences of the political parties in power on the budget deficit for the current target year. The empirical analysis suggests the following: Firstly, in pre-election periods, governments in countries with optimistic forecasts have underestimated their current budget deficit forecast. Secondly, socialist rather than conservative administrations have produced downward predictions of the current period budget deficit in the country groups with optimistic and inaccurate forecasts. Thirdly, past values of the budget deficit forecasts have positively affected the current period magnitude. Finally, past forecast errors have affected the budget deficit forecasts for the current target year mainly in the country groups with optimistic and inaccurate forecasts.

*JEL classifications: E60, H62*

*Keywords: Budget deficit, forecast values, forecast errors, accurate forecasts, inaccurate forecasts, optimistic forecasts, pessimistic forecasts, socialist government, conservative government, election period.*

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# **EX ANTE vs EX POST GOVERNMENT BUDGET DEFICITS, THE EU-15 EXPERIENCE AT THE TURN OF THE CENTURY**

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## **1. Introduction**

The Stability and Growth Pact (SGP) of the European Union (EU) is concerned with the enforcement of fiscal discipline in the Economic and Monetary Union (EMU), on a permanent basis, in order to ensure consistency between national budget policies and the price stability objective of the European Central Bank. To achieve this objective, the SGP imposes sanctions on EMU member states running a deficit in excess of the reference value of three percent of GDP, established by the Maastricht Treaty. In the case of persisting excessive deficits the sanctions can take the form of fines of appropriate order (European Commission (1999), Beetsma and Jensen (2003) and the literature cited therein).<sup>1</sup> However, the imposition of numerical rules that are not contingent on the business cycle may force governments to tighten fiscal policy during recessions, thus aggravating macroeconomic fluctuations; or may encourage them to employ creative accounting in order to facilitate meeting the Maastricht criteria, thus reducing the degree of transparency in the government budget (Milesi-Ferretti (2003)). In this regard, Brueck and Stephan (2005) argue that eurozone governments relative to non-eurozone governments have manipulated their budget deficit forecasts since the adoption of the SGP before elections, thus creating political forecast cycles. Similar in spirit is the work of Mink and De Haan (2005); by using data for the 1999-2004 period, they find strong evidence in support of the view that the SGP did not restrict policy makers in pursuing expansionary fiscal policies in the eurozone in election years. Strauch et al (2004) and Von Hagen (2004) claim that differences in the performance of budgetary and growth forecasts are caused by bias in budgetary projections across the EU member states. They find that national differences in the forecast bias range from too optimistic to overly cautious depending, respectively, on policy makers exercising discretion or abiding by rules. The optimistic bias was more apparent during the convergence process toward the EMU. In the US case, Miller (1991) ascertains that the Congressional Budget Office (CBO) forecasts of nominal government expenditure, revenue and deficits are too optimistic, while Penner (2002) emphasizes that the CBO projections have been inaccurate due to errors in the choice of the assumptions made.

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<sup>1</sup> There has been a debate on the efficacy of the SGP in recent years. See, for instance, Buiters (2003), De Grauwe (2003) and Calmfors (2005). Upon questioning the efficacy of the SGP, Calmfors proposes alternative ways of promoting fiscal discipline in the EU.

According to the SGP, member states should prepare, on an annual basis, stability programs if they belong to the eurozone or convergence programs otherwise. The information to be provided via these programs must present, among other things, a medium-term objective for the budgetary position of close to balance or in surplus. The information must cover the current year, the preceding year and the following three years.<sup>2</sup>

In the context of the SGP, this paper investigates potential discrepancies between the budget balance projection processes pursued by the national governments of the EU-15 member states. In particular, it focuses on the investigation of the built in properties in the budget balance projection process of the countries involved, and the political behavior of the incumbent governments as well as their role in the pre-election period in influencing the budget deficit forecast for the “current” target year. Several questions can be addressed here. That is, do governments stimulate aggregate demand before elections by running higher budget deficits? Do differences in the policies of socialist and conservative (liberal) administrations influence budget deficit forecasts? Do past forecast errors affect future forecasts and to what degree? Do countries with large past forecast errors revise their future projections on the basis of these errors or do they take into account (all) other relevant information? Do countries with actual budget deficits traditionally higher than their respective ex ante projections behave differently relative to countries exhibiting the opposite behavior?

The rest of the paper is organized as follows: A theoretical model is introduced in section 2 and the data used are presented in section 3. The empirical results are discussed in section 4. The last section concludes.

## 2. Methodology

According to the requirements of the SGP, the budget statements of the national governments for a target year  $t$  should present, among others things, (a) the *expected* values of revenues, expenditures and their difference for years  $t$ ,  $t+1$ ,  $t+2$  and  $t+3$  on the basis of the information available at the end of year  $t-1$ , i.e.  $E(Y_{t+j}/I_{t-1}), j= 0, 1, 2$  and  $3$ ; and (b) the *realized* values of the respective variables for year  $t-1$ ,  $Y_{t-1}$ . In the present paper, the budget balance position (government revenue minus government expenditure) of the general government (government hereafter) and the forecast error of the budget balance, are denoted by

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<sup>2</sup> Details are given in European Commission, Directorate-General for Economic and Financial Affairs, *European Economy* (2004), No 3, *Public Finances in the EMU, 2004*; and its web site [www.europa.eu.int/comm/economy\\_finance/index\\_en.htm](http://www.europa.eu.int/comm/economy_finance/index_en.htm).

$Y_t$  and  $e_t = Y_t - E(Y_t / I_{t-1})$ , respectively. A glimpse of the expected and realized values of the above variable for year  $t$ , stemming from successive annual budget reports of the member states of EU-15,<sup>3</sup> reveals that, in all cases, the discrepancy between  $Y_t$  and  $E(Y_t / I_{t-1})$  is different from zero, i.e. the forecasts are not unbiased.

### *The model*

In explaining the government's budget deficit for any year  $t$ , we consider, on the one hand, the behavior of the government, whether socialist or conservative, during its tenure of office as well as its role in the pre-election period, and, on the other, the past values of the deficit and the forecast errors involved. The general form of the model at issue is

$$\mathbf{Y} = \mathbf{B}\mathbf{Y}_{-1} + \mathbf{C}\mathbf{E}_{-1} + \mathbf{D}\mathbf{Z} + \mathbf{G}\mathbf{Dc} + \mathbf{H}\mathbf{Ds} + \mathbf{U} \quad (1)$$

Variables  $\mathbf{Y}$  and  $\mathbf{Y}_{-1}$  in (1) are  $4 \cdot 3 \times 1$  column vectors, notably  $\mathbf{Y} = [\mathbf{y}_t^t, \mathbf{y}_{t+1}^{t+1}, \mathbf{y}_{t+2}^{t+2}, \mathbf{y}_{t+3}^{t+3}]$  and  $\mathbf{Y}_{-1} = [\mathbf{y}_{t-1}^t, \mathbf{y}_t^{t+1}, \mathbf{y}_{t+1}^{t+2}, \mathbf{y}_{t+2}^{t+3}]$ , where  $\mathbf{y}_t^t$  is a  $3 \times 1$  column vector  $[F_t^t, F_t^{t+1}, F_t^{t+2}]$  and  $F_t^{t+i}$  denotes the forecast value of the government's budget deficit for year  $t+i$  on the basis of the information available at the month of the preceding year, the SGP update of the budgetary position of the member state is released, i.e.  $F_t^{t+i} = E(Y_{t+i} / I_t)$ ,  $i = 0, 1, 2$ . Vectors  $\mathbf{y}_{t+1}^{t+1}$ ,  $\mathbf{y}_{t+2}^{t+2}$  and  $\mathbf{y}_{t+3}^{t+3}$  should be interpreted accordingly, by appropriately changing the values of the subscripts and superscripts of the elements involved. Moreover, vector  $\mathbf{y}_{t-1}^t = [F_{t-1}^t, F_{t-1}^{t+1}, F_{t-1}^{t+2}]$ . Variable  $\mathbf{E}_{-1} = [\mathbf{e}_{t-1}^t, \mathbf{e}_t, \mathbf{e}_{t+1}, \mathbf{e}_{t+2}]$  is a  $4 \cdot 3 \times 1$  column vector of the forecast errors of the government's budget deficit. For year  $t$ , the forecast error is written as the difference between the actual,  $Y_t$ , and the forecast,  $F_t^t$ , values involved, i.e.  $\varepsilon_t = Y_t - F_t^t$ , while  $\mathbf{e}_t$  is defined as the product of  $\varepsilon_t$  times the  $3 \times 1$  unit vector. The political (dummy) variable  $\mathbf{Z} = [z_t, z_{t+1}, z_{t+2}, z_{t+3}]$  is a  $4 \cdot 3 \times 1$  column vector intended to depict the impact of pre-election periods on the government's forecasts. The element  $z_t$  of vector  $\mathbf{z}_t$  is the election year dummy associated with the incumbent government. Its construction procedure is described in section 3. Vector  $\mathbf{z}_t$  is defined as the product of  $z_t$  times the  $3 \times 1$  unit vector. Variables  $\mathbf{Dc} = [\mathbf{Dc}_t, \mathbf{Dc}_{t+1}, \mathbf{Dc}_{t+2}, \mathbf{Dc}_{t+3}]$  and  $\mathbf{Ds} = [\mathbf{Ds}_t, \mathbf{Ds}_{t+1}, \mathbf{Ds}_{t+2}, \mathbf{Ds}_{t+3}]$  are  $4 \cdot 3 \times 1$  column vectors of political dummies indicating the political ideology of the government in majoritarian (two-party) political systems, where symbols  $c$  and  $s$  stand for conservative and socialist governments, respectively. Under the last two terms, we classify

<sup>3</sup> Datasource: AMECO databases (2003, 2005).

administrations with ideologies considered as being in the right and the left of the center, respectively. In general, socialist or left wing parties give greater weight to unemployment than inflation vis-à-vis conservative or right wing parties (Hibbs, 1977; Haynes and Stone, 1990; Gaertner; 1994, Andrikopoulos et al. 2004). In this sense, they are expected to generate greater budget deficits during their tenure in office than conservatives. On the other hand, coalition governments, in proportional political systems, have a tendency to create larger budget deficits and build up government debt (Alesina et al., 1997).

Symbols  $Dc_t$  and  $Ds_t$  take the value 1 if the government is conservative and socialist, respectively, and zero otherwise. The case of coalition governments is left as a reference. Variables  $Dc_t$  and  $Ds_t$  are obtained by multiplying the scalars  $Dc_t$  and  $Ds_t$  times the 3x1 unit vector. Finally,  $U$  is a 4·3x1 column vector of the regression's residuals, i.e.,  $U = [\mathbf{u}_t, \mathbf{u}_{t+1}, \mathbf{u}_{t+2}, \mathbf{u}_{t+3}]$ ; and  $B, C, D, G$  and  $H$  are matrices of appropriate order.

Model (1) gives rise to two alternative specifications of the forecasting procedure of the budget deficit of the general government. These procedures are distinguished by the form of matrices  $B$  and  $C$ . In the first case, both matrices are diagonal, i.e.

$$\mathbf{B} = \begin{bmatrix} b_{11} & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 \\ 0 & 0 & b_{33} & 0 \\ 0 & 0 & 0 & b_{44} \end{bmatrix}, \quad \mathbf{C} = \begin{bmatrix} c_{11} & 0 & 0 & 0 \\ 0 & c_{22} & 0 & 0 \\ 0 & 0 & c_{33} & 0 \\ 0 & 0 & 0 & c_{44} \end{bmatrix} \quad (2)$$

This implies that the forecasts for the budget deficit made in year  $t$  for year  $t+i$  are revised in accordance with the preceding year's forecasts for the same target year,  $t+i$ , and the previous year's forecast error. The coefficients  $b_{ii}$  and  $c_{ii}$  denote the impact of the preceding years' forecasts and forecast errors, respectively, on the forecast value of the budget deficit for the current target year and the following two years. To illustrate how this version of the model works, we rewrite the non behavioral part of expression (1) as

$$\begin{aligned} \mathbf{y}_t^t &= b_{11}\mathbf{y}_{t-1}^t + c_{11}\mathbf{e}_{t-1} + \mathbf{u}_t \\ \mathbf{y}_{t+1}^{t+1} &= b_{22}\mathbf{y}_t^{t+1} + c_{22}\mathbf{e}_t + \mathbf{u}_{t+1} \\ \mathbf{y}_{t+2}^{t+2} &= b_{33}\mathbf{y}_{t+1}^{t+2} + c_{33}\mathbf{e}_{t+1} + \mathbf{u}_{t+2} \\ \mathbf{y}_{t+3}^{t+3} &= b_{44}\mathbf{y}_{t+2}^{t+3} + c_{44}\mathbf{e}_{t+2} + \mathbf{u}_{t+3} \end{aligned} \quad (3)$$

and, analytically write the first equation of (3) as

$$\begin{bmatrix} F_t^t = b_{11}F_{t-1}^t + c_{11}(Y_{t-1} - F_{t-1}^{t-1}) + u_t \\ F_t^{t+1} = b_{11}F_{t-1}^{t+1} + c_{11}(Y_{t-1} - F_{t-1}^{t-1}) + u_t \\ F_t^{t+2} = b_{11}F_{t-1}^{t+2} + c_{11}(Y_{t-1} - F_{t-1}^{t-1}) + u_t \end{bmatrix} \quad (4)$$

In the second case, matrices  $\mathbf{B}$  and  $\mathbf{C}$  are triangular, i.e.

$$\mathbf{B} = \begin{bmatrix} b_{11} & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 \\ b_{31} & b_{32} & b_{33} & 0 \\ b_{41} & b_{42} & b_{43} & b_{44} \end{bmatrix}, \quad \mathbf{C} = \begin{bmatrix} c_{11} & 0 & 0 & 0 \\ c_{21} & c_{22} & 0 & 0 \\ c_{31} & c_{32} & c_{33} & 0 \\ c_{41} & c_{42} & c_{43} & c_{44} \end{bmatrix} \quad (5)$$

The elements of  $\mathbf{B}$  and  $\mathbf{C}$  measure the contribution of the forecasts and forecast errors, respectively, up to the preceding four periods, on this period's forecast of the budget deficit. To illustrate how this version of the model works, we rewrite expression (1) as:

$$\begin{aligned} \mathbf{y}_t^t &= b_{11}\mathbf{y}_{t-1}^t + c_{11}\mathbf{e}_{t-1} + \mathbf{u}_t \\ \mathbf{y}_{t+1}^{t+1} &= b_{21}\mathbf{y}_{t-1}^t + b_{22}\mathbf{y}_t^{t+1} + c_{21}\mathbf{e}_{t-1} + c_{22}\mathbf{e}_t + \mathbf{u}_{t+1} \\ \mathbf{y}_{t+2}^{t+2} &= b_{31}\mathbf{y}_{t-1}^t + b_{32}\mathbf{y}_t^{t+1} + b_{33}\mathbf{y}_{t+1}^{t+2} + c_{31}\mathbf{e}_{t-1} + c_{32}\mathbf{e}_t + c_{33}\mathbf{e}_{t+1} + \mathbf{u}_{t+2} \\ \mathbf{y}_{t+3}^{t+3} &= b_{41}\mathbf{y}_{t-1}^t + b_{42}\mathbf{y}_t^{t+1} + b_{43}\mathbf{y}_{t+1}^{t+2} + b_{44}\mathbf{y}_{t+2}^{t+3} + c_{41}\mathbf{e}_{t-1} + c_{42}\mathbf{e}_t + c_{43}\mathbf{e}_{t+1} + c_{44}\mathbf{e}_{t+2} + \mathbf{u}_{t+3} \end{aligned} \quad (6)$$

and analytically write the second equation of (6) as

$$\begin{bmatrix} F_{t+1}^{t+1} = b_{21}F_{t-1}^t + b_{22}F_t^{t+1} + c_{21}(Y_{t-1} - F_{t-1}^{t-1}) + c_{22}(Y_t - F_t^t) + u_{t+1} \\ F_{t+1}^{t+2} = b_{21}F_{t-1}^{t+1} + b_{22}F_t^{t+2} + c_{21}(Y_{t-1} - F_{t-1}^{t-1}) + c_{22}(Y_t - F_t^t) + u_{t+1} \\ F_{t+1}^{t+3} = b_{21}F_{t-1}^{t+2} + b_{22}F_t^{t+3} + c_{21}(Y_{t-1} - F_{t-1}^{t-1}) + c_{22}(Y_t - F_t^t) + u_{t+1} \end{bmatrix} \quad (7)$$

In the empirical analysis the estimates associated with the diagonal [eq. (2)] and triangular [eq. (3)] matrices will be identified as versions 1 and 2, respectively, of the model.

The behavioral part of the model is the same in both versions. Matrices  $\mathbf{D}$ ,  $\mathbf{G}$  and  $\mathbf{H}$  are diagonal. The element  $d_{ii}$  of matrix  $\mathbf{D}$  intends to capture the impact of government behavior in pre-election periods on the budget deficit forecasts made in the same periods. The respective elements of matrices  $\mathbf{G}$  and  $\mathbf{H}$  intend to capture the potential effects stemming from the political orientation of conservatives and socialists, respectively, on the dependent variable.

### *Types of forecasts of budget balances*

In general, the forecasts under discussion can be distinguished in four categories, namely optimistic, pessimistic, accurate and inaccurate. A forecast is viewed as pessimistic or optimistic, when the actual deficit of country  $i$  in year  $t$  is greater or smaller than the corresponding forecast value for the current target year. A forecast is considered as accurate or inaccurate if the forecast error falls short off or exceeds the corresponding EU-15 average value, respectively. In view of

the type of the forecasts made, the EU-15 member states can be classified in four groups according to the two-way potential classification scheme of Table 1. According to this scheme, the countries at issue can be classified in four groups. These consist of countries with (a) optimistic and inaccurate forecasts, (b) optimistic and accurate, (c) pessimistic and inaccurate, and (d) pessimistic and accurate.

**Table 1: Potential classification of countries in terms of the type of forecasting  
The government's budget balance**

Classification of countries according to alternative criteria	<b>Group 1:</b> Countries with optimistic forecasts ( <i>Criterion:</i> negative mean forecast error)	<b>Group 2:</b> Countries with pessimistic forecasts ( <i>Criterion:</i> positive mean forecast error)
<b>Group 3:</b> Countries with inaccurate forecasts ( <i>Criterion:</i> Countries with mean <i>absolute</i> forecast error greater than the respective EU-15 average)	<i>Subgroup 1.3:</i> Forecasts optimistic and inaccurate	<i>Subgroup 2.3:</i> Forecasts pessimistic and inaccurate
<b>Group 4:</b> Countries with accurate forecasts ( <i>Criterion:</i> Countries with mean <i>absolute</i> forecast error less than the respective EU-15 average)	<i>Subgroup 1.4:</i> Forecasts optimistic and accurate	<i>Subgroup 2.4:</i> Forecasts pessimistic and accurate

### 3. The Data

To evaluate the above propositions we have focused on the EU-15 member states by using the forecasts of their budget balance as a percent of their GDP, which are reported in their 1999-to-2003 *Stability and Convergence Programs*.<sup>4</sup> Each of the EU-15 countries submits every year an update of its Stability or Convergence Program to the European Commission in accordance with the European Council Regulation 1466/97 (Article 4). In this update reported are, among other variables, the general government's budget balance forecasts for the current and the following three years, as well as the actual value of the variable involved lagged one period. For instance, in the November 2000 update, the projections of the government's budget balance are reported for the *current* target year 2000 and the next three years 2001, 2002 and 2003. All variables employed are in nominal terms.

<sup>4</sup> All budget deficit related data are available in the web site of the European Commission: [www.europa.eu.int/comm/economy\\_finance/index\\_en.htm](http://www.europa.eu.int/comm/economy_finance/index_en.htm).



In the empirical analysis, we employ the 1999 to 2003 data from the Stability Programs updates of all EU-15 countries. In this context, at the end of every year, a government updates its forecasts for the current and the following two target years on the basis of past forecasts for the same target years and the respective forecast errors. The actual budget balances of the EU-15 member countries as percentages to GDP for the time period 1995-2003 are presented in Table 2. The respective figures suggest that the great majority of the governments, irrespective of the ideology of the party in power, tend to produce smaller budget deficits and/or balanced budgets, especially since 1998, the year of enactment of SGP.

**Table 2: Actual budget balances as % of GDP, 1995-2003**

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003
AUT	-5.3	-4.0	-2.0	-2.5	-2.3	-1.5	0.3	-0.6	-1.2
BEL	-4.3	-3.8	-2.0	-0.8	-0.5	0.1	0.4	0.1	0.1
DEN	-2.3	-1.0	0.4	1.1	3.3	2.6	3.1	2.0	1.2
FIN	-3.9	-3.0	-1.3	1.5	2.0	6.9	5.2	4.7	2.5
FRA	-5.5	-4.1	-3.0	-2.7	-1.8	-1.4	-1.5	-3.2	-4.1
GER	-3.5	-3.4	-2.7	-2.2	-1.5	1.1	-2.8	-3.6	-4.1
GRE	-10.2	-7.4	-6.6	-4.3	-3.4	-4.1	-6.1	-4.9	-5.7
			[-4.0]	[-2.5]	[-1.8]	[-1.9]	[-1.4]	[-1.2]	[-1.1]
IRE	-2.1	-0.1	1.4	2.3	2.0	4.5	1.2	0.0	0.2
ITA	-7.6	-7.1	-2.7	-3.1	-1.7	-0.7	-2.6	-2.3	-3.2
LUX	2.1	2.0	3.2	3.1	3.5	6.1	6.4	2.5	0.2
NEL	-4.2	-1.8	-1.1	-0.8	0.7	2.2	0.1	-1.1	-3.2
POR	-5.5	-4.8	-3.6	-3.2	-2.9	-2.8	-4.2	-2.8	-2.9
SPA	-6.6	-5.0	-3.2	-3.0	-1.2	-0.8	-0.1	-0.1	0.0
SWE	-7.4	-2.9	-1.7	2.3	1.5	3.5	4.5	1.3	0.2
UK	-5.8	-4.4	-2.2	0.2	1.1	4.0	0.8	-1.3	-3.3

*Source:* AMECO databases 2003 (for the years 1995-2002) and 2005 (for 2003). For Greece the post-1997 data embody the 2004 accounting revisions and come from the AMECO database 2005. Figures in brackets (AMECO database 2003) depict the creative accounting practices of the pre-2004 government.

*Notes:* The data are in accordance with the European System of Accounts 1995 (ESA 95). Minus and plus signs denote budget deficits and surpluses, respectively.

Pre-election periods and the types of government formed are given in Table 3. An overview of the information in this table reveals that, during the sample period: (a) Four countries, namely Austria, Belgium, Finland and the Netherlands, have proportional-type political systems, which have given rise to coalition governments. (2) The remaining countries have a majoritarian system that interchanges two parties in power. In particular, (3) Denmark, Germany, Greece, Portugal, Sweden and the UK have socialist governments; (4) Ireland, Luxembourg and Spain have conservative governments; and (5) France and Italy switch from

socialist to conservative administrations.<sup>5</sup> The political dummy variables employed in the empirical analysis are presented in the appendix (Table A.1). To construct the pre-election period dummy variable, we divided particular calendar years according to the proportion of total months in a year that each party spent in power.<sup>6</sup> The calculations were based on the definition of the election year as the 12-month period ending at the end of the month of the election. According to this procedure, if an election takes place in March, then  $z_t$  takes the value 0.25.

**Table 3: Pre-election periods and political parties in power**

	1999	2000	2001	2002	2003
AUT	0.83:COL	...	...	0.92:COL	...
BEL	0.50:COL	...	...	...	0.42:COL
DEN	0.92:SOC	...	0.92:SOC	...	...
FIN	0.25:COL	...	...	...	0.25:COL
FRA	...	0.25:SOC	...	0.50:CON	...
GER	...	...	...	0.75:SOC	...
GRE	...	0.33:SOC	...	...	...
IRE	...	...	...	0.42:CON	...
ITA	...	...	...	0.42:CON	...
LUX	0.67:CON	...	...	...	...
NET	...	...	...	0.42:COL	...
POR	0.83:SOC	...	...	0.25:SOC	...
SPA	0.08:CON	0.33:CON	...	0.58:CON	0.33:CON
SWE	...	...	...	0.75:SOC	...
UK	...	...	0.42:SOC	...	...

*Source: Chronicle of Parliamentary Elections, annual issues. (Publications of the Inter-Parliamentary Union. Geneva, Switzerland).*

*Notes:* (a) Numbers in cells, preceding the types of government, indicate percentage of year before the national elections. (b) Abbreviations of types of government: (1) COL= Coalition; (2) CON=Conservative; (3) SOC=Socialist.

<sup>5</sup> Under the terms *conservative* and *socialist*, we classify administrations with ideologies considered as being in the right and the left of the center, respectively. During the period of the sample, and under the term *conservative* included are the following parties: Liberal Democracy [since 7/3/2002] (France), Forza Italia [since 11/6/2001] (Italy), the Fianna Fail coalition (Ireland), Christian Social People's Party (Luxembourg) and Partido Popular (Spain). Under the term *socialist* included are the following: Social Democracy (Denmark), Socialist Party [until 7/3/2002] (France), Social Democratic Party (Germany), Democrats of the Left [1999-19/4/2000] and coalition [26/4/2001-11/6/2001] (Italy), Panhellenic Socialist Movement (Greece), Socialist Party (Portugal), Social Democratic Labor Party (Sweden) and Labour Party (UK). It should be noted that names of parties not accompanied by dates in brackets governed the countries involved during the entire sample period. In that period, the countries with proportional political systems were governed by the following coalitions in different time intervals: Social Democratic Party, Austrian People's Party (Austria); Christian People's Party, Flemish Liberals and Democrats (Belgium); Social Democratic Party, Finish Center (Finland); and Labour Party, Christian Democratic Appeal (Netherlands). Additional details are given in: *Chronicle of Parliamentary Elections, annual issues. (Publications of the Inter-Parliamentary Union. Geneva, Switzerland).*

## 4. Empirical analysis

### 4.1. Classification of the EU-15 countries

As has already been mentioned, the first step in this analysis is to classify the EU-15 countries in four groups according to the two-way classification scheme of Table 1. Thus, to classify a country into groups 3 and 4 we proceed as follows: (a) We compute the forecast error of the current period ( $Y_t - F_t^t$ ) as well as the forecast errors lagged one period ( $Y_t - F_{t-1}^t$ ), two periods ( $Y_t - F_{t-2}^t$ ) and three periods ( $Y_t - F_{t-3}^t$ ). (b) We calculate each period's mean absolute forecast errors (MAFE) for country  $i$ .<sup>7</sup> (c) We compute the weighted average of absolute forecast errors over all periods via the following expression:  $w_1(\text{current period MAFE}) + w_2(\text{first period MAFE}) + w_3(\text{second period MAFE}) + w_4(\text{third period MAFE})$ , where the weights are ratios of the number of observations available for each period's MAFE over the total number of observations, i.e.  $w_1 = 5/14$ ,  $w_2 = 4/14$ ,  $w_3 = 3/14$  and  $w_4 = 2/14$ . That is, for the current period MAFE we employ five observations, namely the forecasts of five subsequent years; for the first period MAFE we employ four observations, etc. These weights emphasize the higher importance of the most recent MAFEs in influencing the weighted average absolute forecast error. (d) We compute the overall weighted average of the MAFEs of all countries under consideration for each period, by using the calculated values in step b. If, the weighted average of the MAFEs of country  $i$  is lower (higher) than the respective average of all countries then that country is identified as the country with accurate (inaccurate) forecasts.

Next, to classify country  $i$  in groups 1 and 2, we compute each period's mean forecast error for that country. This may be positive (pessimistic forecast) or negative (optimistic forecast). Our estimates indicate that the three-period mean forecast errors for all countries are negative, which suggests that all countries have behaved optimistically upon formulating their longer term forecasts. Similarly, the two-period mean forecast errors are negative in eleven from

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<sup>6</sup> See Andrikopoulos et al.(2004) and the literature cited therein.

<sup>7</sup> That is, the current period mean absolute forecast error is calculated via the expression  $\frac{1}{5} (|Y_{99} - F_{99}^{99}| + |Y_{00} - F_{00}^{00}| + |Y_{01} - F_{01}^{01}| + |Y_{02} - F_{02}^{02}| + |Y_{03} - F_{03}^{03}|)$ , where subscripts 99, ...,03 refer to the years 1999, ..., 2003. In particular, the one-, two-, and three- period mean absolute forecast errors are calculated as

$$\frac{1}{4} (|Y_{00} - F_{99}^{00}| + |Y_{01} - F_{00}^{01}| + |Y_{02} - F_{01}^{02}| + |Y_{03} - F_{02}^{03}|), \quad (i)$$

$$\frac{1}{3} (|Y_{01} - F_{99}^{01}| + |Y_{02} - F_{00}^{02}| + |Y_{03} - F_{01}^{03}|), \quad (ii)$$

and

$$\frac{1}{2} (|Y_{02} - F_{99}^{02}| + |Y_{03} - F_{00}^{03}|), \quad (iii)$$

respectively.

among the fourteen member states analyzed here. The exceptions are Belgium, Finland and Luxemburg, which exhibited positive mean forecast errors. Finally, following a methodology similar to the above, we classify country  $i$  as one with optimistic (pessimistic) forecasts if its weighted average forecast error is lower (higher) than the overall average of the countries involved.

The final outcome of the above considerations is presented in Table 4. There, the fifteen EU countries are subdivided into four groups. That is, the group of countries with: (a) optimistic and inaccurate forecasts, notably, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and the United Kingdom; (b) optimistic and accurate forecasts, i.e. France and Spain; (c) pessimistic and inaccurate forecasts, namely Luxemburg; and (d) pessimistic and accurate forecasts, i.e. Austria, Belgium, Denmark, Finland and Sweden.

**Table 4: Classification of the EU-15 countries according to the projections of their government's budget balance**

<i>Classification of countries according to alternative criteria</i>	<i>Group 1: Countries with optimistic forecasts</i>	<i>Group 2: Countries with pessimistic forecasts</i>
<i>Group 3: Countries with inaccurate forecasts</i>	<i>Subgroup 1.3:</i> Germany, Greece, Ireland, Italy, Netherlands, Portugal, United Kingdom	<i>Subgroup 2.3:</i> Luxemburg
<i>Group 4: Countries with accurate forecasts</i>	<i>Subgroup 1.4:</i> France, Spain	<i>Subgroup 2.4:</i> Austria, Belgium, Denmark, Finland, Sweden

*Source:* Table 1.

At this point the following remarks are in order: (a) The budget deficits of almost all countries in subgroup 2.4 were decreasing since 1995, but were eventually transformed into surpluses since 1997 (Denmark), 1998 (Finland and Sweden) and 2000 (Belgium). In short, the countries in this subgroup have managed to control their actual budget deficits and formulated, in general, accurate and down-to-earth predictions of their future budget balances. (b) The budget balance position of Luxemburg, the only country in subgroup 2.3, although positive throughout the sample period, exhibited a remarkable variability. (c) The countries in subgroup 1.4, France and Spain are characterized as countries with accurate, albeit somewhat optimistic, forecasts. Spain managed to balance the budget in 2003. On the other hand, France deviated from its medium term path in reducing her deficit by violating the respective Maastricht reference value since 2002. (d) Finally, seven countries with optimistic and inaccurate forecasts comprise the largest subgroup, 1.3. More specifically, two countries, namely, the Netherlands and the UK, have experienced budget surpluses since 1999 and 1998, respectively, but switched to relatively

low deficits since 2002. Ireland has presented a declining trend of budget surpluses which eventually ended up to a balanced budget. Two countries, Italy and Portugal, have managed to decrease their deficits through time up to the end of the preceding century, and stabilized them around the Maastricht reference value of 3% thereafter. Germany's budget balance position exhibited a cyclical behavior through time, notably a pattern of decreasing deficits until the year 2000, where it achieved a surplus, and increasing deficits thereafter, which eventually exceeded the 3% reference value. Finally, Greece's performance has been out of order during the sample period due to the creative accounting practices followed by the socialist government until 2004 and the accounting revisions implemented in summer 2004 by the conservative administration elected in March 2004.

In brief, three countries (Italy, the Netherlands and the UK) marginally violated the Maastricht criterion of 3% in 2003; two countries (France and Germany) seriously violated it, whereas Greece exhibited an idiosyncratic behavior. The remaining nine countries managed to stabilize their budget deficits below the Maastricht reference value.

Finally, to get a glimpse of the performance of the current period forecast errors of the EU-15 member states, we present their evolution over the 1999-2003 sample period in the Appendix, Figure A.1. There, it can be seen that the forecast errors of countries with optimistic forecasts (panel a) mostly assume negative values, whereas the respective values of countries with pessimistic forecasts (panel b) are mostly positive. Furthermore, the forecast errors of countries with inaccurate forecasts (panel c) exhibit a greater variability relative to countries with accurate forecasts (panel d).

#### *4.2. Estimation of the model*

In order to uncover the characteristics of the forecasting procedure followed by the four groups of countries of Table 4 in conjunction with the ideological behavior of their governments in power apropos of their budget deficits, we have estimated both versions of the model presented in Section 2. The regression results obtained from Versions 1 and 2 of the model, namely equations (1) and (2), and (1) and (5), respectively, are cited in Tables 5 and 6. The estimates refer to the four groups of the member states taken separately and as a whole for comparison. Degrees of freedom problems have prevented us from running comparable regressions for the cases of the four subgroups of countries presented in Table 4. In addition, Greece has been excluded from the estimation process, due to a disorder of its budget data in the post-1997 period. That is, the relevant data prior to the 2004 revision are not considered as reliable on account of the creative accounting practices of the previous socialist government,

whereas their counterparts after the revision cannot be used, since the forecasts reported by the previous socialist government were not based on the large budget deficits revealed afterwards. The estimation method employed is Pooled Least Squares; the model selection process is the backward procedure. The rest of the analysis is based only on the statistically significant estimates of regression coefficients at levels 5% and better.

#### *4.2.1. Estimates based on Version 1 of the model*

The estimates associated with Version 1 of the model reveal the following: (a) Past values of the budget deficit exert a positive influence on the current period budget deficit forecast in all country groupings. That is, the higher the past forecasts of the budget deficit, the higher the current period's forecasts are expected to be. (b) The past years' values of the forecast error of the budget deficit do not seem to have had a serious impact on its current period forecasts, apart from the case of countries with inaccurate forecasts. (c) The evidence suggest that, in pre-election periods, governments in countries with optimistic forecasts have affected the current period forecasts of the deficit more than the countries in the other groups. (d) From the two political parties considered, socialists rather than conservatives seem to have predominantly affected the current period forecasts of the deficit: socialists have influenced it in the country groups with optimistic and inaccurate forecasts and to a lesser degree in the group with accurate forecasts; conservatives have influenced it in the group with pessimistic forecasts and to a lesser degree in the group with inaccurate forecasts. This finding is in harmony with the theoretical view that socialists are more prepared than conservatives to generate budget deficits during their tenure in office, and, thus, create political forecast cycles. (e) Concerning coalition governments, the reference group in this analysis, the following remarks are in order:<sup>8</sup> For the countries with optimistic and inaccurate forecasts, the regression coefficients associated with socialist governments are either negative or smaller than those pertaining to conservative governments. This suggests that socialists tend to produce lower forecasts of the budget deficit than conservative or coalition governments. Moreover, it appears that there are not important differences between conservatives and coalitions in the case of countries with optimistic forecasts, since only one regression coefficient related to conservative governments is statistically significant. These findings suggest that socialists rather than conservative and coalition governments tend to produce downward reevaluations of their budget deficit forecasts. To put it differently, lowering systematically the predictions of the budget deficit can lead to a

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<sup>8</sup> Inferences concerning the performance of coalition governments (our reference group) can be drawn via comparisons of the regression coefficients of the relevant political dummies.

worsening of the budgetary position of the country groups involved. Such an evidence is not detected in the cases of countries with pessimistic and accurate forecasts.

#### *4.2.2. Estimates based on Version 2 of the model*

Qualitatively speaking, the estimates obtained from Version 2 of the model are in line with those from Version 1. Again, the great majority of the estimated coefficients of past values of the budget deficit positively affect the current period forecasts. The estimates suggest that governments in the country groups with inaccurate forecasts rely less on past forecast values of the deficit than the other country groups do. However, it is worth mentioning that countries with accurate forecasts do not take into account longer term past forecast values. (b) Past values of the forecast error have only trivially affected the current period deficits in countries with pessimistic and accurate forecasts. Conversely, they have played a rather important role in affecting the current period deficits in countries with optimistic and inaccurate forecasts. In particular, in the case of countries with inaccurate forecasts, the past forecast errors seem to play a dominant role in the forecast formation procedure. This implies that vast reevaluations of the budget balance forecasts relying on serious forecast errors enhance inaccuracy. (c) Governments in the country groups with pessimistic and accurate forecasts do not seem to have taken measures, in pre-election periods, in order to affect their budget deficit forecasts for the current period. (d) There is a weak evidence that (i) socialist governments have manipulated current period deficits in countries with optimistic and accurate forecasts, and (ii) conservative governments in the country group with inaccurate forecasts. Upon comparing the size of the political dummy coefficients, it appears that, in the country groups with optimistic and inaccurate forecasts, socialists rather than conservatives have a tendency of reevaluating downwards the budget deficit forecasts. To put it another way, by relaxing the target values of their budget deficit, socialists in these country groups are led to successive negative forecast errors. Conversely, conservatives stick to the target value of the budget deficit forecast and avoid revising it downwards.

The evidence presented in this paper helps increase our understanding on the budget deficit forecasting procedure in the EU. It elaborates further on the findings of: (a) Brueck and Stephan (2005) and Mink and De Haan (2005) by emphasizing that expansionary fiscal policies have been pursued in election years in the EU-15 area and not exclusively in the eurozone; and (b) Strauch et al. (2004) and Von Hagen (2004) by pointing out that differences in the performance of budgetary forecasts are caused by socialist governments rather than by other types of government in the country groups with optimistic and inaccurate forecasts.

## 5. Summary and Conclusions

In this paper, we have searched for regularities in the projection processes of the government budget balance of the EU-15 member states, during the 1999-2003 time period. According to the projections of their government's budget balance and the criteria employed in the text, these countries have been classified into four groups, namely, countries with pessimistic, optimistic, accurate and inaccurate forecasts. In the analysis, we have experimented with two versions of a general model consisting of two parts: one technical, relying on the potential impact of past forecast and forecast errors on the formation of the budget deficit for the current target year; the other behavioral, intended to capture the impact of ideological differences (reflected in the policies) of socialist and conservative administrations on the budget deficit for the current target year. The difference between the two versions lies on its non-behavioral part: the forecast of the budget deficit for a given target year is revised according to (a) the preceding year's forecast value and forecast error (version 1), and (b) the forecast values and forecast errors of the preceding periods, up to four years (version 2).

The conclusions emerging from the empirical analysis are summarized below: (a) In general, past values of budget deficit forecasts positively affect the current period magnitude. (b) Past forecast errors enter in the formulation of the budget deficit forecasts for the current target year mainly in the country groups with optimistic and inaccurate forecasts. Moreover, the forecast formation process of countries with inaccurate forecasts seems to have been affected more by past forecast errors than any other factor. (c) There is weak evidence that, in pre-election periods, governments in countries with optimistic forecasts have underestimated their current budget deficit forecast. (d) Socialist rather than conservative administrations seem to have produced downward predictions of the current period budget deficit in the country groups with optimistic and inaccurate forecasts.

The upshot of this analysis is that in the light of the prevailing EU rules and economic reality,<sup>9</sup> the member states should agree on a common procedure in forecasting their government budget balances. Greater accuracy and avoidance of optimistic practices upon preparing their next years' budgets should be among the first items on the agenda.

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<sup>9</sup> See also Flores et. al. (2005).



**Table 5: Regression results obtained from version 1 of the model (equations 1 and 2)**

Explan. variables	Groups of countries																			
	All countries				Group 1: optimistic forecasts				Group 2: pessimistic forecasts				Group 3: inaccurate forecasts				Group 4: accurate forecasts			
	1.0410 (22.986) $y_{00}^0$	$y_{01}^1$ (8.748)	$y_{02}^2$	$y_{03}^3$	1.0907 (17.777) $y_{00}^0$	$y_{01}^1$ (2.254)	$y_{02}^2$	$y_{03}^3$	0.9588 (17.777) $y_{00}^0$	$y_{01}^1$ (10.847)	$y_{02}^2$	$y_{03}^3$	0.8881 (17.777) $y_{00}^0$	$y_{01}^1$ (3.455)	$y_{02}^2$	$y_{03}^3$	1.0030 (17.777) $y_{00}^0$	$y_{01}^1$ (11.471)	$y_{02}^2$	$y_{03}^3$
$y_{99}^0$			0.8521 (7.729)				0.7515 (4.370)				1.0028 (13.549)								1.0520 (12.863)	
$y_{00}^1$				0.9813 (10.169)				1.5453 (14.738)				0.6094 (5.472)					1.1488 (4.745)			0.558 (6.029)
$y_{01}^2$		0.2500 (2.279)											-0.3362 (-2.372)							
$y_{02}^3$														0.5346 (4.141)						
$e_{99}$																				
$e_{00}$								1.4076 (3.575)												0.5012 (2.164)
$e_{01}$																				
$e_{02}$					0.0354 (3.081)															
Z 02							-0.0201 (-5.829)										-0.0248 (-5.595)			
Z 03								0.0481 (2.838)												
Dc00	0.0048 (2.405)				0.0069 (3.669)								0.0097 (2.801)							
Dc01									0.0143 (3.024)											
Dc02			-0.0133 (-4.933)							-0.0354 (-9.594)										
Dc03				-0.010 (-3.767)								-0.0134 (-3.077)					-0.0070 (-2.119)			-0.0220 (-5.460)
Ds00	0.0042 (3.525)				0.0029 (2.446)				0.0102 (4.122)								0.0070 (3.651)			
Ds01		-0.0052 (-2.340)				-0.0118 (-5.646)											-0.0124 (-4.239)			
Ds02			-0.0077 (-2.829)				-0.0075 (-2.864)									-0.0097 (-3.557)				-0.0074 (-3.148)
Ds03				-0.0086 (-4.332)													-0.0091 (-2.254)			
Obs	42	42	42	42	24	24	24	24	18	18	18	18	21	21	21	21	21	21	21	21
$\bar{R}^2$	0.931	0.697	0.632	0.760	0.950	0.658	0.595	0.729	0.932	0.779	0.847	0.701	0.942	0.740	0.528	0.243	0.937	0.826	0.893	0.881
SER	0.005	0.010	0.010	0.008	0.004	0.007	0.007	0.007	0.005	0.008	0.005	0.007	0.005	0.009	0.007	0.008	0.005	0.007	0.006	0.006
F	278.72	48.22	36.21	65.78	219.71	23.17	17.87	31.87	232.96	60.81	95.51	40.86	164.77	29.46	23.40	4.21	299.86	131.58	167.99	74.81
Prob (F)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.031	0	0	0	0

Notes: (1) Method of estimation: Pooled least squares. (2) The symbols of dependent and explanatory variables are explained in section 4.1. (3) t-statistics are in parentheses. (4) SER = standard error of regression. (4) z = preelection period; Dc and Ds are dummies for the conservative and the socialist party; respectively; obs = total panel observations; F = F statistic.

**Table 6: Regression results obtained from version 2 of the model (equations 1 and 5)**

Explan. variables	Groups of countries																			
	All countries				Group 1: optimistic forecasts				Group 2: pessimistic forecasts				Group 3: inaccurate forecasts				Group 4: accurate forecasts			
	1.0410 (22.986) $y_{00}^0$	0.8357 (11.812) $y_{01}^1$	$y_{02}^2$	$y_{03}^3$	1.0907 (15.241) $y_{00}^0$	0.6056 (5.721) $y_{01}^1$	$y_{02}^2$	$y_{03}^3$	0.9588 (17.174) $y_{00}^0$	$y_{01}^1$ (12.946)	$y_{02}^2$	0.6658 (5.752) $y_{03}^3$	0.8881 (10.700) $y_{00}^0$	0.9350 (11.292) $y_{01}^1$	$y_{02}^2$	$y_{03}^3$	1.0030 (17.709) $y_{00}^0$	$y_{01}^1$ (11.471)	$y_{02}^2$	$y_{03}^3$
$y_{99}^0$			1.0566 (9.477)				1.0302 (6.718)	-0.5761 (-3.320)			1.0028 (13.549)	-1.1802 (-6.944)							1.0520 (12.863)	
$y_{00}^1$				1.0253 (11.710)				1.7796 (13.024)								0.9179 (6.232)				0.6814 (8.578)
$y_{01}^2$		0.7445 (3.480)				0.6381 (2.526)		-0.8990 (-4.481)		0.6910 (2.893)		0.5908 (2.768)	-0.3362 (-2.372)	1.7395 (6.700)	-0.8611 (-2.613)					
$y_{02}^3$			-0.3975 (-3.632)	-0.3542 (-3.780)			-0.3902 (-3.832)							-0.4052 (-3.478)	0.4844 (92.987)	-0.5760 (-7.969)				
$e_{99}$							0.5308 (3.115)	0.3284 (2.434)								0.8366 (4.824)				-0.5535 (-3.607)
$e_{00}$				0.3024 (1.798)												-0.4970 (-3.021)				0.7410 (3.874)
$i e_{01}$																				
$i e_{02}$																				
z 02							-0.0121 (-2.842)									-0.0243 (-5.343)				
z 03																				
Dc00	0.0048 (2.405)				0.0069 (3.669)								0.0097 (2.801)							
Dc01																				
Dc02			-0.0124 (-5.277)								-0.0354 (-9.594)				-0.0066 (-2.390)					
Dc03				-0.0082 (-3.165)																-0.0193 (-6.014)
Ds00	0.0042 (3.525)				0.0029 (2.446)				0.0102 (4.122)								0.0070 (3.651)			
Ds01						-0.0057 (-3.250)														
Ds02			-0.0065 (-2.694)												-0.0157 (-5.201)					-0.0074 (-3.148)
Ds03				-0.0068 (-3.613)																
Obs	42	42	42	42	24	24	24	24	18	18	18	18	21	21	21	21	21	21	21	21
$\bar{R}^2$	0.931	0.746	0.720	0.817	0.950	0.714	0.684	0.835	0.932	0.772	0.847	0.901	0.942	0.898	0.655	0.778	0.937	0.826	0.893	0.928
SER	0.005	0.009	0.009	0.007	0.004	0.006	0.006	0.005	0.005	0.008	0.005	0.004	0.005	0.006	0.006	0.005	0.005	0.007	0.006	0.005
F	278.72	121.56	36.09	46.87	219.71	29.75	17.57	39.80	232.96	58.44	95.51	52.47	164.77	88.63	10.48	24.43	299.86	131.58	167.99	87.48
Prob (F)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: (1) Method of estimation: Pooled least squares. (2) The symbols of dependent and explanatory variables are explained in section 4.1. (3) t-statistics are in parentheses. (4) SER = standard error of regression. (4) z = preelection period; Dc and Ds are dummies for the conservative and the socialist party, respectively; obs = total panel observations; F = F statistic.

## APPENDIX

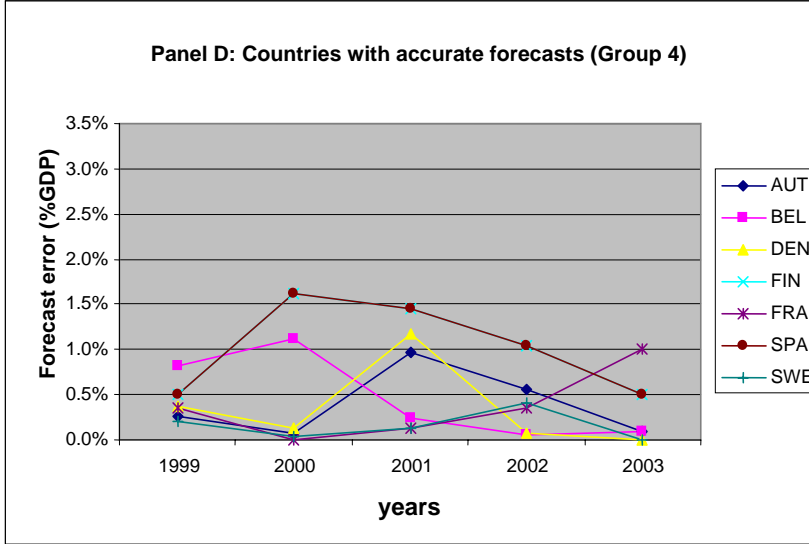
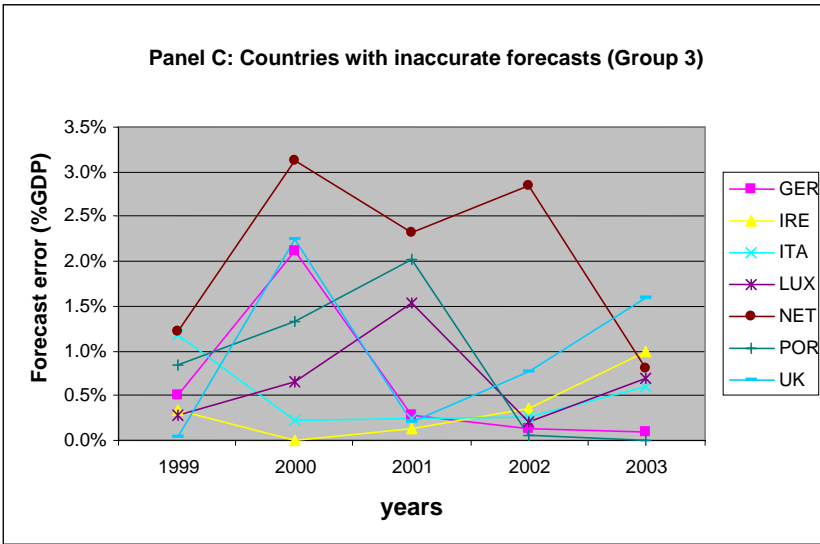
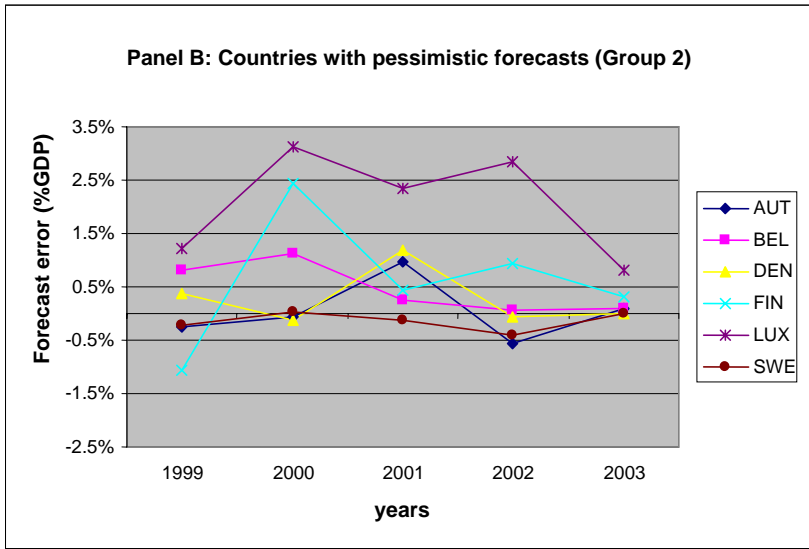
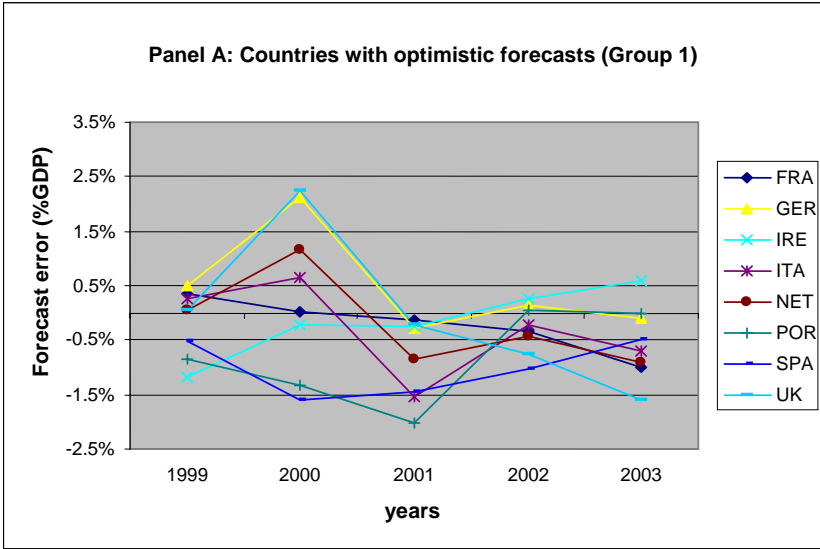
**Table A.1: Political dummy variables**

Country	Dummy for the Conservative Party, $D_c$					Dummy for the Social Party, $D_s$				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
AUT	0	0	0	0	0	0	0	0	0	0
BEL	0	0	0	0	0	0	0	0	0	0
DEN	0	0	0	0	0	1	1	1	1	1
FIN	0	0	0	0	0	0	0	0	0	0
FRA	0	0	0	1	1	1	1	1	0	0
GER	0	0	0	0	0	1	1	1	1	1
GRE	0	0	0	0	0	1	1	1	1	1
IRE	1	1	1	1	1	0	0	0	0	0
ITA	0	0	0	1	1	1	1	1	0	0
LUX	1	1	1	1	1	0	0	0	0	0
NET	0	0	0	0	0	0	0	0	0	0
POR	0	0	0	0	0	1	1	1	1	1
SPA	1	1	1	1	0	0	0	0	0	1
SWE	0	0	0	0	0	1	1	1	1	1
UK	0	0	0	0	0	1	1	1	1	1

*Source: Chronicle of Parliamentary Elections, annual issues. (Publications of the Inter-Parliamentary Union. Geneva, Switzerland).*

*Note: Austria, Belgium, Finland, and The Netherlands had coalition governments during the period of the sample.*

Figure A.2: Evolution of Forecast Errors



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