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Maritta Paloviita

# Real time uncertainty in fiscal planning and debt accumulation in the euro area



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# Real time uncertainty in fiscal planning and debt accumulation in the euro area<sup>1,2</sup>

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## Abstract

This study explores real time uncertainty in euro area fiscal policies since the late 1990s. Using real time data from the OECD Economic Outlook publications we investigate the impact of real time uncertainty on fiscal planning and debt accumulation separately for two country groups in the euro area: countries in geographical periphery (Greece, Ireland, Italy, Portugal and Spain) and other euro area countries (Austria, Belgium, Finland, France, Germany and the Netherlands). The results indicate that real time uncertainty substantially affects fiscal planning. Ex ante fiscal plans have generally been long-term oriented and counter-cyclical in the euro area, but in the periphery countries policies have been more sensitive to economic cycles and less long-term oriented than in the other countries. We find evidence that high indebtedness in the periphery countries cannot be explained by short-term pro-cyclical ex ante fiscal planning. Instead, high initial debt ratios, policy changes after the budget-planning stage and cumulated macroeconomic imbalances have contributed substantially to accumulated debt ratios. Overall, reliable statistics, balanced macroeconomic developments and longer-term policy orientation, which are central in the new EU fiscal framework, are crucial for sound and sustainable public finances.

Keywords: fiscal policy, debt accumulation, real time data, cyclical sensitivity, economic crisis

JEL classification numbers: E62, E32

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<sup>1</sup> The views expressed are those of the author and do not necessarily reflect the views of the Bank of Finland.

<sup>2</sup> The earlier version of this paper was titled "Fiscal policy orientation, uncertainty and debt accumulation in the euro area countries". Useful comments received in Conference on Fiscal Policy And Coordination In Europe, hosted by National Bank of Slovakia (September 2012) are gratefully acknowledged. Thanks are due to Helvi Kinnunen and Jouko Vilminen for useful comments and to Sami Oinonen and Tarja Yrjölä for excellent research assistance.

# 1 Introduction

The economic and financial crisis has significantly weakened public finances in the euro area. Burgeoning government deficits and high indebtedness have raised the question of medium and long term sustainability of public finances. Interest-rate differentials on euro area sovereign debt were very small in the pre-crisis years. Due to the crisis, however, market participants have started to pay more attention to country-specific risks in pricing sovereign bonds. The largest increases in government bond yields have been observed in the geographical periphery in the euro area, i.e. in Greece, Ireland, Italy, Portugal and Spain. These countries have been under intense market pressure already for years.

Reasons for worsening fiscal imbalances and debt accumulation vary across the euro area countries. In some countries, abundant credit expansion, along with increased private sector indebtedness and serious banking sector problems, have pushed fiscal balances onto an unsustainable path. Weak price competitiveness has contributed in some cases to slow real GDP growth and increasing debt levels during the period of monetary union. In some countries the risk of excessive debt was already high before 1999. In spite of highly divergent economic developments in the euro area, however, it is the orientation of fiscal policy that ultimately explains the observed heterogeneity of debt accumulation.

Due to the current sovereign debt crisis, the EU fiscal framework has been renewed recently in order to deal with the crisis and ensure long run fiscal sustainability in the member states. The new framework includes new and updated regulations, as well as easier procedures for imposing sanctions. These create much tighter common rules for individual countries' conduct of economic policy.

Economic monitoring and forecasting, which are crucial elements in the fiscal framework, always entail significant degrees of uncertainty. In making policy decisions, it is a challenge for policymakers to assess current and future economic developments on the basis of information available at the time. The effects and impact-lags of fiscal measures are also difficult to estimate. Errors in economic monitoring and forecasting pose significant risks of poor policy decisions.

Fiscal policy stance can be analyzed using fiscal policy rules. In order to get a clear picture of intended policy, fiscal rules must be analyzed on the basis of real time information. The fiscal policy stance may look quite different in the light of final, as opposed to real time, data. Real time estimates of macroeconomic variables are typically revised – often several times – before the final numbers are published. In addition, economic forecasts are often quite inaccurate. Real time uncertainty may lead to substantial surprises in public sector finances and unexpected debt accumulation, as was observed during the crisis.

This empirical study contributes to the current fiscal policy debate by examining the impact of real time uncertainty on discretionary fiscal policies in the euro area countries. First, we use real time annual data collected from OECD Economic Outlook publications (December issues) and estimate fiscal policy reaction functions for the euro area and for two separate country-groups defined on the basis of recent developments in government bond yields. Special attention is paid to the long term fiscal policy orientation and cyclical response of budget planning. The impact of the crisis on policy decisions is analyzed in more detail. Then, we compare the actual development of primary balances and debt ratios to corresponding reference paths based on reaction function estimations and real time data. Impacts of initial debt ratios, divergent real growth histories and real interest rate developments are also investigated.

The results suggest that during the period of monetary union euro area fiscal policies have been on average long-term oriented and counter-cyclical. In both country-groups the response to the economic cycle has been counter-cyclical, but this has not restrained substantial debt accumulation in the periphery economies. Partly due to substantial differences in initial debt ratios, current debt ratios have remained very heterogeneous. Sluggish real GDP growth in particular has also affected debt accumulation in some cases. The crisis underscored the role of real time uncertainty in budget planning. Overall, this study indicates that it is not short-term counter-cyclical fiscal policies but rather balanced macroeconomic developments and longer-term policy orientation that are crucial for sound and sustainable public finances. Overall, the results show that reliable statistics, tight budgetary monitoring and accurate forecasting are central to good fiscal governance.

The paper proceeds as follows. Section 2 presents the data and analyses real time accuracy. Fiscal policy rules are estimated in section 3, and the debt dynamics are explored in section 4. Conclusions are presented in section 5.

## **2 Data description**

Annual real time data for the period 1997 – 2011 are constructed using OECD Economic Outlook publications, December issues No. 62 – 90. Eleven euro area countries are included in the analysis. Greece, Ireland, Italy, Portugal and Spain comprise the group of countries in the geographical periphery (Group A) while Austria, Belgium, Finland, France, Germany and Netherlands belong to the group of other euro area countries (Group B). Each of the Outlook issues includes, for each country, time series for the following variables: real GDP growth rate, ratio of cyclically adjusted primary balance to potential GDP,<sup>3</sup> ratio of gross

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<sup>3</sup> To estimate the discretionary component of fiscal policy, one must eliminate from the government financial balance the business-cycle effects and other effects not due to current fiscal actions, such as changes in interest rates and prior developments in debts and receivables.

government debt to GDP (Maastricht debt), and the OECD's production function –based estimate of the output gap.<sup>4</sup> The panel data include more than a decade of real time lagged values of all the variables, annual real time estimates of current-year values, and real time forecasts for the following year. The 'final' data, for our purposes, are from the latest annual Economic Outlook (December 2011, No. 90).<sup>5</sup>

There are several advantages of using OECD data in real time fiscal policy analysis. For example, all the series are comparable across countries, since they are constructed using the same methodology. Moreover, OECD forecasts contain policy makers' perceptions of fiscal policy measures and economic developments, since national authorities contribute regularly to the OECD forecasting process. The December issues provide information available at times when budget plans are made.

Real time estimates and corresponding revised information on cyclically adjusted primary balances and real GDP growth rates are shown in Appendix 1. The term REV refers to final data, and FOR to forecasts made in the previous December (at the time of fiscal planning). The variable CUR is a real time December estimate for the current year (assessed in the end of the budget year). Real time series reflect the uncertainty policy makers face at the time of fiscal planning.

There has been much variation in revised cyclically adjusted primary balances in the euro area, as shown in Figure 1 in Appendix 1. Only in Belgium, Finland, Italy and Spain were revised balances permanently positive in the pre-crisis years. Typically, real time estimates of cyclically adjusted primary balances have been overly optimistic. On average, real time estimates of economic growth have been clearly more accurate than the corresponding estimates of cyclically adjusted primary balances (see Figures 1 and 2). Sharp decreases in real growth in 2009 were not foreseen in any of the countries at the end of the previous year.

[Insert Table 1 here]

Next, we investigate the accuracy of the real time information. We compare the final data with corresponding December current-year estimates for the each year. Three periods are compared: 1999 – 2010 (the whole sample), 1999 – 2007 (pre-crisis period) and 2008 – 2010 (crisis period)<sup>6</sup>. We also compare final data for current-year cyclically adjusted primary balances with previous-year forecasts. In this case we consider the periods 2000 – 2011 (the whole sample), 2000 – 2007 (pre-crisis period) and 2008 – 2011 (crisis period). Table 1 reports mean errors (ME), mean average errors (MAE) and root mean squared errors (RMSE) for the

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<sup>4</sup> For details of the OECD's production-function-based methodology, see Beffy et al. (2006) and OECD (2009): Chapter 4 in Economic Outlook No. 85.

<sup>5</sup> The most recent years' data are still subject to revision.

<sup>6</sup> Real time estimates and final data are the same for year 2011.

euro area and the two country-groups. Mean errors for all individual countries are shown in Appendix 2.

It is quite clear that there was more real time uncertainty during the crisis than in the earlier years. Comparison shows that on average in both sub-periods the primary balance estimates are more inaccurate for the periphery countries. In contrast, for real GDP growth, average real time uncertainty did not differ as between the two country-groups. Individual country results in Appendix 2 indicate notable heterogeneity across the countries. Especially, in Greece, Portugal and Spain, primary balances were systematically lower than expected in real time in the crisis years. In all the periphery countries, the decrease in primary balances was surprisingly pronounced. Real GDP growth was higher than expected in all the countries before the crisis, especially in Finland, the Netherlands and Spain. The largest mean error for crisis-period growth was observed for Greece.

Next, we examine how real time estimates of primary balance and real GDP growth for year 2009 have evolved over time (see Appendix 3). At the end of 2008, the primary balance forecast for the next year was clearly negative only in Ireland but very close to zero in Austria and France. In December 2009, however, the estimates were revised substantially downwards – only in Italy was the estimate still clearly positive. The balances have been revised significantly downwards over time in later revisions in the periphery countries – only for Italy do the final data indicate a non-negative balance in 2009. In December 2008 real GDP growth forecasts for the next year were clearly too optimistic, especially in Finland and Ireland.

Overall, our data indicate that in the euro area economic developments have been highly divergent during the period of monetary union. Due to the deep recession, heterogeneity has increased notably in recent years. The crisis, which hit all the euro area countries at the same time, was unexpected and deep. One might well surmise that the real time uncertainty has had an impact on fiscal policies and debt accumulation, especially in the crisis years.

### **3 Real time fiscal planning**

#### **3.1 Empirical specification of fiscal policy reaction function**

Next, we analyze ex ante fiscal plans in the euro area using the real time panel data described above. The fiscal policy reaction function indicates, depending on the exact specification, how the fiscal authority responds to the current or forecasted state of the economy as well as the degree of persistence of planned policies. It reveals whether policy is systematically pro- or counter-cyclical. Fiscal policy reaction functions have typically been investigated using revised data (see

e.g. Lane 2003a, Lane 2003b and European Commission 2004). In recent studies real time information also has been used (see Cimadomo 2011 for a survey of real time fiscal policy literature).

Discretionary fiscal policy plans for the next year are generally made by the end of the budget year. Since policy decisions are always based on real time information, it is natural to contrast policy variables to data published in the December issues of OECD Economic Outlook. We follow Cimadomo (2008) and Paloviita and Kinnunen (2011) and use real time information for all variables in the fiscal policy reaction function. We examine how euro area planned policies (the primary focus of policy makers) have responded to the economy's current cyclical situation. Discretionary fiscal actions are measured by the cyclically-adjusted primary balance (CAPB), i.e. the difference between tax revenues and expenditures excluding interest payments, the dynamics of which are determined by the reaction function, specified as

$$CAPB_{t+1}^t = c + \alpha CAPB_t^t + \beta GDP_t^t + \gamma DEBT_t^t + \varepsilon_t \quad (1)$$

In equation (1) the variable  $CAPB_{t+1}^t$  reflects policy actions planned at time  $t$  for the next period, and the term  $GDP_t^t$  is a real time estimate of current real GDP growth. The variable  $CAPB_t^t$  refers to a real time estimate of the current primary balance and the variable  $DEBT_t^t$  to the corresponding debt-to-GDP ratio<sup>7</sup>.

If fiscal policy is counter-cyclical, taxes are raised or expenditures reduced when the output gap is positive and vice versa when the output gap is negative. Thus, the coefficient  $\beta$  is positive. The policy inertia variable indicates the degree to which policy design emphasizes long-term goals: the larger the estimated coefficient  $\alpha$ , the greater the long-term orientation. A high degree of persistence in fiscal policy means that the fiscal actions of a given period also limit the options for future fiscal actions and thereby limit the leeway for discretionary measures.<sup>8</sup> The debt coefficient  $\gamma$  indicates how policy makers take indebtedness into account in budget planning. We also estimate the reaction function in a forward looking form. In this case, we use expected real GDP growth as our metric for cyclical conditions.

### 3.2 Estimation results

First, we use a panel least squares estimation method to estimate the reaction function for the whole euro area, without paying special attention to the recent

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<sup>7</sup> Other factors influencing fiscal policy plans can also be taken into account in the reaction function. For example, variables related to demographics are typical additional explanatory variables (see e.g. Beetsma and Giuliodori 2010).

<sup>8</sup> Afonso et. al. (2010) find a negative correlation between degrees of discretionary leeway and persistence, which supports this view.



crisis. Here, we use country-group dummies (periphery countries and other euro area countries) in order to see, whether we can improve the analysis by examining the two country-groups separately. We then proceed to a closer examination of the impact of the crisis on budget plans by adding a crisis dummy to equation (1).

The conduct of fiscal policy varies across the countries. For example, the political cycle may impact each country's policy decisions: typically, the pressure for fiscal easing increases before elections. The institutional setup for fiscal policy also affects the policy responses: the tighter the politicians' hands are tied, the more inert the discretionary policy and the less the leeway in policy planning. Cross-country differences are taken into account by using country-specific constants (cross section fixed effects) in panel estimations. Correspondingly, because of possible policy changes over time, time-fixed effects are also used.

[Insert Table 2 here]

Estimation results without the crisis dummy, summarized in table 2, indicate that the reaction function provides a plausible representation of planned fiscal policies in the euro area. The explanatory power of the reaction function is always quite high, and the estimated coefficients have reasonable magnitudes and signs. Estimation results in the first column indicate that on average ex ante fiscal plans have been counter-cyclical, but the estimated cyclical-stance coefficient is statistically insignificant. We find evidence of quite low policy persistence (estimated coefficient is 0.4) and of a significant impact of indebtedness on policy decisions. When the same estimation is repeated with country-group dummies included, the empirical performance of the model improves, since all the estimated coefficients are statistically significant at the 5 per cent level (2<sup>nd</sup> column, table 2). This indicates that in the periphery countries the policies have been more sensitive to the economic cycle and less long-term oriented than in the other countries and that indebtedness has had a stronger impact on policy decisions in the periphery countries. According to the Wald test, the policies have been statistically different in the two country-groups at the 5 per cent level<sup>9</sup>. Separate estimations for the two country-groups are shown in the 3<sup>rd</sup> and 4<sup>th</sup> columns of table 2. Again, we obtain evidence of different fiscal policy orientation in the two country-groups: budget plans have been notably less long term policy orientated in the crisis countries (0.4) than in the other countries (0.7). Indebtedness seems to have affected policy decisions in both groups. For the periphery countries, however, the estimated coefficient is twice as large as for the other countries. The cyclical variable is not statistically significant in any case<sup>10</sup>.

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<sup>9</sup> We test the joint hypothesis that all estimated coefficients are the same for both country-groups. The Wald test F-statistic is 5.491 and the corresponding probability is 0.002.

<sup>10</sup> When the equation (1) is estimated without the debt-to-GDP variable, the explanatory power of the equation is somewhat lower in all cases.

Next, we explore the impact of the crisis on fiscal policies. We add a crisis dummy to the reaction functions of both country-groups in order to provide separate coefficients for all explanatory variables in the two sub-periods. The CRISIS dummy is set to zero in 1999 - 2007 and one in 2008 – 2011.<sup>11</sup> The dummy variable replaces time-fixed effects in the panel estimations.<sup>12</sup> The exact specifications for the euro area and the two country-groups are chosen using the Wald test of coefficient restrictions. In the first step, we estimate separate coefficients for all explanatory variables in the reaction function (not reported here). Then, using the Wald test of coefficient restrictions, we seek to identify those explanatory variables for which separate coefficients are needed for the pre-crisis and crisis years. The final specifications are reported in table 3.

[Insert Table 3 here]

The results suggest that on average euro area policy persistence decreased substantially in the crisis years. However, the cyclical and debt responses have been essentially the same in both sub-periods. The two country-groups have reacted to the crisis in clearly different ways. After 2007 the policy inertia decreased and the debt response increased in the periphery countries, whereas the response to cyclical stance has been virtually the same in both sub-periods. In the other countries, the impact of the cyclical stance became important only during the crisis, but policy persistence and debt response did not change from the earlier years.

### 3.3 Sensitivity analysis

We did a sensitivity analysis in order to assess the relevance of our estimation results in the previous section. We explored the effects of reaction-function specification (current or expected cyclical stance) and the impact of a single country on the estimation results.

When the reaction function is estimated in a forward looking form, fiscal policy plans and the expected cyclical situation may be correlated. Thus, there might be feedback effects from planned policy to real GDP growth. Possible simultaneity problems are taken into account in the estimations by employing instrumental variables. Again, the impact of the crisis is analyzed separately using the crisis

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<sup>11</sup> Galí and Perotti (2003) estimate a similar equation based on a dummy variable in order to examine the significance of the Maastricht Treaty for fiscal policy. Dummy variables are also used by Beetsma and Giuliodori (2010). In that study OECD countries are divided into EU members and other countries in an analysis of fiscal policy. Staerh (2008) divides his real time data set into Central and Eastern European countries and examines the cycle-sensitivity of fiscal policy. Candelon et. al. (2010) use a similar approach in studying the stability of fiscal rules for EMU countries before and after the Maastricht Treaty.

<sup>12</sup> As Pina (2009) has argued, it is not necessary reasonable use time fixed effects in fiscal policy reaction functions. Since these effects capture fiscal responses to common shocks, they may change the interpretation of the cyclicity parameter  $\beta$ .

dummy and the final specifications are based on the Wald test. The results for the two country-groups, given in Appendix 4, confirm the earlier results for policy persistence and the impact of indebtedness on fiscal decisions: policy inertia has been lower and the response to cyclical stance and indebtedness has been higher in the periphery countries than in the other euro area countries. According to the Wald test, the crisis did not substantially change fiscal policies (the crisis dummy is not needed in any of the cases). This may reflect the fact that during the crisis years, especially for 2009, real GDP growth forecasts were overly optimistic (see Figure 2 in Appendix 1).

The impact of a single country on panel estimation results in table 3 is examined next. Since the periphery crisis countries are very heterogeneous, we excluded one country at a time from this country-group and re-estimated the same reaction function. The results based on current real GDP growth (not reported here) suggest that fiscal policies have been quite homogeneous in the periphery countries. However, the decrease in policy inertia during the crisis is largely due to policy changes in Greece and Ireland. On the other hand, the impact of Greece on the high debt-to-GDP coefficient is substantial. We also find evidence that the cyclical response of fiscal decisions has been relatively large in Ireland and relatively low in Greece.

We also examine whether Belgium dominates the estimation results in the group of other euro area countries. In this country-group, the highest debt levels have been observed in Belgium throughout the EMU period. The results suggest (not reported here) that without Belgium the estimation results are virtually unchanged: the cyclical response is statistically significant only during the crisis, and the estimated policy persistence coefficient is about 0.8. Thus, the result seems to suggest that the level of debt alone is not sufficient to signal the fiscal limit of a single country.

Due to the small sample size, it is not useful to estimate reaction functions for individual countries. We calculated correlations between ex ante fiscal plans for the next year and real GDP growth estimates for the current year. The evidence suggests that in individual countries budget plans and the current cyclical situation have generally been positively related. Correlation coefficients vary between 0.27 (Belgium and Italy) and 0.96 (Ireland). Only for Greece is the correlation coefficient marginally negative.

Overall, our analysis indicates that ex ante fiscal plans have been counter-cyclical in the euro area. Fiscal policies in the periphery countries have deviated from those in the other countries. In making policy decisions, the periphery countries have paid more attention to the cyclical stance and indebtedness than have the other countries, but their policy decisions have been less long-term oriented. The crisis reduced policy persistence only in the periphery countries. After 2007 the impact of the economic cycle on fiscal plans became important in the group of

other countries. The results are quite robust with respect to exact specification of the reaction function (current or expected cyclical stance). The results were also robust in the sense that none of the countries seems to dominate the estimation results.

The analysis above reveals some interesting features of ex ante fiscal policies in the periphery countries. In terms of short-term counter-cyclicality, the estimation results indicate that the periphery countries have not engaged in excessively lax fiscal policies as compared to the other euro area countries. In fact, their policies have been quite responsible with respect to cyclical conditions: on average their policies have been tighter in good times and looser in bad times, compared to other countries. Even at the onset of the financial crisis, fiscal policies in the periphery countries were less expansionary than in the other countries. Therefore, it is surprising that, in spite of quite reasonable fiscal policy orientation, we have seen rapid debt accumulation in the periphery countries over the years. In the following section, debt accumulation in the periphery countries is analyzed in more detail. Using reference debt paths based on real data and reaction function estimations, we are able to assess the impact of real time uncertainty on debt accumulation.

## **4 Real time uncertainty in debt accumulation**

### **4.1 Background**

Before analyzing debt dynamics in the periphery countries, we summarize macroeconomic developments in the euro area since the late 1990s. Figure 1 shows that debt-to-GDP ratios were quite heterogeneous across the euro area countries already prior to monetary union. In 1998 the average debt ratio was 70 per cent in the euro area, almost 100 per cent in Greece, and well over 100 per cent in Italy and Belgium. The lowest ratios were observed in Finland, Portugal and Ireland. Average initial debt ratios were almost the same in the two the country-groups. Heterogeneous initial debt levels suggest that the room for producing public services and proving social transfers (after interest payments) varied substantially across the countries already in the early years of monetary union.

[Insert Figure 1 here]

Average real GDP growth rates are reported in table 4. In some countries rapid real GDP growth has supported public spending increases in the monetary union. In 1999-2007 average real GDP growth was below 2 per cent in Italy, Germany and Portugal. The highest average growth rates were achieved in Ireland (6 per cent) and Greece (about 4 per cent). In the pre-crisis years the average real growth

was 3.4 per cent in the periphery countries and one percentage point lower in the other countries. During the crisis average growth was clearly negative in the periphery countries but marginally positive in the other countries. Overall, real GDP growth histories have been quite heterogeneous in the euro area.

[Insert Table 4 here]

In the early years of monetary union, the level of interest rates, especially long-term rates, varied widely across the countries. However, implicit interest rates decreased gradually over the years. The range between the highest and lowest interest rates shrank from 3.7 percentage points in 1999 to about 1 percentage point in 2007. The standard deviation of interest rates, which was considerable in the early years of monetary union, narrowed to 0.3 per cent before the crisis (see figure 2). The crisis reversed the downward trend of interest rates.

[Insert Figure 2 here]

The difference between the real interest rate and real GDP growth reveals the combined effect of real growth, interest rates and inflation on the risk of excessive debts. In the pre-crisis years, average real interest rate was about 1 percentage point lower than average real GDP growth in the euro area (see table 5). In the periphery countries, the average difference was clearly negative (-2.3 percentage points) and in the other countries slightly positive (0.5 percentage point). During the crisis the difference was clearly positive, especially for the periphery countries. In the pre-crisis years, particularly in Ireland and Spain, and to some extent in Greece, rapid GDP growth and declining interest rates reduced the debt servicing costs. As regards the other euro area countries, only in Finland and the Netherlands was the difference between the interest rate and economic growth rate slightly negative. Partly the observed differences between real interest rates and growth rates reflect the fact that in a monetary union the interest rate of a small open economy is exogenously fixed.

[Insert Table 5 here]

## 4.2 Analysis of debt accumulation

Debt accumulation depends on initial debt levels and primary balances, as well as economic growth and the level of interest rates<sup>13</sup>. When planning the budget, policymakers face real time uncertainty. Therefore, actual primary balance developments and debt accumulation, which are published later, may be markedly

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<sup>13</sup> Stock-flow adjustment also affects debt accumulation. It includes government transactions, which affect the debt level but not the primary balance (e.g. purchasing of shares in financial companies). Stock-flow adjustment is excluded in this section. Therefore, actual debt ratios are modified in order to make them comparable with the corresponding reference series.

different from policymakers' assessments at the time of budget planning. Both data revisions and policy changes after budget planning may significantly impact the revised (final) series.

Next, we illustrate the impact of real time uncertainty on primary balances and debt accumulation in Greece, Ireland, Italy, Portugal and Spain. In the first step, we use the estimated coefficients of the reaction function for the periphery countries to calculate reference paths for the actual cyclically adjusted primary balance histories of these countries. These reference paths, which are based on real time data, are benchmarks for actual primary balance developments. They show how primary balances have evolved over time according to budget plans and real time information. In other words, these paths reflect ex ante budget plans of policymakers on the basis of information available at the time. They illustrate intentional policy decisions, but they do not take into account later policy decisions (policy changes in the budget implementation stage) and data revisions.

In the second step, primary balance reference series are used to construct reference paths for debt accumulation. Initial debt ratios, country-specific economic growth histories and country-specific interest rate histories are taken into account in constructing these series. Comparison of actual debt histories with the corresponding reference series reveals how real time uncertainty at the time of fiscal planning has affected debt accumulation over time. Again, the difference between the two series reflects real time uncertainty. Moreover, it takes into account country-specific interest rates and real time uncertainty as to economic growth at the time of budget planning.

[Insert Figure 3 here]

Figure 3 shows the actual histories and corresponding reference paths of cyclically adjusted primary balances for Greece, Ireland, Italy, Portugal and Spain<sup>14</sup>. The revised balances (CAPBf) were above the reference paths (CAPBu) in Ireland and Spain in the mid-2000s – apparently due to surprisingly rapid real growth. The sharp decrease in the Irish balance during the crisis reflects the one-off support for the banking sector. In the early years of monetary union, primary balance surpluses in Greece were lower than expected in real time. In 2003-2009 the balance was clearly negative, although it was expected to be close to zero. In Italy, revised balances have been systematically lower than expected at the time of fiscal planning. The opposite is true for Portugal: the primary balances have been systematically negative, but even lower balances were expected. All in all, the cumulative effect of primary balance developments on debt accumulation seems to have been quite heterogeneous in the periphery countries in the EMU period. As pointed out earlier, in addition to real time uncertainty, other factors, such as additional policy decisions during budget implementation, explain the difference

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<sup>14</sup> In figure 3 actual balances for 2012 are forecasts made in December 2011.

between ex ante budget plans and final outcomes. Here, the focus is on ex ante fiscal plans, which are crucial in the EU fiscal framework.

[Insert Figure 4 here]

The observed debt-to-GDP ratios and corresponding reference debt paths with real time uncertainty are shown in figure 4<sup>15</sup>. In order to make the comparison reasonable, actual developments were represented by debt as measured by cumulating observed annual deficit figures. In other words, our debt concept does not include the cumulated effect of financial transactions or valuations (i.e. deficit-debt adjustment items) on debt. It is clear that the actual debt histories have been quite heterogeneous in the periphery countries. Initial debt levels in 1998 were about 60 per cent in Portugal, Ireland and Spain, about 100 per cent in Greece, and almost 120 per cent in Italy. Only in Portugal did the actual debt ratio increase gradually in the pre-crisis years (primary balances were systematically negative), but a clear downward trend was observed in Spain and Ireland. In Italy and Spain the debt-to-GDP ratio in 2011 was very close to the initial level of 1998. By contrast, in the other countries the debt ratio has increased substantially during the period of monetary union.

In Greece the systematic difference between the final primary balance and the corresponding reference path contribute a huge difference between the corresponding debt ratios. On the other hand, positive developments in final primary balances in the mid-2000s compared to real time estimates in Ireland and Spain explain why final debt ratios are below the reference paths for these countries. For Italy, the primary balance estimates were systematically too optimistic, which explains the higher-than-expected debt ratios. In Portugal, by contrast, due to the overly pessimistic real time estimates of primary balances, the increase in actual debt ratios has been surprisingly moderate.

All in all, our analysis based on fiscal policy rules, real time data and simple reference paths suggests that real time uncertainty has substantially affected fiscal planning. Other factors, such as policy changes after budget plans, divergent real GDP growth histories and heterogeneous interest rate levels, have contributed to the observed developments in public finances.

## 5 Conclusions

This paper examined euro area fiscal policies using real time data. Estimated fiscal policy reaction functions were utilized to illustrate the effects of real time uncertainty on ex ante fiscal planning and excessive debt accumulation. The analysis indicated that euro area ex ante fiscal plans have been essentially counter-

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<sup>15</sup> In figure 4 actual debt-to-GDP ratios for 2012 are forecasts made in December 2011.

cyclical. However, in the periphery countries, policies have been more sensitive to the cyclical situation and less long-term oriented than in the other countries. We provided evidence that short-term counter-cyclical policy is far from being a sufficient condition for sound public finances. It may turn out to be ill grounded in terms of realized macro developments.

If the periphery countries had taken full advantage of the ‘dividens’ from rapid real GDP growth and declining interest rates due to monetary union membership, the debt problems would have been greatly alleviated. Due to rapid growth and low level of interest rates, the periphery countries seem to have perceived macroeconomic developments too favorable. Hence, the incentives to lower debt levels at an increasing pace were not strong enough. The undersized role of the debt ratio in policy settings has led to a situation, in which some countries with high initial debt ratios at the start of EMU now have even higher debt ratios. Overall, our results suggest that tight monitoring of budgeting processes and multi-annual fiscal planning - central elements in the new EU fiscal framework – will strengthen medium and long term fiscal sustainability.



## References

- Afonso, A., Agnello, L. and Furceri, D.** (2010) Fiscal policy responsiveness, persistence, and discretion, *Public Choice*, 145, 503-530.
- Beetsma, R. and Giuliodori, M.** (2010) Fiscal Adjustment to Cyclical Developments in the OECD: An Empirical Analysis Based on Real-Time Data, *Oxford Economic Papers*, 62, 419-441.
- Beffy, P. O., Ollivaud, P., Richardson P. and Sedillot, F.** (2006) New OECD Methods for Supply-Side and Medium-term Assessments: A Capital Services Approach, *OECD Economics Department Working Papers*, No. 482.
- Candelon, B., Muysken, J. and Vermeulen, R.** (2010) Fiscal policy and monetary integration in Europe: an update, *Oxford Economic Papers*, 62, 323-349.
- Cimadomo, J.** (2008) Fiscal Policy in Real Time, *ECB Working Paper No. 919*, forthcoming in *Scandinavian Journal of Economics*.
- Cimadomo, J.** (2011) Real-Time Data and Fiscal Policy Analysis: A Survey of the Literature, *Federal Reserve Bank of Philadelphia Working Paper*, No. 25.
- European Commission** (2004) The Pro-Cyclicality of Fiscal Policy in EMU, *Quarterly Report on the Euro Area*, Vol. 3.
- Galí, J. and Perotti, R.** (2003) Fiscal policy and monetary integration in Europe, *Economic Policy*, 18, 533-572.
- Lane, P. R.** (2003a) Business Cycles and Macroeconomic Policy in Emerging Market Economies, *International Finance* 6, 89-108.
- Lane, P. R.** (2003b) The Cyclical Behaviour of Fiscal Policy: Evidence from the OECD, *Journal of Public Economics*, 87, 2661-2675.
- OECD** (2009) Beyond the crisis: medium-term challenges relating to potential output, unemployment and fiscal positions, *Chapter 4 of OECD Economic Outlook no. 85*.
- Paloviita, M. and Kinnunen, H.** (2011) Real time analysis of euro area fiscal policies: adjustment to the crisis, *Bank of Finland Discussion Paper No. 21*.
- Pina, A.** (2009) Elusive Counter-Cyclicality and Deliberate Opportunism? Fiscal Policy from Plans to Final Outcomes, *Banco de Portugal Working Paper No. 6*.
- Staehr, K.** (2008) Fiscal policies and business cycles in an enlarged euro area, *Economic Systems*, 32, 46-69.

**Table 1. Accuracy of real time data**

	1999–2010			1999–2007			2008–2010		
<b>CAPB</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>
EA11	-1.105	1.363	3.176	-1.022	1.334	2.878	-1.355	1.452	4.071
Group A	-1.687	1.911	5.366	-1.440	1.738	4.442	-2.429	2.429	8.139
Group B	-0.620	0.907	1.351	-0.674	0.996	1.574	-0.459	0.638	0.681
	1999–2010			1999–2007			2008–2010		
<b>GDP</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>
EA11	0.234	0.629	0.707	0.424	0.632	0.669	-0.335	0.621	0.821
Group A	0.152	0.677	0.904	0.370	0.662	0.775	-0.499	0.724	1.291
Group B	0.303	0.589	0.542	0.469	0.607	0.580	-0.198	0.535	0.429
	1999–2010			1999–2007			2008–2010		
<b>CAPB for</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>	<b>ME</b>	<b>MAE</b>	<b>RMSE</b>
EA11	-1.676	2.085	9.369	-1.251	1.715	4.672	-2.527	2.825	18.763
Group A	-2.677	3.076	17.383	-1.907	2.351	7.633	-4.217	4.526	36.882
Group B	-0.842	1.259	2.690	-0.704	1.185	2.203	-1.118	1.408	3.663

ME = mean error, MAE = mean average error, RMSE = root mean squared error

**Table 2. Ex ante fiscal plans**

	<b>EA11</b>	<b>EA11 with country dummies</b>	<b>Group A</b>	<b>Group B</b>
$GDP_t$	0.055 (0.061)		0.137 (0.105)	0.114 (0.080)
GroupA* $GDP_t$		0.297* (0.053)		
GroupB* $GDP_t$		0.116* (0.056)		
$CAPB_t$	0.427* (0.043)		0.373* (0.072)	0.674* (0.067)
GroupA* $CAPB_t$		0.454* (0.040)		
GroupB* $CAPB_t$		0.796* (0.068)		
$DEBT_t$	0.061* (0.011)		0.049* (0.021)	0.024* (0.012)
GroupA* $DEBT_t$		0.071* (0.009)		
GroupB* $DEBT_t$		0.019* (0.016)		
$R^2$	0.865	0.856	0.838	0.959
D-W	2.050	2.079	2.047	1.876
Obs	142	142	64	78

**Table 3. Impacts of crisis on ex ante fiscal plans**

	<b>EA11</b>	<b>Group A</b>	<b>Group B</b>
	Before and during the crisis	Before and during the crisis	Before and during the crisis
$GDP_t$	0.168* (0.040)	0.311* (0.073)	
$(1-Crisis)*GDP_t$			0.052 (0.047)
$Crisis*GDP_t$			0.149* (0.035)
$CAPB_t$			0.820* (0.038)
$(1-Crisis)*CAPB_t$	0.711* (0.051)	0.735* (0.091)	
$Crisis*CAPB_t$	0.418* (0.045)	0.352* (0.058)	
$DEBT_t$	0.049* (0.008)		0.016** (0.009)
$(1-Crisis)*DEBT_t$		0.047* (0.014)	
$Crisis*DEBT_t$		0.059* (0.011)	
$R^2$	0.841	0.834	0.949
D-W	2.037	2.136	1.765
Obs	142	64	78

**Table 4. Average real GDP growth rates**

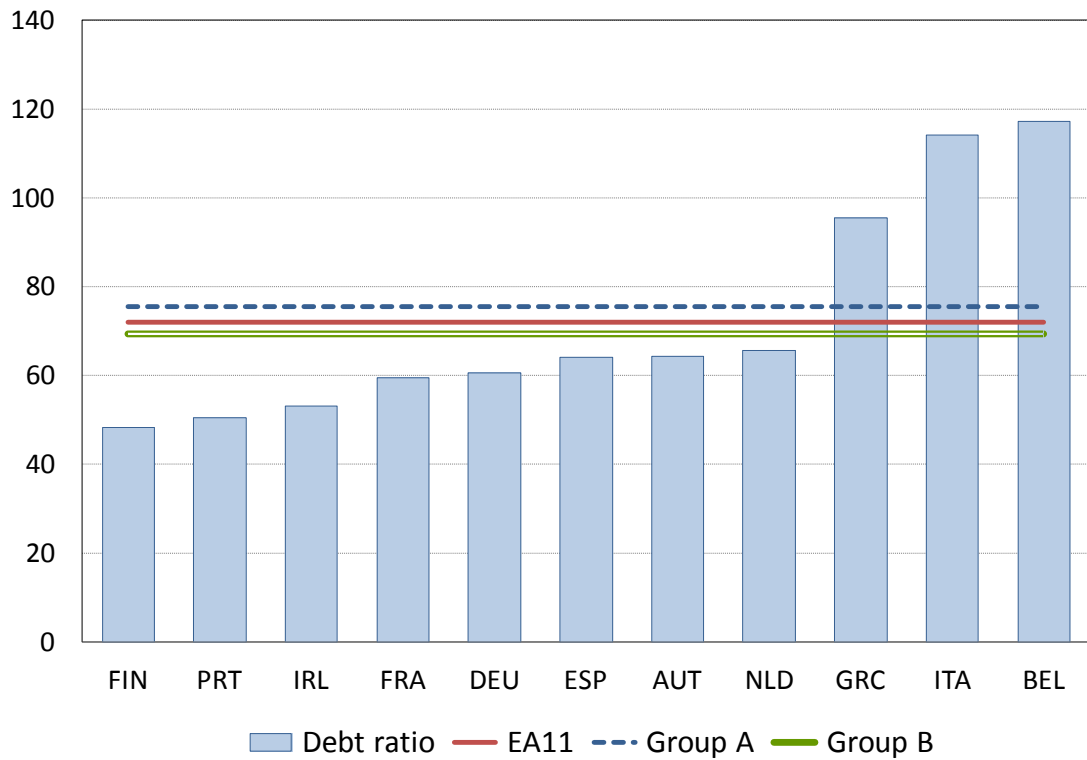
	<b>Average real GDP growth, %</b>		
	<b>1999–2011</b>	<b>1999–2007</b>	<b>2008–2011</b>
AUT	2.0	2.6	0.8
BEL	1.8	2.3	0.6
FIN	2.4	3.6	-0.1
FRA	1.5	2.2	0.0
DEU	1.3	1.7	0.6
GRC	1.8	4.1	-3.3
IRL	3.5	6.0	-2.3
ITA	0.8	1.5	-1.0
NLD	1.8	2.5	0.3
PRT	1.0	1.8	-0.7
ESP	2.4	3.7	-0.5
<b>EA11</b>	1.9	2.9	-0.5
<b>Group A</b>	1.9	3.4	-1.6

<b>Group B</b>	1.8	2.5	0.4
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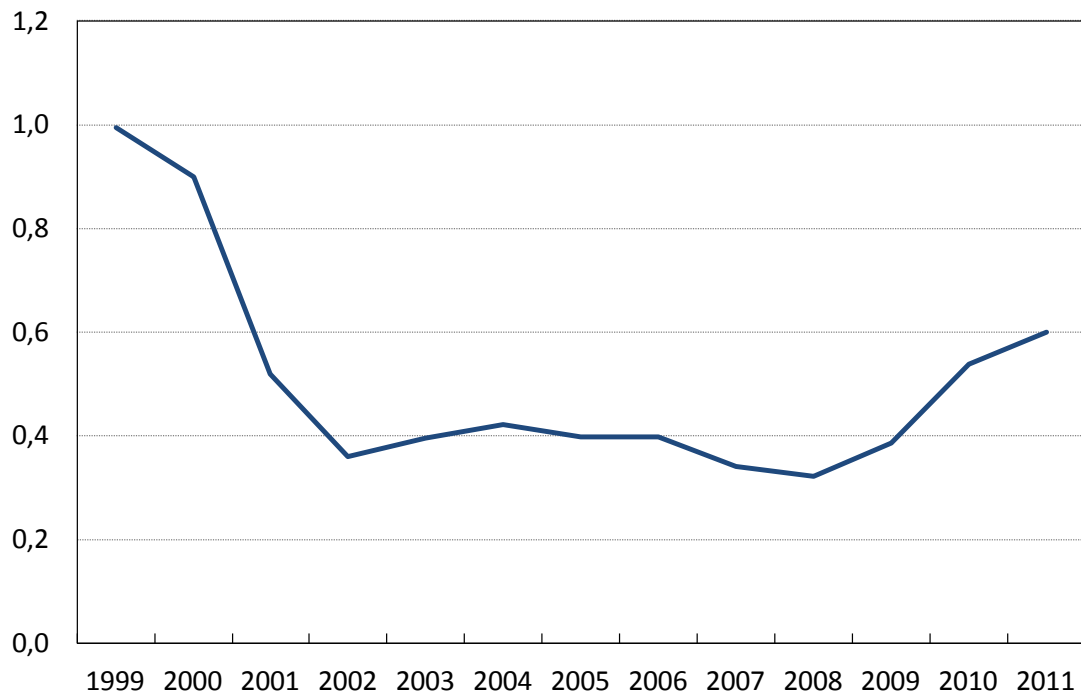
**Table 5. Difference between interest rate and economic growth**

	<b>Whole sample</b>	<b>Pre-crisis years</b>	<b>Crisis years</b>
AUT	0.9	0.7	1.5
BEL	1.0	0.8	1.4
FIN	-0.3	-0.7	0.8
FRA	0.7	0.2	1.8
DEU	2.3	2.3	2.2
GRC	0.2	-1.9	4.9
IRL	-1.8	-6.4	8.6
ITA	1.6	0.7	3.4
NLD	0.2	-0.5	2.0
PRT	0.7	-0.5	3.4
ESP	-1.5	-3.4	2.9
<b>EA11</b>	0.4	-0.8	3.0
<b>Group A</b>	-0.2	-2.3	4.6
<b>Group B</b>	0.8	0.5	1.6

**Figure 1. Debt-to-GDP ratios in 1998**

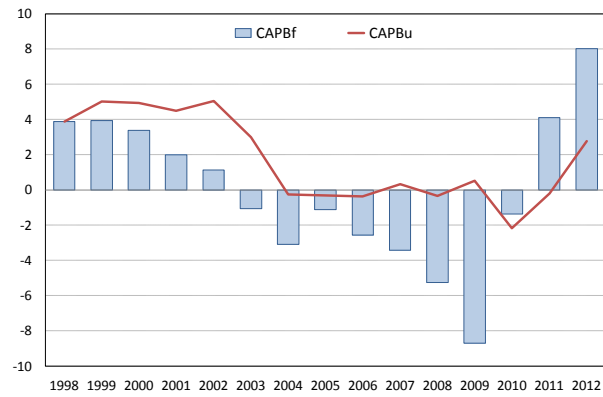


**Figure 2. Standard deviation of implicit interest rates on government debt**

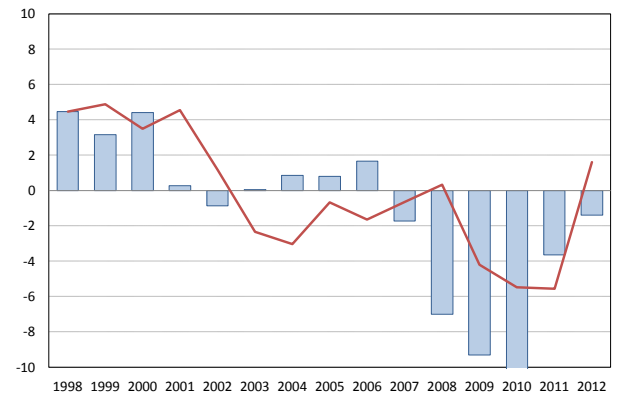


**Figure 3. Actual and reference paths for cyclically adjusted primary balances**

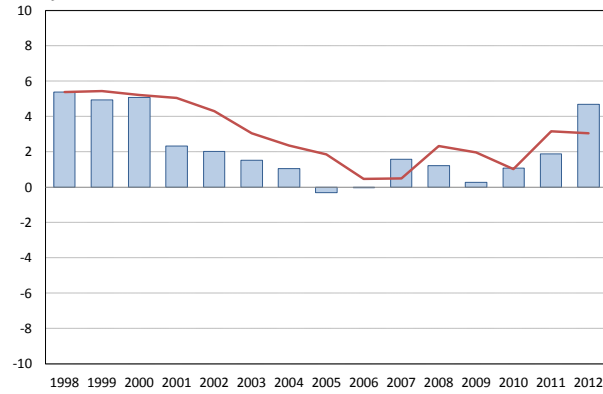
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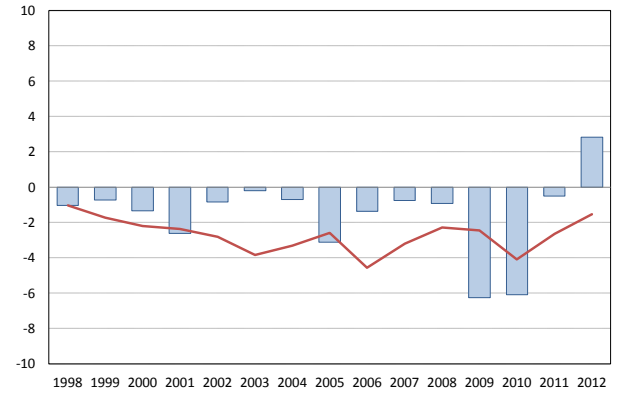
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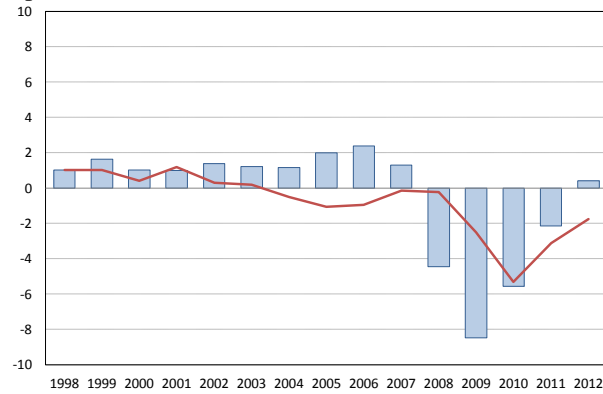
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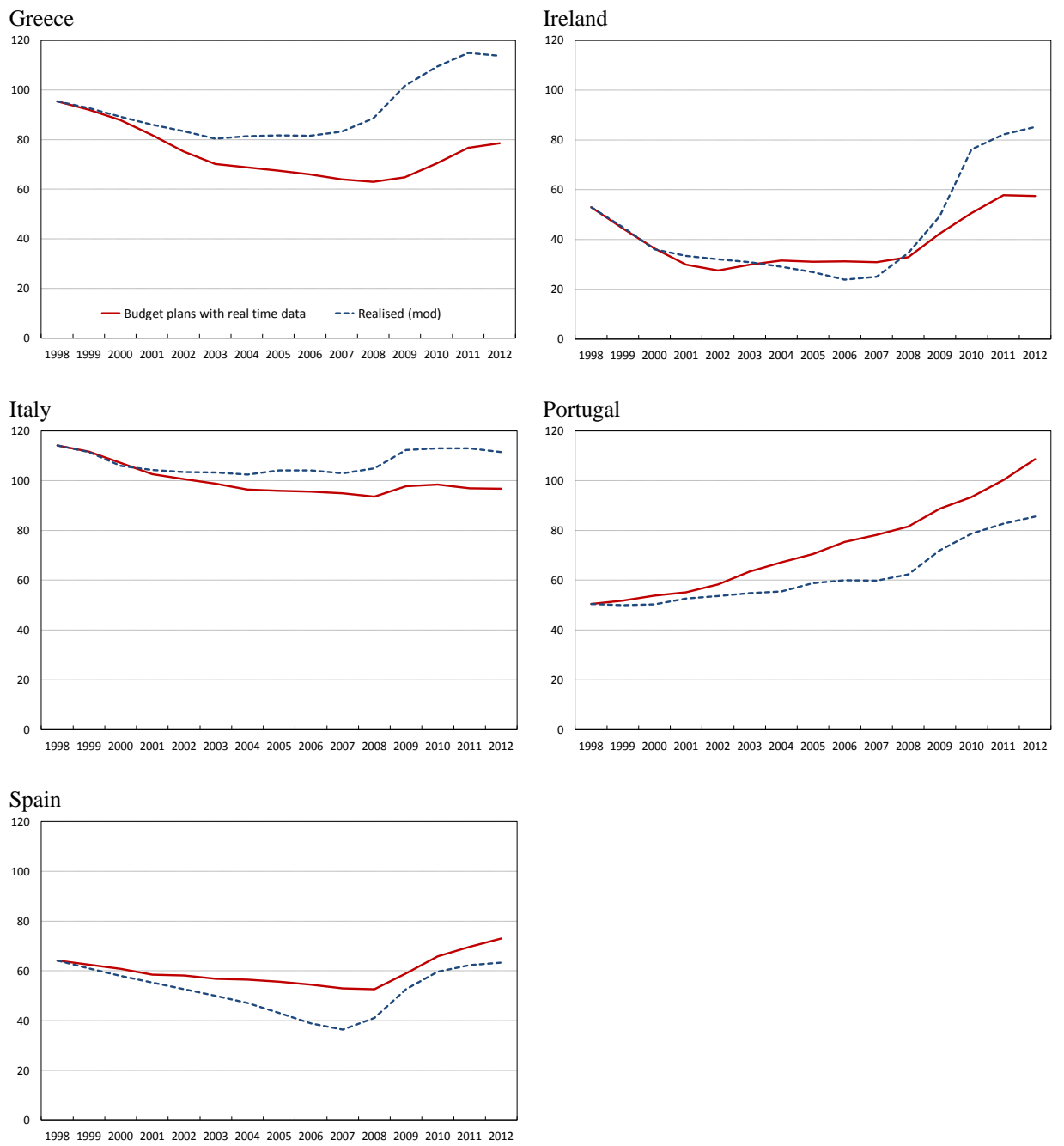
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Spain



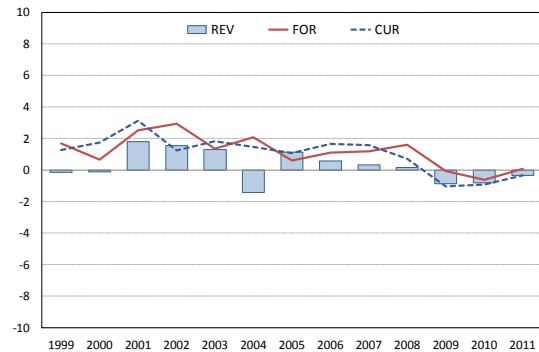
**Figure 4. Actual and reference paths for debt-to-GDP ratios**



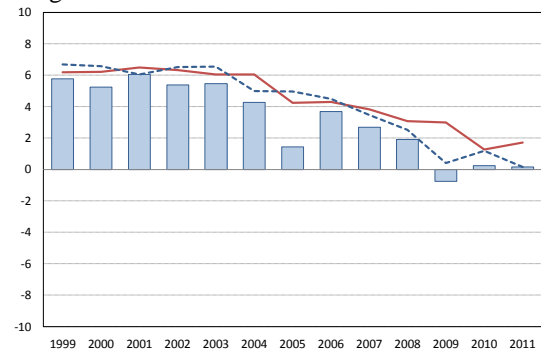
## Appendix 1. Real time and revised data

### Figure 1. Cyclically adjusted primary balances

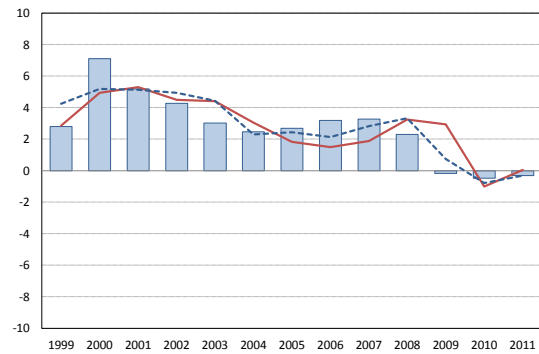
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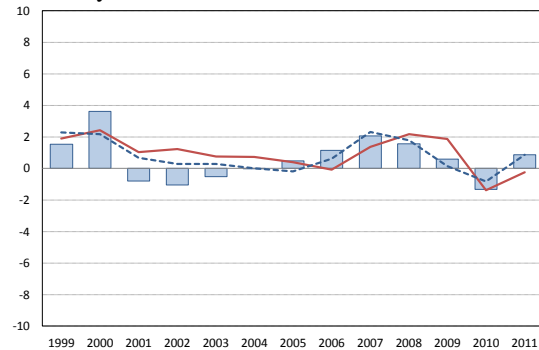
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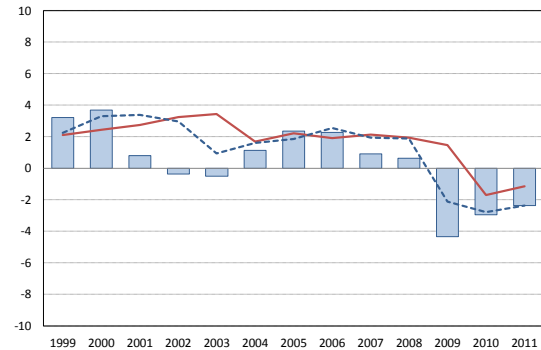
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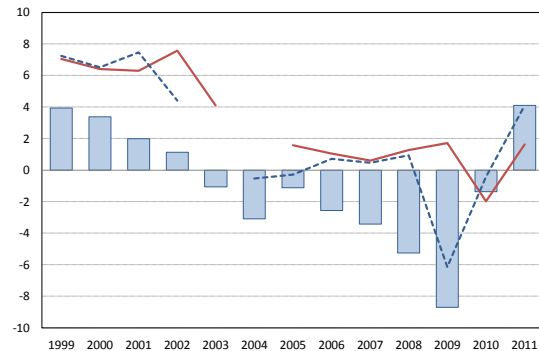
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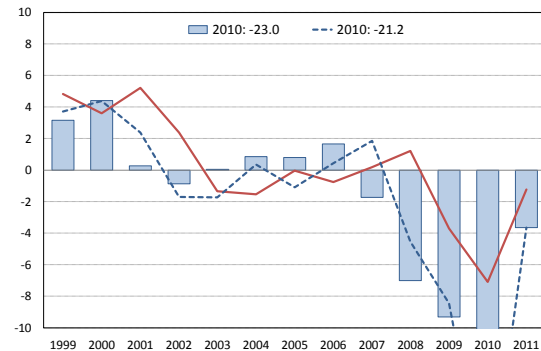
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Greece

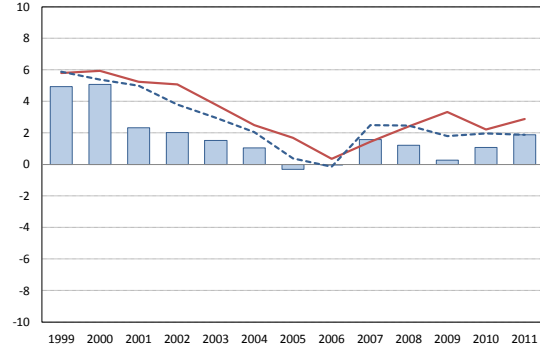


Ireland

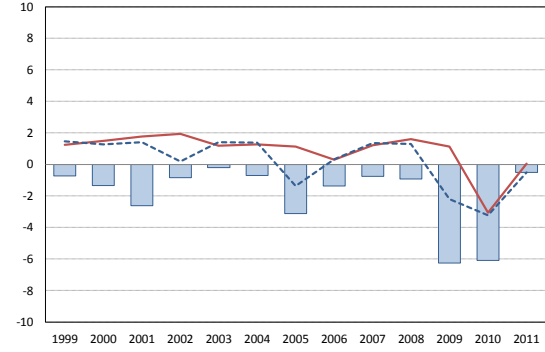




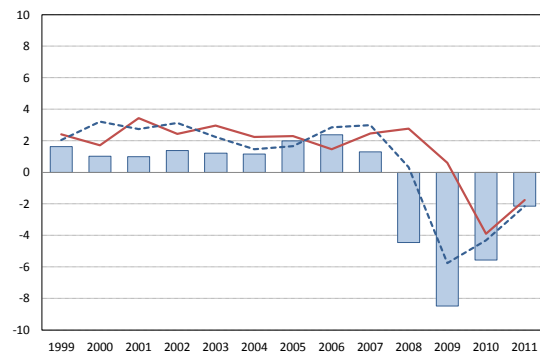
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### Portugal

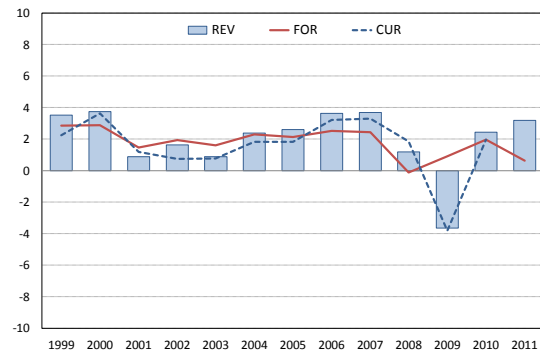


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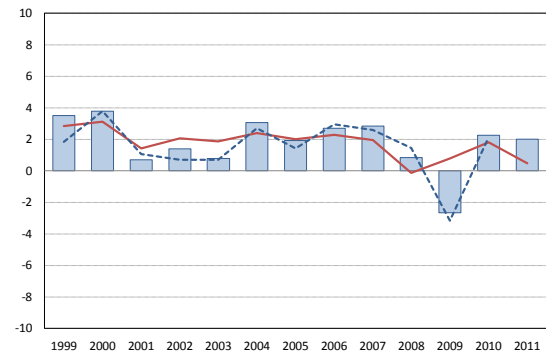


**Figure 2. Real GDP growth rates**

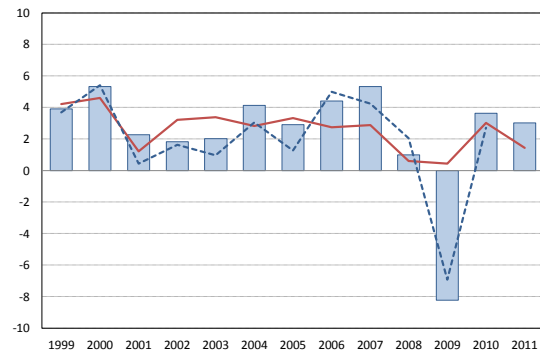
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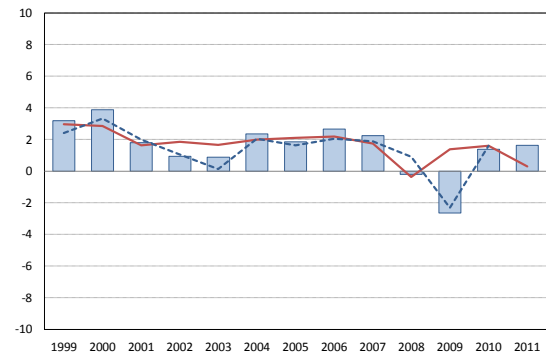
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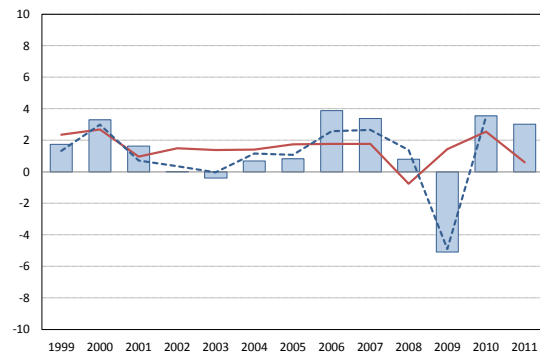
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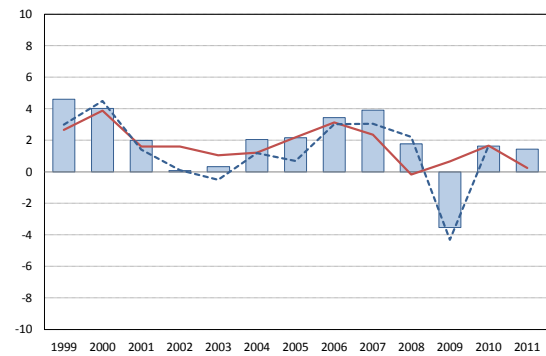
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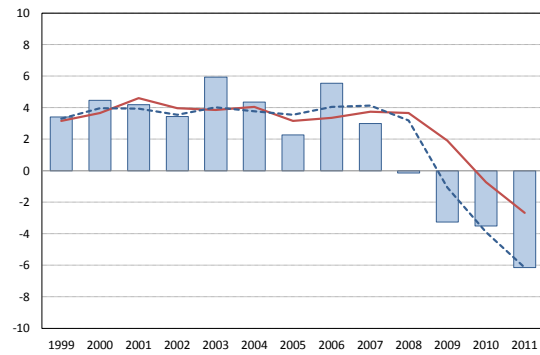
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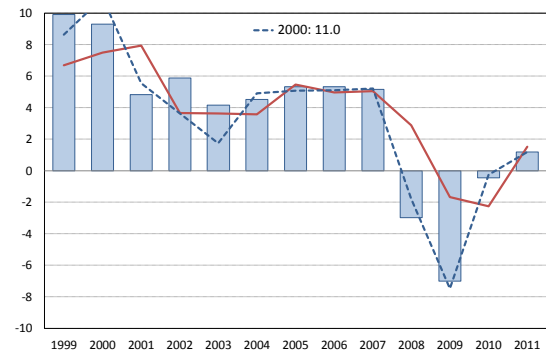
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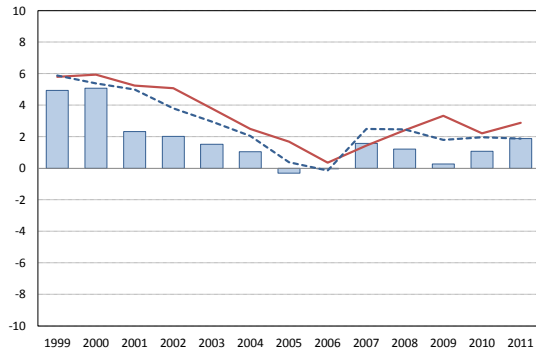
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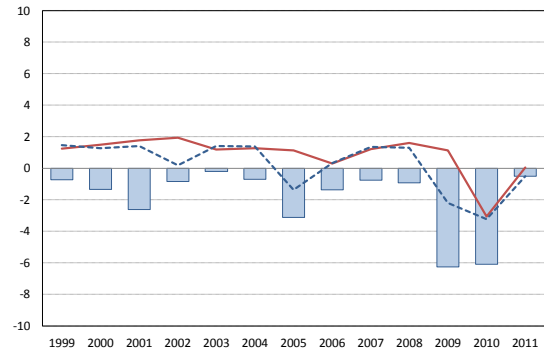
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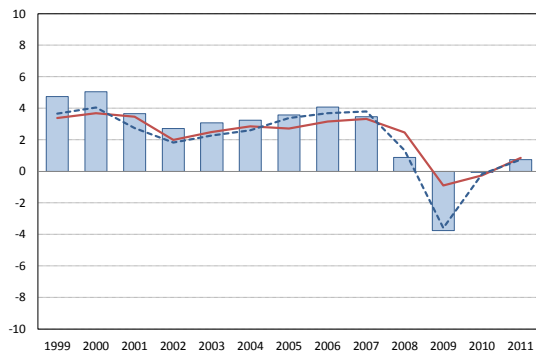
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### Portugal

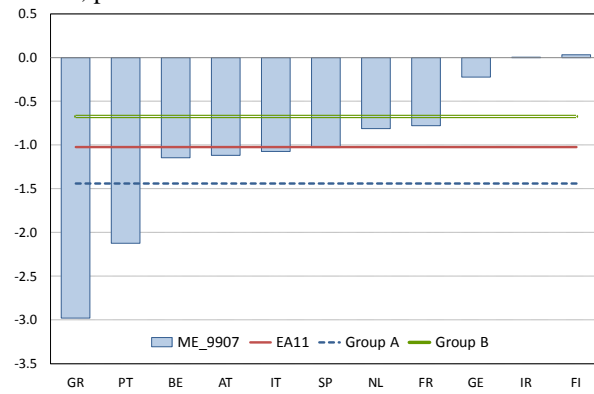


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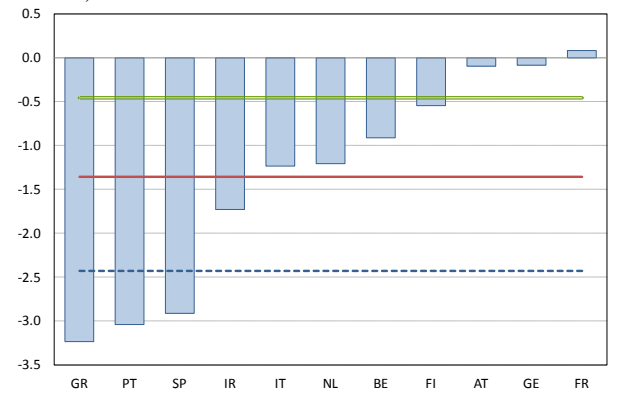


## Appendix 2. Accuracy of real time data, mean errors (ME)

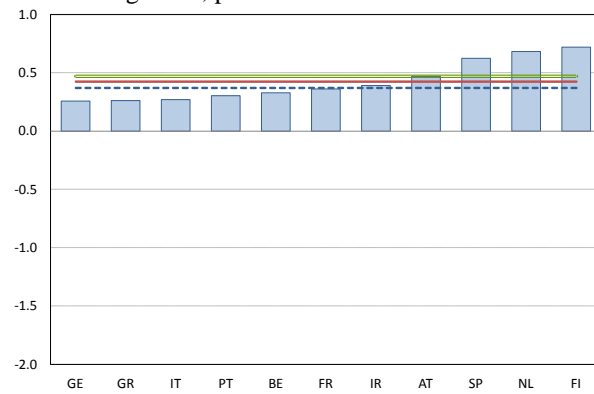
CAPB, pre-crisis



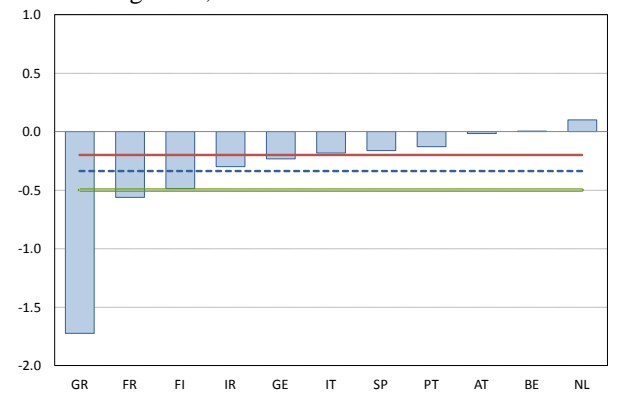
CAPB, crisis



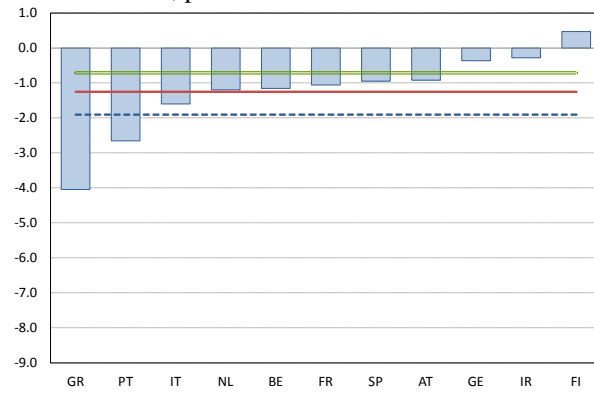
Real GDP growth, pre-crisis



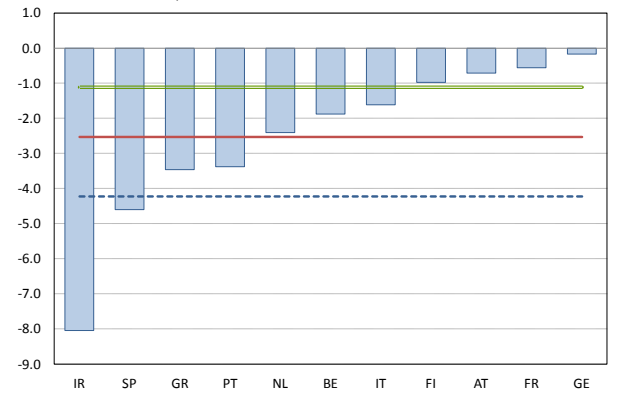
Real GDP growth, crisis



CAPB forecast, pre-crisis

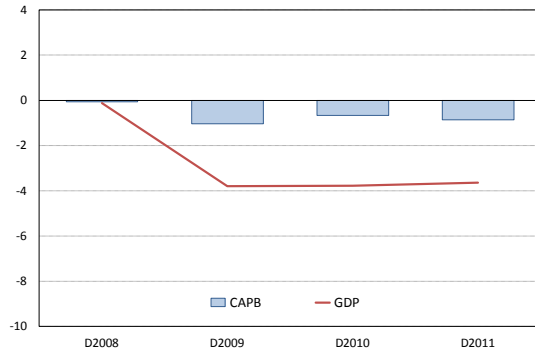


CAPB forecast, crisis

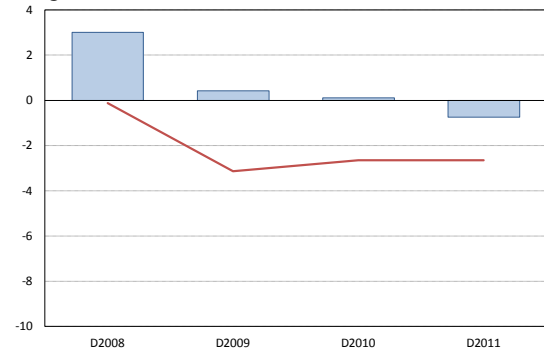


### Appendix 3. Real time assessments for year 2009

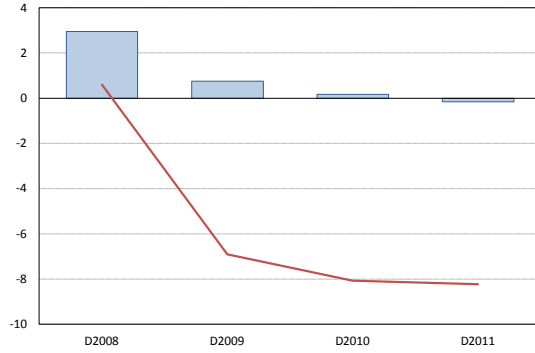
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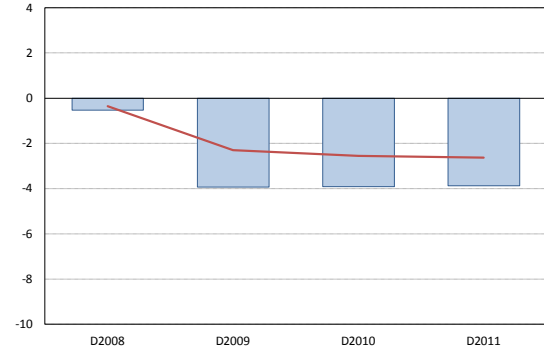
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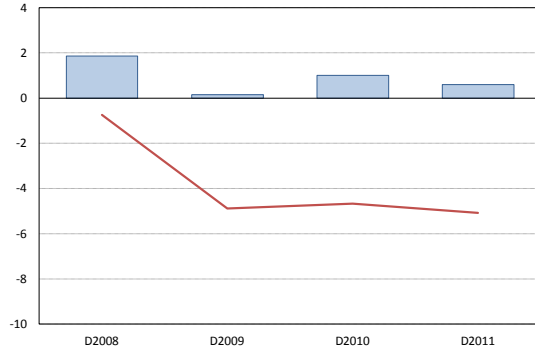
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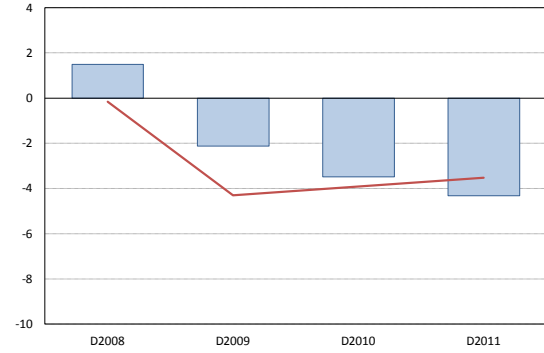
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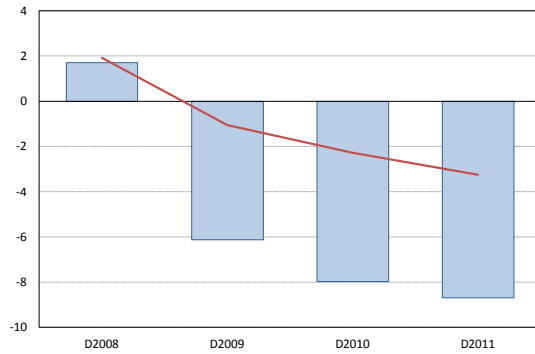
Germany



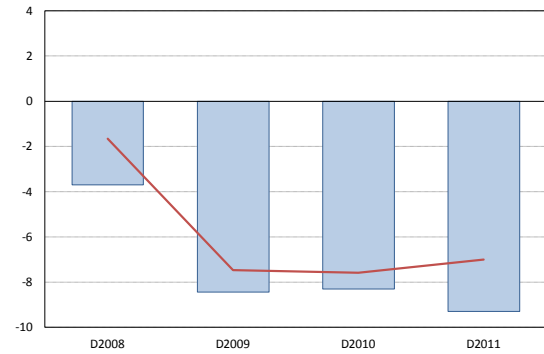
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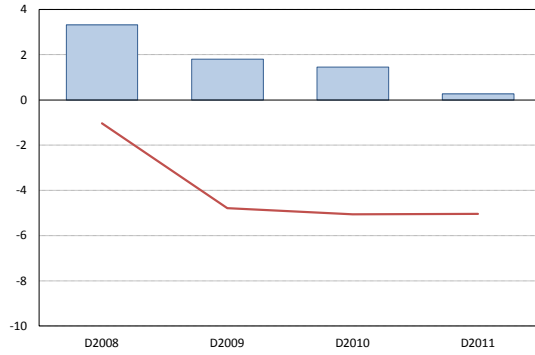
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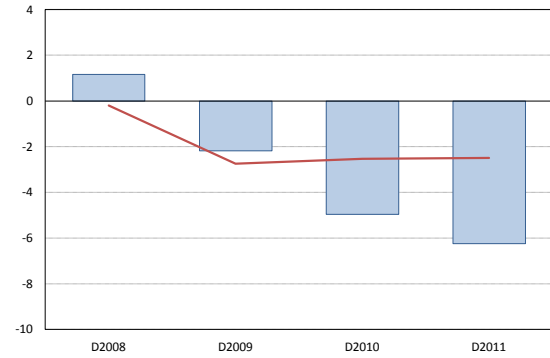
Ireland



### Italy



### Portugal



### Spain



Note: The first observations are forecasts made in the end of 2008 (D2008). Real time current-year estimates were published in December 2009 (D2009). The last two observations are data revisions, made in December 2010 (D2010) and December 2011 (D2011).

#### Appendix 4. Forward-looking ex ante fiscal plans

	Group A	Group B
GDP <sub>t+1</sub>	0.498* (0.160)	0.349* (0.163)
(1-Crisis)*GDP <sub>t+1</sub>		
Crisis*GDP <sub>t+1</sub>		
CAPB <sub>t+1</sub>	0.523* (0.092)	0.707* (0.068)
DEBT <sub>t</sub>	0.078* (0.014)	0.014 (0.012)
R <sup>2</sup>	0.736	0.915
D-W	2.341	2.044
Obs	64	78

Notes: Numbers in parentheses are standard errors. \* refers to significance at 5 % level. The instruments for the output gap –based IV-equation are the real time current and lagged estimates of real GDP growth. Correspondingly, in the model with real GDP growth, the instruments are real time current and lagged estimates of the output gap. In both cases real time current and lagged estimates of the central government debt-to-GDP ratio are also included in the instrument set.

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