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**Working Paper**

## Real time analysis of euro area fiscal policies: adjustment to the crisis

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Helvi Kinnunen – Maritta Paloviita

# **Real time analysis of euro area fiscal policies: adjustment to the crisis**




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## Real time analysis of euro area fiscal policies: adjustment to the crisis

The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Bank of Finland.

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# Real time analysis of euro area fiscal policies: adjustment to the crisis

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Discussion Papers 21/2011

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## Abstract

Using real time data from the OECD and fiscal policy reaction functions, this study explores euro area fiscal policies since the late 1990s. Both discretionary plans for the budget year and policy changes during budget implementation stages are investigated. The main focus is on the fiscal adjustment to the recent financial and economic crisis. The results suggest that during the monetary union (EMU) euro area planned fiscal policies have been long-term oriented and counter-cyclical. In the implementation stages new policy decisions have been made as a response to unexpected economic developments. We provide evidence that the crisis had a clear impact on discretionary policies. Due to the increased uncertainty, the crisis emphasized the impact of cyclical developments on fiscal planning. In the implementation stages, huge forecast errors made in budget planning were observed. As a consequence, new decisions were made in order to alleviate negative impacts of the crisis on the euro area economies.

Keywords: fiscal policy, real time data, planning stage, implementation stage, cyclical sensitivity, economic crisis

JEL classification numbers: E62, E32

# Euromaiden finanssipolitiikka reaaliaikaisen aineiston avulla tarkasteltuna: kriisiin sopeutuminen

Suomen Pankin keskustelualoitteita 21/2011

Maritta Paloviita – Helvi Kinnunen  
Rahapolitiikka- ja tutkimusosasto

## Tiivistelmä

Tässä keskustelualoitteessa tarkastellaan euromaissa harjoitettua finanssipolitiikkaa 1990-luvun lopulta lähtien OECD:n reaaliaikaisen aineiston ja finanssipolitiikan reaktiofunktioiden avulla. Tarkastelussa ovat mukana sekä päätösperäiset budjettisuunnitelmat että politiikkamuutokset budjetin toteutusvaiheessa. Huomion kohteena on erityisesti finanssipolitiikan sopeutuminen viimeaikaiseen rahoituskriisiin ja siitä seuranneeseen taloudelliseen taantumaan. Tulosten mukaan euromaat ovat rahaliiton (EMU) aikana sitoutuneet budjettisuunnitelmiaan pitkän aikavälin suunnitelmiin ja pyrkineet tasaamaan suhdanteita. Budjettien toteutusvaiheessa on reagoitu uusilla päätöksillä yllätyksiin talouskehityksessä. Tutkimus osoittaa, että kriisi muutti euromaiden päätösperäistä finanssipolitiikkaa. Epävarmuuden kasvu korosti kriisin aikana suhdannekehityksen merkitystä budjettisuunnittelussa. Kun budjettien toteutusvaiheessa havaittiin suunnitteluvaiheessa tehdyt huomattavat ennustevirheet, uusilla päätöksillä pyrittiin lieventämään kriisin negatiivisia vaikutuksia euromaiden talouksiin.

Avainsanat: finanssipolitiikka, reaaliaikainen aineisto, politiikan suunnittelu ja toteutus, suhdanneherkkyys, taloudellinen kriisi

JEL-luokittelu: E62, E32

# Contents

Abstract.....	3
Tiivistelmä (abstract in Finnish) .....	4
<b>1 Introduction.....</b>	<b>7</b>
<b>2 Data description .....</b>	<b>9</b>
<b>3 Empirical analysis .....</b>	<b>10</b>
<b>4 Concluding remarks.....</b>	<b>17</b>
Tables.....	18
Appendix 1.....	23
Appendix 2.....	26
References.....	28



# 1 Introduction

During the international financial crisis and subsequent global recession, fiscal policies dampened the decreases in output and employment in the euro area countries. Both automatic stabilizers and a wide range of discretionary policy measures alleviated the negative impacts of the crisis. As a result, the crisis severely weakened public sector finances in the euro area<sup>1</sup>.

Active use of fiscal policy to smoothen economic cycles always entails a significant dose of uncertainty. Fiscal measures may be ineffective and their macroeconomic effects can differ drastically from estimated effects, especially if policy makers fail to take sufficient notice of economic agents' reactions to policy changes. The impact-lags of fiscal measures are also difficult to estimate. For example, fiscal policy is pro-cyclical if expansionary policies do not have effect until the economy has recovered from the slump. Errors in forecasting, however, pose the main risk to inappropriate policy decisions.

Fiscal policy decisions are always based on information available at the time, i.e. real time information. Typically, real time estimates of economic developments are subsequently revised – often several times – before the final (revised) numbers are published. Therefore, the stance of fiscal policy may look quite different in the light of final as opposed to real time data. The recent crisis highlights the uncertainty in evaluating the effectiveness of fiscal policy and the importance of the difference between real time and final data for a balanced assessment of the fiscal policy stance.

It is important to distinguish the budget planning stage from the budget implementation stage in order to get the correct perspective on discretionary fiscal policy. It is in the budget planning stage, where policy plans are made for the budget year, which determine the intended stance of fiscal policy. Fiscal policy in the implementation stage refers to new policy decisions made during the budget year, in response to information available at the time. The use of real time information enables us to analyze the two fiscal stages separately.

Fiscal policy studies are often based on fiscal policy reaction functions and real time information<sup>2</sup>. Cimadomo (2008), for instance, analyses fiscal policy in 19 industrial countries in 1994 – 2006. The results show that, based on final data, fiscal policy in OECD countries was relatively pro-cyclical, whereas it was

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<sup>1</sup> For more on euro area fiscal policies during the crisis, see eg van Riet (ed.) (2010). Future challenges are discussed in Cimadomo (2011a).

<sup>2</sup> See Cimadomo (2011b) for a survey of the real time fiscal policy literature.

counter-cyclical from the perspective of real time data. Pina (2009), using European Commission data, also shows that, based on real time data, fiscal policy in 15 EU countries has generally been more counter-cyclical than is suggested by the final data. In Beetsma et al. (2009) the budget implementation process in EU countries is examined using a real time data set for the years 1998 – 2007. The results of that study suggest that strong national fiscal institutions contribute to ambitious fiscal plans and effective implementation. Fiscal planning and budget implementation stages in the Netherlands are analyzed in Beetsma et. al. (2010). Using real time data over the period 1958 – 2009, that study finds evidence that institutional factors are important for understanding the objectives of fiscal planning. Beetsma and Giuliadori (2010) study fiscal plans and their implementation in OECD countries in 1995 – 2006. Using real time data they find that empirical identification of the fiscal planning and implementation stages is crucial. They provide evidence that fiscal plans have been a-cyclical in EU countries and counter-cyclical in other OECD countries. Moreover, in the implementation stage, the response of EU countries to unexpected changes in the output gap has been pro-cyclical. By contrast, in other OECD countries the response has been a-cyclical.

Recently, a growing number of studies have investigated the exceptional policy measures implemented during the crisis. Also, the worsened fiscal positions and endangered long-term sustainability of public finances have been at the center of analytical and practical fiscal policy debate. However, the issue of how the crisis has affected both the planned and the implemented policies has not yet been examined intensively.

Our study contributes to the current literature and policy debate by examining euro area discretionary fiscal policy in the EMU period, focusing separately on policy changes during the crisis. The planning and implementation stages are distinguished via real time panel data constructed from OECD Economic Outlook publications (June and December issues). Although, the final data for recent years have not yet been published, the currently available real time information enables us to investigate possible policy changes during the crisis. Both fiscal policy reaction functions and specifications that explain policy changes in the budget implementation stage are estimated using panel data for ten euro area countries.

The results suggest that during the time of monetary union (EMU) euro area planned fiscal policies have been long-term oriented and counter-cyclical. In the implementation stages new policy decisions have been made in response to unexpected economics developments. We provide evidence that the crisis had a definite impact on discretionary policies. Due to the increased uncertainty, the crisis spotlighted the impact of cyclical developments on fiscal planning. In the

implementation stages, huge forecast errors in connection with planned policy were observed. As a consequence, policies were significantly adjusted in order to alleviate the negative impacts of the crisis on euro area economies.

The paper proceeds as follows. Section 2 presents the data and analyses the forecast accuracy. Empirical analysis is reported in Section 3 and conclusions are drawn in section 4.

## 2 Data description

Annual real time data for the period 1997 – 2010 are constructed using OECD Economic Outlook publications, for June and December, issues No. 61 – 88. Twelve euro area countries are included in the study: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain. 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 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 one or two calendar years. The final data, for our purposes, are from the latest annual Economic Outlook (December 2010, No. 88)<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 fiscal plans are made. Correspondingly, the June issues reflect the real time information available to policy makers during budget implementation stages.

Next, we look at the data and some standard summary statistics of forecast accuracy. We also show how real time estimates for a certain year have evolved

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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 that are not due to fiscal actions, such as changes in interest rates and the effects of prior developments in debts and receivables.

<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.

over time. Figures 1 – 3 in Appendix 1 depict real time estimates of economic developments over the period 2008 – 2010. They clearly indicate that the crisis was deep and unexpected. In 2008 real GDP growth forecasts for the next year were overoptimistic for all the countries. Output gap developments reflect sharp decreases in aggregate activity as measured by the real GDP. Cyclically adjusted primary balances decreased substantially, demonstrating the exceptionally large fiscal stimulus applied during the crisis.

[Insert Table 1 here]

Table 1 provides summary information on the average accuracy of December forecasts. We compare real time estimates of current-year outcomes with previous-year forecasts of those outcomes. Three different periods are compared: 1998 – 2010 (the whole sample), 1998 – 2007 (pre-crisis period) and 2008 – 2010 (crisis period). As shown in Table 1, forecasts were not very accurate during the recession years; both the Mean Absolute Errors (MAE) and Root Mean Squared Errors (RMSE) were twice as large as in previous years and the debts were systematically underestimated. One might well surmise that the exceptionally large forecast errors have had an impact on fiscal policies in the crisis years.

Figures in Appendix 2 show illustratively how the assessments of economic developments in the year 2009 changed in the course of time. Until the end of 2008, in most of the countries the primary balance in 2009 was projected to remain in surplus. In June 2009 the estimates were revised downwards substantially and many of them became negative. For Belgium and Greece, the biggest downward revisions were not made until around the end of 2009. Only for Italy did the primary balance estimates for year 2009 remain roughly unchanged over time. The output gap estimates and real GDP growth estimates were also revised downwards sharply in mid-2009. After that, cyclical variables were typically revised slightly upwards. Only for Finland, were the estimates for output gap and real GDP growth substantially revised further downwards after summer 2009. Overall, the figures clearly show that the crisis hit the euro area countries at the same time (in mid-2009). It is clear that the recession was unexpected and deep.

### **3 Empirical analysis**

In this section we analyse euro area discretionary fiscal policies in the EMU period using simple regressions and the panel data described above. Planned fiscal policies and policy changes in the budget implementation stages are examined separately. Special attention is paid to policy inertia and cyclical sensitivity of

policy decisions. In addition, the impacts of the recent crisis on euro area fiscal policies are examined in more detail. Greece and Ireland are excluded from the regression analysis, because due to exceptional developments the observations for these countries qualify as outliers. Consequently, including them could distort the analysis of average euro area policies.

### 3.1 Planned fiscal policies

Fiscal policy plans for the next year are generally made after summer. By the end of the year, fiscal authorities approve the budget for the next year. Since planned policies are always decided on the basis of information available at the time, it is natural to use December information from the OECD Economic Outlook publications for analysing planned policies.

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 how persistent the planned policies are. Consequently, a fiscal policy reaction function can be used to assess whether fiscal policy is systematically pro- or counter-cyclical. Using real time analysis, we examine how euro area planned policies (the primary focus of policy makers) have responded to expected cyclical conditions in the budget year. Thus, we make use of forward looking reaction functions. Discretionary fiscal actions are measured by the cyclically adjusted primary balance (CAPB), ie the difference between tax revenues and expenditures, the dynamics of which are determined by the reaction function, specified as

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

In equation (1) the variable  $CAPB_{t+1}^t$  reflects policy actions planned at time  $t$  for the next period, and the term  $GAP_{t+1}^t$  is a real time (period  $t$ ) estimate of the output gap in period  $t+1$ . The variable  $CAPB_t^t$ , is a real time estimate of the current primary balance in period  $t$  and is a measure of fiscal policy inertia (persistence)<sup>6</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,

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<sup>6</sup> Other factors influencing fiscal policy plans can be taken into account by adding variables to the reaction function. The ratio of gross debt to GDP, the government deficit or variables related to demographics are typical additional variables in reaction functions (see, for example, Beetsma and Giuliodori 2010).

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, 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, so that there is less leeway for discretionary measures<sup>7</sup>. Because potential GDP and the output gap measures are subject to considerable uncertainty, we use real GDP growth as an alternative measure of cyclical conditions. In order to conduct a robustness analysis of the forward-lookingness of budget planning, we also estimate the reaction functions, which are based on real time current-year estimates of the output gap or real GDP growth.

There are differences in the conduct of fiscal policy 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. In panel estimations cross-country differences are taken into account by using the country-specific constants (cross section fixed effects).

In the forward looking equation (1) fiscal policy plans and the expected cyclical situation may be correlated. Thus, there might be feedback effects from planned policy to the output gap (or real GDP growth). Possible simultaneity problems are taken into account in the estimations by employing instrumental variables. Our empirical analysis is based on the panel two-stage least squares method. When equation (1) is based on current-year estimates of cyclical conditions, ordinary least squares method (OLS) is used.

First, we examine whether planned fiscal policies in the euro area countries have been historically pro- or counter-cyclical and how plan-determined (persistent) their policies have been. We then analyze the effects of the recent crisis on fiscal-policy plans. In order to distinguish between the crisis period and the pre-crisis period, we add a dummy variable to the reaction function. The CRISIS dummy is equal to zero in 1999 - 2008 and equal to one in 2008 - 2010<sup>8</sup>. We investigate, whether the effect of cyclical conditions on policy plans changes during the crisis

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<sup>7</sup> Afonso et. al. (2010) find a negative correlation between degrees of discretionary leeway and persistence, which supports this view.

<sup>8</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 similar approach in studying the stability of fiscal rules for EMU countries before and after the Maastricht Treaty.

and whether the crisis had an impact on policy inertia. We use the Wald test of coefficient restrictions in order to determine, whether the impact of the crisis on planned policies was statistically significant.

[Insert Table 2 here]

Results for equation (1) are reported in table 2, and the corresponding Wald test results are summarized in table 3. The IV-columns give results for the forward looking models and OLS-columns display the corresponding results for the models without forward looking variables. 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.

Overall, the results in table 2 without the crisis dummy indicate that the reaction function provides a reasonable representation of planned fiscal policy in the euro-area countries. The explanatory power of the reaction function is quite high, and the estimated coefficients have the correct signs and reasonable magnitudes. All estimated coefficients are statistically significant at the 5% level in the forward looking models. Among the OLS results, only the estimated output-gap coefficient is not significant at the 5% level.

The crisis seems to have affected euro area planned policies. When the crisis dummy is used in equation (1) to separate the two periods, we obtain evidence that the cyclical sensitivity of fiscal plans increased during the crisis (we obtain higher coefficient estimates of the cyclical variable for the crisis years than for the earlier years). Both the expected output gap and the current real GDP growth are statistically significant only in the crisis period, which is reasonable. During the crisis, it was very challenging for policy makers to assess future cyclical conditions in the planning stage. In order to avoid policy mistakes, also real time current GDP growth estimates were taken into account in fiscal planning. Policy inertia seems to have decreased only slightly during the recession (in three of four cases). In spite of some policy changes reported in table 2, the impact of the crisis on euro area fiscal policies was however quite limited. According to the Wald test the estimated coefficients for the two periods are not statistically different in most of the cases in table 3.

[Insert Table 3 here]

Overall, the estimation results reported above suggest that in the EMU period euro area planned fiscal policies have generally been quite long-term oriented (persistence coefficient varies between 0.6 – 0.8). In addition, the real time views of cyclical conditions have impacted the fiscal plans. The cyclical situation coefficients are larger in the forward looking models than where the current-year's variables are used. This is reasonable, since it is obvious that actual fiscal planning is forward looking. The crisis seems to have altered the effect of cyclical conditions on fiscal planning.

### 3.2 Fiscal policy adjustment in the implementation stage

Next, we analyze how euro area fiscal policies reacted to new information during the budget year. More precisely, we investigate policy makers' reassessments of economic conditions in the course of the budget year. Using real time information we are able to capture the economic situation confronting policy makers when previously planned policy measures are implemented. If the fiscal situation or cyclical conditions have changed substantially from the view prevailing when fiscal plans were made, fiscal policy is adjusted (i.e. new decisions are made). In the analysis of policy changes in the implementation stage, we use both June and December information from the OECD Economic Outlook publications.

The term  $CAPB_t^{t,t-1} (= CAPB_t^t - CAPB_t^{t-1})$  is the difference between the real time current-year estimate of the primary balance and the corresponding last-year forecast. Correspondingly, we define the variable  $CAPB_{t-1}^{t,t-1} (= CAPB_{t-1}^t - CAPB_{t-1}^{t-1})$  as the difference between the real time view of last year's primary balance and the real time estimate of the current-year primary balance, as assessed last year. We also measure revision of the cyclical situation at the interim stage of the budget year as  $GAP_t^{tj,t-1} = GAP_t^{tj} - GAP_t^{t-1}$ , i.e. the difference between a real time mid-year estimate of the current year output gap and the corresponding expected output gap at the time of fiscal planning. The mid-year real time estimate  $GAP_t^{tj}$  is based on June information from the OECD. We follow Beetsma and Giuliodori (2010) and estimate the regression

$$CAPB_t^{t,t-1} = c + \phi CAPB_{t-1}^{t,t-1} + \rho CAPB_t^{t-1} + \theta GAP_t^{tj,t-1} + \mu_t \quad (2)$$

In equation (2) the adjustment to discretionary policy during the budget year is explained by the three factors which relate real time information at the time of fiscal planning to real time information at the time of budget implementation. During the implementation stage, fiscal policy is adjusted to new information related to the previous year's primary balance, last year's fiscal plans and new

information on cyclical conditions. The term  $CAPB_t^{t-1}$  refers to the budget process effect on fiscal adjustment. The budget planning stage and implementation stage are closely linked, since it is clear that large forecast errors in the planning state increase the need to adjust policy in the course of the budget year.

Equation (2) obviates potential endogeneity problems, since we use real time mid-year estimates of the output gap. It is reasonable to assume that it takes at least a half year before the error in the fiscal stance has an impact on the output gap. Therefore, equation (2) can be estimated using OLS method. Again, the estimations include country-specific constants and two alternative measures of cyclical conditions. The EMU period estimation results, with and without the crisis dummy, are reported in table 4. The corresponding Wald test results are shown in table 5. First we investigate the primary balance effects and cyclical effects on fiscal policy adjustment separately. Then we analyze the total effect of all factors<sup>9</sup>.

[Insert Table 4 here]

[Insert Table 5 here]

The primary balance effects are reported in section A of table 4. The results indicate that when assessing the EMU period without separating the crisis period, only the base effect is important for fiscal adjustment in the implementation stage. The non-significant effect of the budget process may be related to stable fiscal policy frameworks in the euro area countries. (In the case of the budget process effect, the estimated coefficient and  $R^2$  are very low.) When the crisis years and previous years are examined separately, the  $R^2$  values are higher and the estimated coefficients are higher for the crisis period compared to the earlier years. Interestingly, the budget process effect is significant in the crisis period. This may reflect the huge forecast errors of primary balances observed in 2008 – 2010. It is worth noting that the budgetary process is significantly estimated only for the crisis period with a negative sign. It indicates that planned budget surpluses tend to be followed by downward revisions in the implementation stage. As reported in table 5, the Wald test suggests that the change in fiscal adjustments due to the base effects and the budget process effects were statistically significant during the crisis period.

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<sup>9</sup> In order to take into account potential serial correlation in the error terms, the lagged dependent variable was also included in the original regressions. Since this term was not statistically significant, it was not included in the results reported here.

Next, we consider whether the revised view of the cyclical situation has affected fiscal adjustment (see section B in table 4). The estimation results for the whole EMU period (incl. the crisis period) suggest that fiscal plans have been adjusted in response to new information on both cyclical variables. When the specification is based on real GDP growth (instead of the output gap), both the estimated coefficient and the explanatory power of the equation are higher. However, when the model is estimated over the two subsamples corresponding to the pre-crisis and crisis periods using the crisis dummy, we obtain evidence that the output gap contributed significantly to policy change only during the crisis. Only in the case of the output gap, does the Wald test suggest that fiscal policy adjustment changed significantly during the crisis. This confirms the results obtained in the analysis of planned policies in the previous section: the importance of the output gap for discretionary policy decisions increased during the crisis.

Measured by the estimated total effect of the three factors analyzed above (see section B in table 4), we conclude that the model is able to capture quite well the changes of policy during the budget year. The crisis emphasized the role of both the output gap and the budget process on fiscal adjustment. According to the Wald test, the change in fiscal policy adjustment was significant in the crisis years (see table 5).

All in all, the empirical analysis presented above indicates that during the monetary union (EMU) euro area planned fiscal policies have been long-term oriented and counter-cyclical. In the implementation stages fiscal plans have been adjusted in response to unexpected macroeconomic developments. We provide evidence that the crisis had a clear impact on discretionary policies. The impact of the cyclical situation on fiscal planning increased due to heightened uncertainty. In the implementation stages huge realized forecast errors relative to information available at the time of budget planning stage were observed. As a consequence, policies were adjusted substantially in the implementation stage in order to alleviate the negative effects of the crisis on euro area economies. The results reflect increased uncertainty and huge forecast errors during the recession. The crisis was unexpected and deep. During the crisis years, fiscal plans were adjusted in the course of the budget year more extensively than in the pre-crisis years. Especially in June 2009, the real time assessments of economic conditions were totally different than a half year earlier (see appendix 2).

It is worth noting that the crisis seems to have emphasized the importance of the output gap as a measure of cyclical conditions for fiscal policy purposes. This is reasonable, since during a deep recession real GDP growth and the output gap can give very different pictures of the cyclical situation. For instance, looking at GDP growth, one may see the recession as a collapse in a single year whereas the

output gap may indicate a long-lasting downswing (as long as output remains below potential). Unlike the output gap, the growth of real GDP does not point to a long-term collapse of economic activity in the crisis years. Therefore, real GDP growth did not provide a very revealing picture of economic performance for fiscal policy purposes. Instead, the output gap more clearly reflected the economic dip caused by the recession. The level of output remained below potential for several years (see figures 2 and 3 in appendix).

## **4 Concluding remarks**

This paper examines discretionary fiscal policies in the euro area countries since the late 1990s. Both fiscal plans for budget years and policy changes during the budget implementation stages are investigated using real time data constructed from the June and December issues of the OECD's Economic Outlook. The main focus of the study is on fiscal adjustment to the recent financial and economic crisis. Greece and Ireland are excluded from the analysis, since exceptional developments in these countries would have distorted the results.

The results indicate that during the crisis forecast errors and statistical revisions in the euro area countries were considerably larger than before. Although the global recession hit all the euro countries at the same time, the cross-country differences in forecast errors and statistical revisions were significant. Conditions in the crisis countries were notably different than in the other countries.

The results suggest that during the time of monetary union (EMU) euro area planned fiscal policies have been long-term oriented and counter-cyclical. Moreover, in the implementation stages new policy decisions have been made in response to unexpected economic developments. The crisis changed the discretionary policies in the euro area. More attention was paid to cyclical developments in fiscal planning. In the implementation stages, policies were adjusted significantly on the basis of real time information.

Fiscal adjustment after the budget planning stage may have negative effects on the economy. Economic agents form their expectations on the basis of fiscal plans. If, however, plans are notably adjusted in the implementation stage, it might be costly for economic agents to change their behaviour accordingly. All in all, the results indicate that during the deep recession, when economic uncertainty was widespread and monetary policy was accommodative and partly based on non-standard policy measures, fiscal policies were adjusted considerably in order to alleviate the negative impacts of the crisis on euro area economies.

## Tables

**Table 1. Average forecast accuracy in the euro area**

	1998–2010		
	ME	MAE	RMSE
Cyclically adjusted primary balance, % of potential GDP	-0.39	1.11	1.61
Ratio of gross government debt to GDP	0.79	3.24	4.39
Output gap, % of potential GDP	-0.05	0.81	1.12
Real GDP growth, %	-0.44	1.18	1.57
	1998–2007		
	ME	MAE	RMSE
Cyclically adjusted primary balance, % of potential GDP	0.06	0.81	1.00
Ratio of gross government debt to GDP	-0.34	2.48	3.04
Output gap, % of potential GDP	0.08	0.67	0.83
Real GDP growth, %	-0.14	0.90	1.10
	2008–2010		
	ME	MAE	RMSE
Cyclically adjusted primary balance, % of potential GDP	-1.71	2.05	2.63
Ratio of gross government debt to GDP	4.57	5.75	6.98
Output gap, % of potential GDP	-0.54	1.31	1.65
Real GDP growth, %	-1.46	2.10	2.53

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

**Table 2. Estimates for euro area planned fiscal policies in the planning stage**

<b>Cyclical variable: output gap</b>	<b>IV</b>		<b>OLS</b>	
	EMU period	Before and during the crisis	EMU period	Before and during the crisis
$GAP_{t+1}$	0.267* (0.082)			
$Crisis * GAP_{t+1}$		0.199* (0.073)		
$(1-Crisis) * GAP_{t+1}$		0.121 (0.082)		
$GAP_t$			0.044 (0.038)	
$Crisis * GAP_t$				0.069 (0.044)
$(1-Crisis) * GAP_t$				0.006 (0.057)
$CAPB_t$	0.557* (0.086)		0.770* (0.039)	
$Crisis * CAPB_t$		0.596* (0.098)		0.705* (0.063)
$(1-Crisis) * CAPB_t$		0.640* (0.082)		0.769* (0.048)
$R^2$	0.881	0.907	0.919	0.921
D-W	1.619	1.890	2.046	2.075
Obs	114	114	114	114
<b>Cyclical variable: real GDP growth</b>	<b>IV</b>		<b>OLS</b>	
	EMU period	Before and during the crisis	EMU period	Before and during the crisis
$GDP_{t+1}$	0.422* (0.140)			
$Crisis * GDP_{t+1}$		0.269 (0.174)		
$(1-Crisis) * GDP_{t+1}$		0.137 (0.116)		
$GDP_t$			0.132* (0.029)	
$Crisis * GDP_t$				0.197* (0.036)
$(1-Crisis) * GDP_t$				0.046 (0.042)
$CAPB_t$	0.650* (0.066)		0.725* (0.033)	
$Crisis * CAPB_t$		0.797* (0.101)		0.682* (0.050)
$(1-Crisis) * CAPB_t$		0.789* (0.078)		0.776* (0.039)
$R^2$	0.883	0.912	0.932	0.938
D-W	2.282	2.194	1.802	1.819
Obs	114	114	114	114

Numbers in parentheses are standard errors. \* refers to significance at 5 % level.

**Table 3. Wald test results for the planning stage**

<b>Null Hypothesis</b>	<b>Output gap</b>	<b>Real GDP growth</b>
<b>Forward looking reaction function</b>		
No change in cyclical response	F = 0.802 (0.373)	F = 0.594 (0.443)
No change in policy persistence	F = 0.255 (0.615)	F = 0.006 (0.939)
No change in planned policy	F = 0.528 (0.591)	F = 0.302 (0.740)
<b>Reaction function based on current economic conditions</b>		
No change in cyclical response	F = 0.996 (0.321)	F = 7.833 (0.006)
No change in policy persistence	F = 0.959 (0.330)	F = 2.565 (0.112)
No change in planned policy	F = 1.013 (0.367)	F = 4.434 (0.014)

p values in parentheses.

**Table 4. Estimates for euro area fiscal policies in the implementation stage**  
**Dependent variable:**  $CAPB_{i,t}^{t,t-1}$

**Section A: Primary balance effects.**

	Base effect		Budget process	
$CAPB_{t-1}^{t,t-1}$	0.949* (0.118)			
$CRISIS \times CAPB_{t-1}^{t,t-1}$		1.253* (0.190)		
$(1 - CRISIS) \times CAPB_{t-1}^{t,t-1}$		0.800* (0.138)		
$CAPB_t^{t-1}$			-0.048 (0.078)	
$CRISIS \times CAPB_t^{t-1}$				-0.346* (0.108)
$(1 - CRISIS) \times CAPB_t^{t-1}$				0.057 (0.079)
$R^2$	0.442	0.463	0.089	0.203
D-W	2.289	2.339	2.007	1.953
Obs	113	113	113	113

Numbers in parentheses are standard errors. \* refers to significance at 5 % level.

**Section B: Cyclical and total effects.**

	Output gap				Real GDP growth			
	Cyclical effect		Total effects		Cyclical effect		Total effects	
$CAPB_{t-1}^{t,t-1}$			0.901* (0.100)				0.716* (0.095)	
$CRISIS \times CAPB_{t-1}^{t,t-1}$				1.267* (0.159)				1.014* (0.161)
$(1 - CRISIS) \times CAPB_{t-1}^{t,t-1}$				0.751* (0.107)				0.684* (0.108)
$GAP_t^{tj,t-1}$	0.498* (0.091)		0.436* (0.068)					
$CRISIS \times GAP_t^{tj,t-1}$		0.618* (0.098)		0.410* (0.078)				
$(1 - CRISIS) \times GAP_t^{tj,t-1}$		0.002 (0.201)		0.079 (0.141)				
$GDP_t^{tj,t-1}$					0.595* (0.064)		0.464* (0.054)	
$CRISIS \times GDP_t^{tj,t-1}$						0.622* (0.068)		0.411* (0.066)
$(1 - CRISIS) \times GDP_t^{tj,t-1}$						0.426* (0.161)		0.197 (0.131)
$CAPB_t^{t-1}$			- 0.121* (0.052)				-0.066 (0.047)	
$CRISIS \times CAPB_t^{t-1}$				- 0.318* (0.075)				- 0.226* (0.076)
$(1 - CRISIS) \times CAPB_t^{t-1}$				-0.105 (0.054)				-0.066 (0.050)
$R^2$	0.294	0.344	0.615	0.698	0.506	0.512	0.686	0.727
D-W	2.090	1.987	2.062	2.004	2.281	2.232	2.199	2.130
Obs	113	113	113	113	113	113	113	113

Numbers in parentheses are standard errors. \* refers to significance at 5 % level.

**Table 5. Wald test results for the implementation stage**

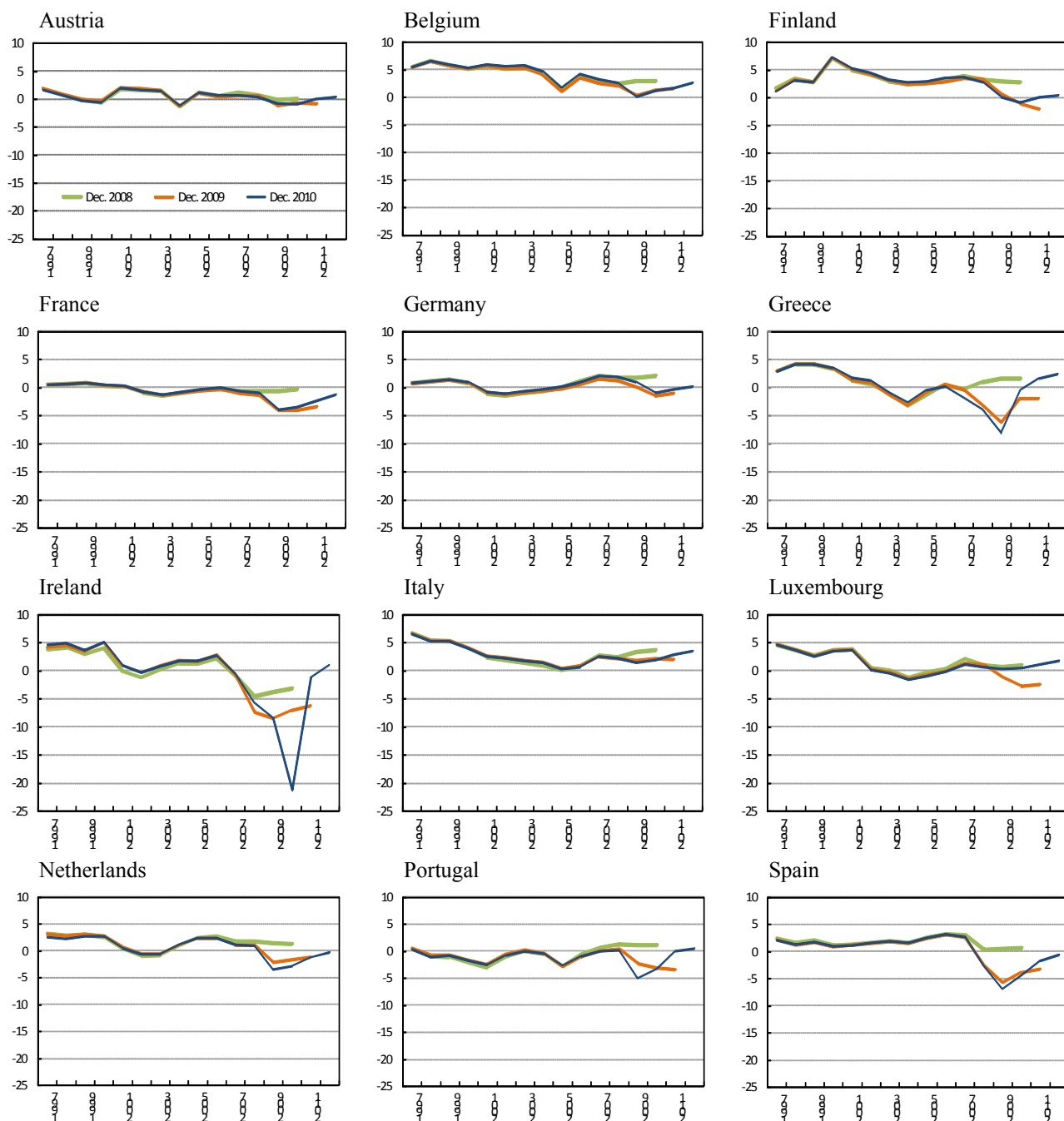
<b>Null Hypothesis</b>	
No change in base effect	F = 4.035 (0.047)
No change in budget process effect	F = 14.428 (0.000)
No change in cyclical effect	
output gap – based regression	F = 7.552 (0.007)
real GDP growth –based regression	F = 1.314 (0.254)
No change in total effects	
output gap –based regression	F = 8.976 (0.000)
real GDP growth –based regression	F = 4.924 (0.003)

p values in parentheses.

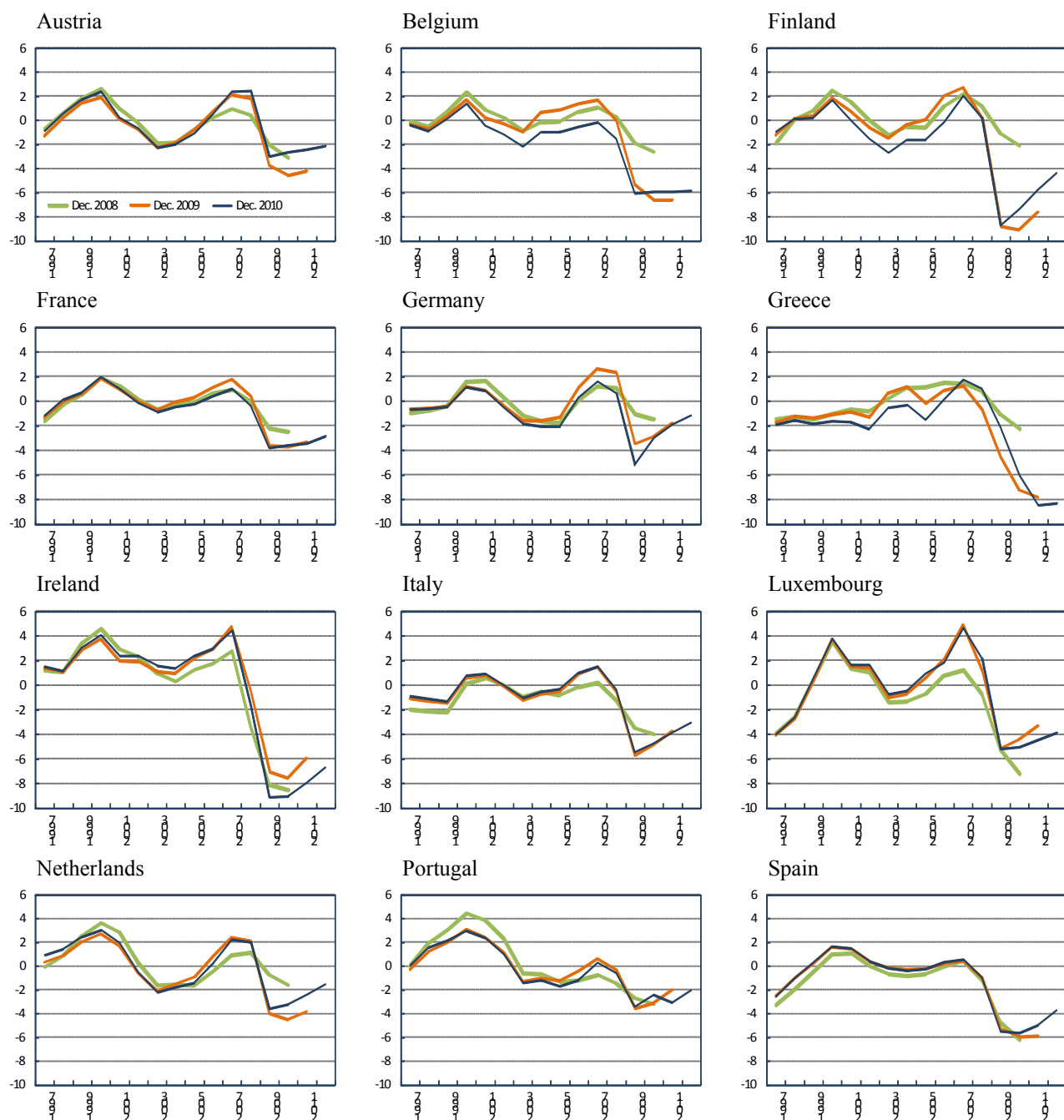
## Appendix 1

### Real time estimates of cyclically adjusted primary balances, output gaps and real GDP growths

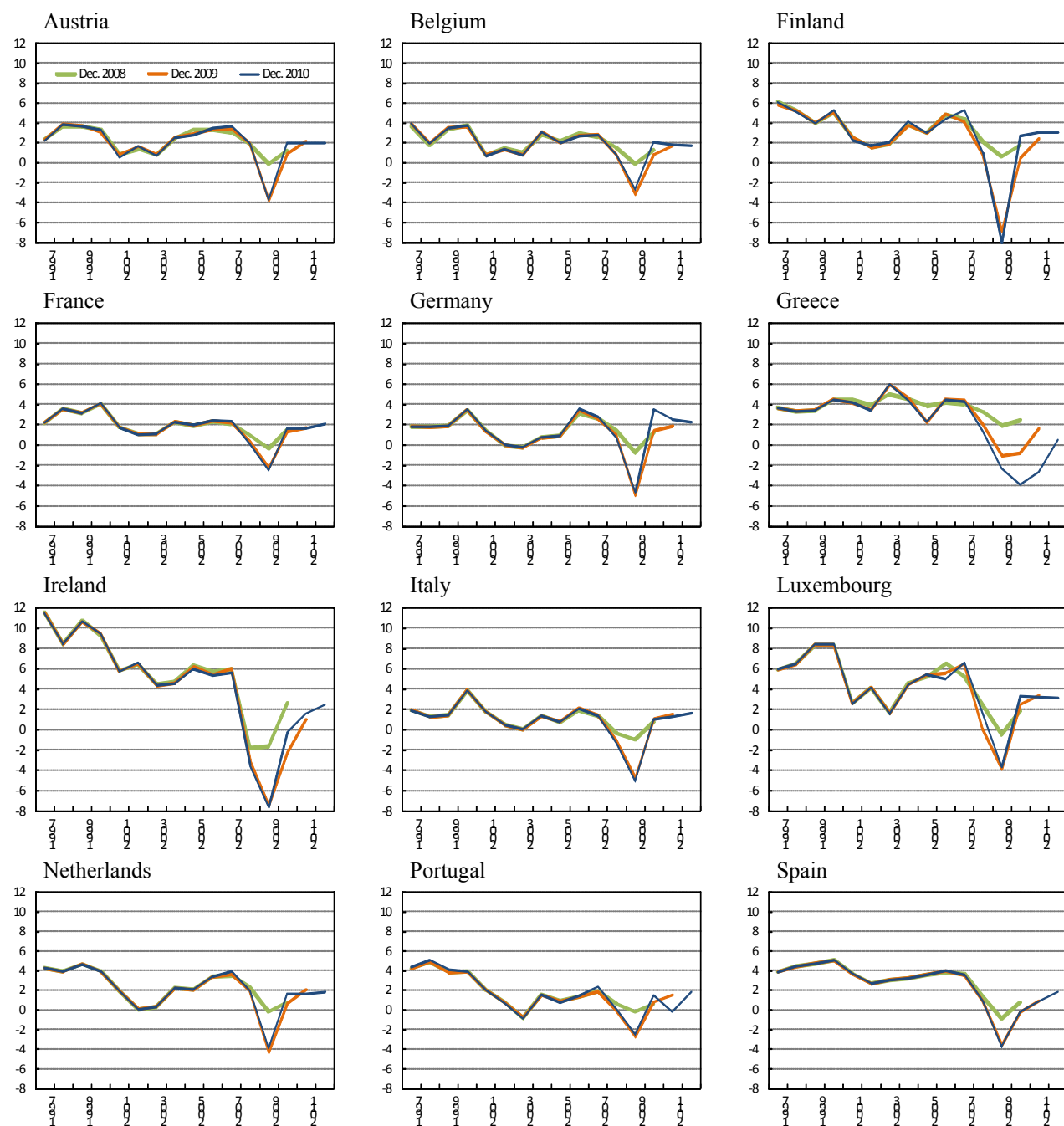
**Figure 1. Real time estimates of cyclically adjusted primary balances (made in December 2008, December 2009 and December 2010)**



**Figure 2. Real time estimates of output gaps (made in December 2008, December 2009 and December 2010)**

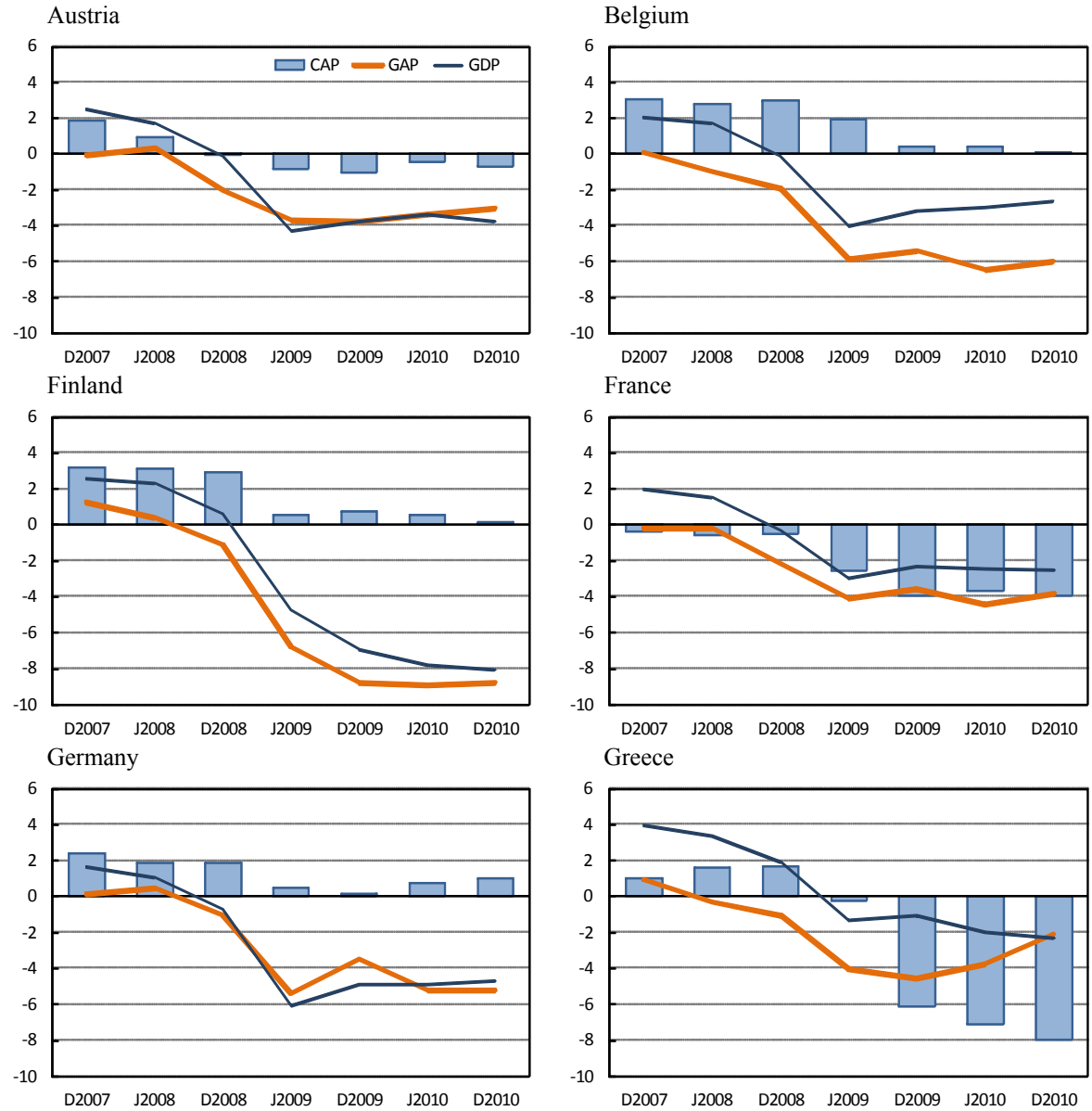


**Figure 3. Real time estimates of real GDP growths (made in December 2008, December 2009 and December 2010)**



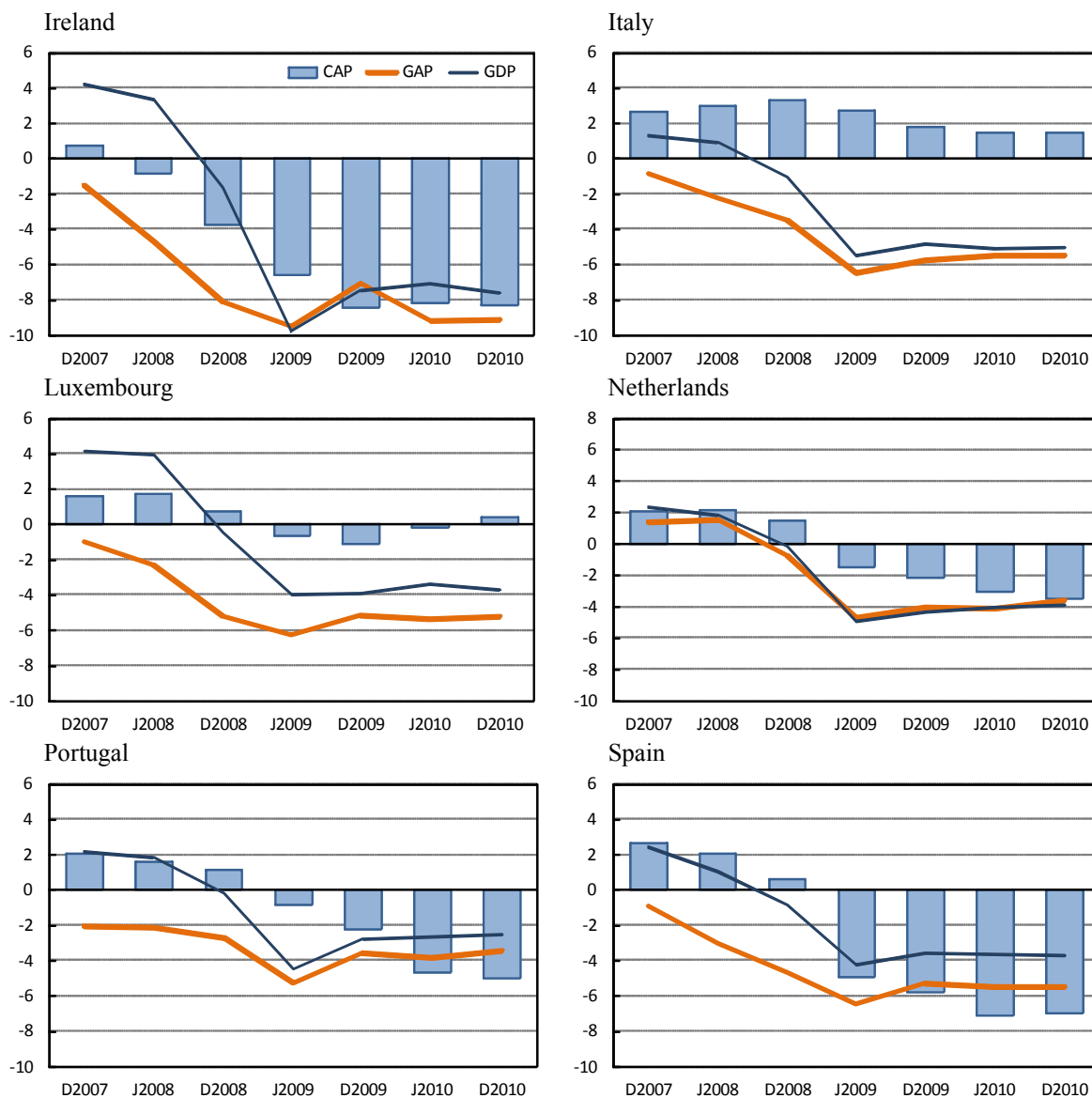
## Appendix 2

### Real time assessments for year 2009



Note: The first three observations are forecasts made in the end of 2007 (D2007) mid-2008 (J2008) and in the end of 2008 (D2008). Real time current-year estimates were published in June 2009 (J2009) and December 2009 (D2009). The last two observations are data revisions, made in June 2010 (J2010) and December 2010 (D2010).

## Appendix 2. Real time assessments for year 2009 (cont.)



Note: The first three observations are forecasts made in the end of 2007 (D2007) mid-2008 (J2008) and in the end of 2008 (D2008). Real time current-year estimates were published in June 2009 (J2009) and December 2009 (D2009). The last two observations are data revisions, made in June 2010 (J2010) and December 2010 (D2010).

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